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COAL

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CONTENTS.

It may be characteristic, but it certainly is not honest of the Denver *Mining Age* to deceive its readers by passing off its own statements as ours by putting them in quotation marks. If the *Age* has any answer to the facts we cited concerning the wisdom or folly of the adoption of free coinage of silver in this country, let it state them, and let it give its readers a chance also to state them by publishing our remarks in our own words without alteration. We will be pleased to reply.

THE London *Economist*, referring to the depression of business and the immense amount of idle gold accumulated in all the great business centers of the world and the remarkably low interest obtainable for money, says:

"Nor is it only here (London) that exceptional ease prevails. At all the chief monetary centers it is the same, and this gives rise to the reflection that there is something almost ludicrous in the convening of a conference to consider how silver may be utilized so as to make up for an alleged scarcity of gold, at a time when stocks of gold are accumulating on all hands. Of course, the dullness of trade and the deadness of speculation are the causes of this accumulation. But, then, the bimetallists have never been weary of asserting that trade depression is the result of a gold scarcity, and if their theory were correct, then the present superabundance of gold should be accompanied by great trade prosperity. Thus their theories are being disproved by facts at the very time when a conference is being called to endeavor to devise means by which these theories may be carried into practice."

THE combination milling process, or combined concentration and amalgamation has many advocates. Indeed it is the system universally employed in gold mills, but its application in silver mills is limited, although where it has been used it has been successful. It would seem, therefore, in face of the good results obtained at the Drumlummon mine of the Montana Company, Limited, that it would be possible for many mines now crushing dry and roasting the ore in various types of furnaces with salt, at a comparatively high cost, to abandon the process in use, crush wet, crushing a greater tonnage with the same power, concentrate the heavier minerals, ship these to a smelter and amalgamate the freer and escaping portion. The cost in the one case is frequently from $8 to $15 per ton, depending upon local condition, and in the other would probably be, on an average, $3.50 to $4 per ton.

THE interesting articles by Mr. AXEL SAHLIN on the magnetic separation of iron ores are concluded in this issue. Mr. SAHLIN gives much information which will be appreciated by those who intend to take part in the Plattsburgh meeting of the American Institute of Mining Engineers, as this subject, as well as methods of crushing, will be the principal topics discussed at that meeting. In view of the excellent results obtained at mines in this country, one of which, the Croton, the members will have an opportunity to visit, it is interesting to note that magnetic separators have been used, not alone to furnish a high grade product of magnetite, but to separate magnetite from other and more valuable ores, or from apatite and other minerals which injuriously affect the iron produced with the further metallurgical treatment of the ore.

It was quite successful, it is said, in separating magnetite from fine blende at Pubram, Bohemia, and it is also used in the South of Europe at present for this purpose. In Australia magnetic separation is used successfully for separating auriferous bismuth ores from magnetite. It seems possible, therefore, that magnetic separation has a wide field in the metallurgy of other ores than those of iron.

MINERS and prospectors returning from South Africa give but poor accounts of that country as a field for the independent miner unbacked by capital and having as a sole resource his knowledge and fortitude. They say that the regulations of the Transvaal are too onerous; not only does the Government demand a monthly payment for a license for prospecting but the owners of the farms demand an equal amount, 10 shillings monthly, for the privilege of prospecting on a strip of ground 150 ft. by 400 ft. To obtain a sufficient amount of ground to make prospecting even prospectively remunerative the expenses on account of licenses alone amount to $60 a month, and even then the miner has no guarantee that after discovery the ground will be his. Unlike this country he and his associates cannot locate contiguous ground in case of a strike, but this is taken up by large companies, which, aided by the governmental regulations regarding the selling of gold through its own channels, are fully advised of the value of the prospects. These regulations have prevented a rush to the new and promising Klein Letaba fields, better known as the Southerland Range. That this lack of a fostering policy is detrimental to the mining industry of that region there can be no doubt. Prospectors are not only the pioneers in any mining country but the back bone of it, and their interests should be advanced, not harassed and retarded by senseless or oppressive regulations.

THE LATE GEORGE ASMUS.

To many of the older members of the American Institute of Mining Engineers the name which stands at the head of this article will recall an accomplished engineer and quaintly delightful companion, whom they used to welcome with enthusiasm many years ago, but whom of late they have not seen, and will now see no more on earth. I do not know whether to rejoice or lament that my almost continuous official connection with the Institute of Mining Engineers, in one capacity or another, since its formation has made me acquainted with so many splendid fellows whose departure from this world, preceding my own, calls for funeral notices, growing ever more and more sorrowfully frequent, from my pen. The

circumstance emphasizes, in a sad, unmistakable way, my consciousness of growing age. My contemporaries and colleagues, one by one, are dropping off; the next generation is stepping forward to take their places; and I find myself more and more uttering reminiscences, narrating histories, and, alas! framing obituary notices of men who were young when I was young, and whom I had not yet learned to consider old.

Nevertheless, it is a satisfaction, if not wholly a pleasure, to place on record, as each friend departs, a tribute to his virtues, a partial record, at least, of his achievements, and an acknowledgment of the pleasure and profit which has accrued to one's personal experience through one's association with him. When I reflect how large a part of the riches, fullness, pleasure and power of life come through friends, and how much I owe in this respect to the friends gained through the Institute of Mining Engineers, it seems to me that hundreds of grateful obituary notices, were I spared to write them, would not suffice to state, still less to discharge the obligation.

This statement applies to few names ever borne on the roll of that society in higher degree than to that of GEORGE ASMUS, who ceased to be a member seven years ago, having returned for permanent residence to his native land, but who had been for thirteen years, almost from the organization of the institute, an active member, frequent in attendance at the meetings, an inexhaustible fountain of enthusiasm, activity and enjoyment, and a firm believer in the future success, and in the influence, at home and abroad, of the enterprise which he had helped to support through infancy and childhood. For three years, 1878 to 1880 inclusive, he was a member of the council. But, aside from any official or professional service, he was, so long as he remained among us, the very center and embodiment of fellowship. His tall form and intelligent, genial face were, in all our assemblies, like a standard around which comrades gathered, to realize their brotherhood under the influence of bewitching humor and wit without malice, which were merely the atmosphere conveying the fragrance of a boundless and inexhaustible good-will.

What I am able to tell of his professional career is meager—more meager than, in justice to him, it should be. I am quite sure that a man who displayed the accurate and varied professional knowledge and the wide range of culture beyond his profession which my friendly intercourse with ASMUS led me recognize in him, must have achieved many things besides those of which I happen to know. I do not remember that I ever heard him speak of his own performances; and when he *was* speaking, on whatever subject, no one was likely to ask him about anything else. And so it comes to pass that upon receiving the news of his death, I find myself more imperfectly informed of the bare facts, even of his life, than I would have imagined myself to be concerning one whom I had loved so heartily, and felt as if I knew so well. What little I can tell, I here set down.

GEORGE ASMUS was born at Giessen, Germany, in 1830. After studying at the ancient university of Freiburg, in the Breisgau, south of Baden, he went to the famous Royal Mining Academy, at Freiberg, in Saxony, for his professional education as a mining engineer. He subsequently practiced his profession at various places in Germany, but in 1862, when still comparatively a young man, he came to the United States, and found his way to the Lake Superior copper regions. Here he introduced the modern Harz jigs with continuous discharge, and other improved concentrating machinery, fairly earning for himself the credit of being one of the pioneers at Lake Superior of that scientific concentration which has since been brought in that region to such a high degree of perfection. He was also for some time the manager of one of the mining companies near Houghton.

About 1867 he took up his residence in New York and became the agent for the United States of the "Lürmann closed front" for blast furnaces. The combination of intelligence, skill, good nature and indomitable pertinacity with which he at first urged the merits of this invention upon American iron masters, and afterward enforced the rights of the patentee against infringements and evasions, resulted in victory, both technical and commercial. It was in October, 1875, that he read at Cleveland a paper on "Furnace Hearths"—the only formal paper, I believe which he ever contributed to the *Transactions* of the Institute—in which the advantages of the Lürmann closed front were explained. Nobody doubts those advantages now, and I fancy that those who were present at the Cleveland meeting of 1875 have a more vivid recollection of the brilliant speech and repartees of ASMUS at the banquet than they have of his paper.

He was a shining example of the advantage, even to a specialist, of a wide and liberal culture. It radiated from him; it lent him marvelous influence, and it commanded the admiration and confidence of strangers before specific proofs of technical knowledge had been given to them. His reading had evidently been very extensive. Somewhere in the back numbers of the ENGINEERING AND MINING JOURNAL there is an article or rather, I think, a series of articles from his pen on the alchemists, evincing great familiarity with that recondite literature. He published several graceful or humorous books of travel, etc., wrote German poetry of no mean order, and was a master of sketching in pen-and-ink. All these accomplishments, subservient to an unfailing temper of kindness and sympathy, and an endless flow of quaint humor, made him irresistibly attractive to old and young of either sex. We all loved him, like children; and children all loved him, as we did.

He died May 31, 1892, in his native land, whither he returned eight or nine years ago. I am told that he had long been an invalid, suffering from some progressive and incurable disease of the heart. Doubtless death came as a welcome release to him. To me, and many others, his departure, while it saddens us, awakens afresh the feeling of gratitude that he lived, and that it was our privilege to know him. R. W. R.

BOOKS RECEIVED.

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

Experiments with Alternate Currents of High Potential and High Frequency. By Nikolo Tesla. Published by the W. J. Johnston Co. Limited. Pages 146. Price, $1.00. Illustrated.

CORRESPONDENCE.

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

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Will you have the goodness to ask the following questions of your readers.

Are the water jackets furnaces used for smelting galenas or copper ores suitable for reducing tin ore, and producing tin bars?

What are the results of the oil fed tin ore furnaces of San Jacinto, referred to in your papers of March, September and December last year?

Is gaseous fuel used for the same purpose?

LA PAZ, BOLIVIA, May, 1892. A TIN MINE PROPRIETOR.

Faulting in Veins.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of the 18th inst., Mr. E. B. Wilson makes it appear that "What does vein-material show that proves movement in the walls enclosing it?" were the words of Prof. Church in stating his "conundrum," whereas it was *I* who put the question in that way (see your issue May 14th, 1892), believing that that was what Prof. Church implied in his letter of April 30th.

Permit me also to say to Mr. Wilson that I merely quoted a case of fault or vein-material between the two walls of a large fault of dislocation in *stratified beds*, because it was one that had come directly within my own knowledge, and I mentioned it in case it might be considered applicable in this connection. Mr. Wilson evidently fails to understand my illustrated description of the fault in England, or he would not have made the remark or suggestion he has done as to "water undermining the strata," etc. W. S. GRESLEY.

ERIE, Pa., June 21, 1892.

Cost of Drying and Roasting at the Holden Mill, Aspen.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In a late issue of your paper Mr. Stetefeldt gives figures on cost of *roasting* and *drying* ore at our lixiviation works, at this point, using producer gas as fuel. The figures he quotes are correct except that the cost was for *roasting* alone, not *roasting* and *drying*.

Thinking the complete figures may be of interest, I give you below details on run of 12,000 tons dry ore. Gross weight, ore, 26,371,008 lbs.; dry weight, ore, 24,585,234 lbs.; moisture 6·77%. Coal used: For drying, 1,289,000 lbs.; for roasting, 1,446,000 lbs.; total, 2,735,000 lbs.: cost at $3.00 per ton, $4,102.50. Cost per ton dry ore: Drying, 104.86 lbs.; coal cost, $0.15729, roasting 117.63 lbs. coal, cost, $0.17644; total, 222.49 lbs.; coal cost. .33373.

In addition to drying the ore the coal charged to drying was also used to dry 3,038,370 lbs. of salt, costing about the same to dry as the ore, although containing much less moisture, under 2%.

The plant for producing gas consists of two Taylor revolving bottom gas producers; one 6 ft. and one 7 ft. in diameter, and was built by R. D. Wood & Co., Philadelphia.

ASPEN, Colo., June 16th, 1892. WILLARD S. MORSE, General Manager.

Refuse in Anthracite Coal Beds.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of June 4th Mr. W. S. Gresley asks the meaning of the word *Refuse* as used in my article upon the above subject, published in ENGINEERING AND MINING JOURNAL of May 7th.

By "refuse" I mean all material that is not pure coal (*e. g.*, slate, rock, bone, sulphur), naturally occurring in the bed as it exists in place before mining, and I do not include the *waste* caused by mining and preparing the coal.

In answer to question, "What constitutes a coal bed?" I may say that my figures referred not merely to the portion of the bed mined, but to the total thickness.

As to whether the anthracite beds are of any earlier origin than the bituminous coals of Pennsylvania I must say that I have never seen anything published which was intended to be *direct evidence* one way or the other upon this point. These coals are of the same origin and belong to the same geological age.

But Dana, Lesqueur, Lesley, and other leading geologists say that there are grounds for the belief that this anthracite or eastern portion was the first formed. (See "Manual of Geology," J. D. Dana, 1875; "Origin of Coal," Lesquereux, Annual Report, 1884, Geol. Survey of Pa., and "Appalachian Sea," Final Report Geol. Survey, Pa., Part I., J. P. Lesley, 1802).

I may add that my experience and observations in connection with the geology of the coals of Pensylvania tends to the belief that the above conclusions will prove to be largely in accord with the present facts and conditions as far as known. WM. GRIFFITH.

SCRANTON, Pa., June 13th, 1892.

What Next for Silver?

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have been interested in the correspondence "What Next for Silver?" and I am, with many others, of opinion that something will have to be done in this question before many years are over. I take the two principal objections against bimetallism to be: 1. That the general commodities cannot be measured by two standards. 2. That even if a ratio of the value between the two metals is fixed it cannot be maintained. Now these two objections would, in my opinion, fall to the ground if every one could be made to pay for the value of all merchandise half in silver and half in gold (according to a fixed ratio between the value of the two metals). We would then also find at once employment for the greater part of all the silver. The production of gold was during 1887–1890 = 683,747 kilos. and an equal value of silver at a ratio, of say, 1·16 would mean 10,939,952 (out of 14,228,629 kilos.) silver produced during this time.

The question now would be: Can every one be made to pay for everything half in silver and half in gold? Although this seems almost impossible, it could be done by making an international standard of a mixture of $\frac{1}{17}$ gold and $\frac{16}{17}$ silver with free coinage thereof. No other coin (except the small coin) ought to circulate, and bankers ought only to be allowed to keep the reserve in this standard metal.

The consumption of silver for coinage being limited to the production of gold and vica versa, the production of the two metals would soon regulate itself.

In speaking of a ratio of 1:16 and standard mixture $\frac{1}{17}$ gold and $\frac{17}{17}$ silver, I did not mean to defend this ratio, but only used it for argument sake. I am sir, yours faithfully,

LONDON, June 10, 1892. JULIUS MATTON.

Build a Dike Around the Petroleum Tanks.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your correspondent, W. S. C., is right about the necessity of doing something with the petroleum tanks to prevent a repetition of such calamities as the one that has taken place at Titusville and Oil City; but owners of tanks, and engineers as well, will be likely to consider whether there is not some other way to insure the safety of our rivers and cities from floods of blazing petroleum which will not involve the enormous expense of burying the tanks, and the liability of the tank to external corrosion when buried, and to collapse from external pressure when empty. Suppose each tank to be surrounded by a dyke one quarter of its own height, the dike inclosing an area equal to four times the area of the base of the tank. If the tank, when full of oil, should burst, the dike would retain the oil and prevent the occurrence of a flood. Where there is a group of tanks, the dike would cost vastly less than the burial of the tanks.

Suppose, for instance, there is a group of 16 tanks, arranged in the form of a square, each tank being 100 ft. diameter and 40 ft. high. The area of each tank being 7,854 sq. ft., or that of the 16 tanks 125,664 sq. ft., they should be inclosed in a plot of ground of four times that area, or 502,656 sq. ft., that is, 709 ft. sq. This would give a space 177¼ ft. sq. for for each tank. The dike would be four times 709 ft long, plus corners, say 3,000 ft. long. If made 10 ft. high, 10 ft. wide on top and with a slope of 1½ to 1, its sectional area would be 250 sq. ft. and its cubical contents 750,000 cu. ft. The amount of earth to be removed to bury the tanks would be 125,664 × 40 ft. deep = 5,026,560 cu. ft., or nearly seven times as much as there is in the dike, to say nothing of the removal of additional earth on a slope outside of the diameter of the tank, to prevent the caving in of the well, or of sheet piling or other methods of supporting the inside of the well.

In many cases, as in the oil regions, tanks are built on ground naturally depressed or in valleys. In such cases the dikes might need to be built only on two or three sides of the rectangular plot of ground. W. K.

The Elizabethton Town Company.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Mr. Pechin, by his condemnation of the Co-Operative Town Company, of Elizabethton, Tenn., deserves the thanks of every one interested in the legitimate industrial growth of the South.

Aside from Mr. Pechin's dissection of the company's financial plan, the misleading statements in the prospectus are sufficient to condemn the scheme in the eyes of any one familiar with the region.

The statement that the company owns "iron, manganese, granite and timber lands" is untrue, as the company has merely options on other lands than their town site. The repetition of such phrases as "mountains of solid iron ore, magnetics, specular, hematite, and limonite," and as "lead, zinc, copper, mica and corundum in inexhaustible quantities," savors too much of the late "busted" boom to be pleasant. That "indications of coal have been discovered in the Holston Mountain a mile and a half north of town" is of intense (?) scientific interest, the mountain being of Potsdam sandstone, and, geologically, about two miles vertically below the coal measures. That "Birmingham gets most of its best steel-making ore" from Cranberry will no doubt be news at both Birmingham and Cranberry. And the further statement that the Cranberry mines are "but two miles away," instead of twenty-three, would have been passed over as a misprint but for the astonishing nature of the other statements. From an agricultural point of view, the statement that "a hundred and twenty bushels to the acre is not an uncommon yield" of corn will be equally astonishing.

This is not the sort of stuff that is wanted in the South now. Clear cut accurate statements of the resources of the Watauga Valley are sufficiently interesting without any "fairy tales."

It is to be hoped by all believers in the industrial future of this region that the new boom will have a short career and as painless a death (to the stockholders) as possible.

It is a pity that the prominent backers and directors of the Co-Operative Town Company had not applied their energies to the development of this rich section in a more legitimate way than town booming with its resultant crop of disgruntled stock and lot holders to cry down the New South.

Yours truly, FRANKLIN BACHE.

ABINGTON, VA., June 18th, 1802.

How Gold Goes Above Par.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The "childlike and Bland" advocates of free silver coinage have created the impression that gold would not be forced to a premium, in case a free silver bill should be enacted, unless foreign silver were sent to this country to be exchanged for gold, and they have taken special pains to explain the reasons why foreign *coined* silver (the stock of foreign "uncoined" being of no consequence) could not be sent here to be exchanged for gold at a profit.

Hence it may be worth while to show why gold may go above par even without a dollar's worth of foreign silver being sent here, and without any additional silver legislation taking place. It is merely a question of keeping up the issue of silver certificates a little while longer at its present rate, and thereby continuing to inflate all values until foreign investors cannot resist the temptation of realizing on their holdings to such an extent as to create, possibly, a sudden demand for the export of a hundred millions of gold or thereabouts.

That is the great financial danger confronting us at the present time.

Supposing that such an unexpected demand should set in, and that in consequence thereof gold should sell at 101, what would be the result? The first ones to take alarm would be those who owe bills for merchandise, payable in gold, which means, practically, everybody who buys imported goods out of first hands from the foreign commission merchant or importer.

This class of debtors owe, for 30 day bills and bills dated ahead, probably always in the neighborhood of $200,000,000, and this amount would have to be secured from brokers or speculators as soon as the banks refused to pay out gold in return for mixed deposits. Gold once above par, our whole exchanges, say 2,000,000,000 of exports and imports, now almost insensibly cleared by the usual monetary institutions, would pass through the hands of the gold brokers, leaving, at the rate of ½% commission, $2,500,000 per annum sticking to their fingers; enough to give 500 of them a living of $5,000 a year, allowing that the charges for "carrying" and "borrowing" will pay the office expenses.

But gold speculation once let loose, the speculative traffic may become ten times as large as the legitimate demand, and for whose benefit?

Who are the real gold bugs, Mr. Editor? Was it the thief crying "Stop thief!" who gave that name to those who want to maintain an honest currency? WASTE BASKET.

NEW YORK, June 22, 1892.

Casper Mountain Asbestos.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As there are no asbestos producing mines in the United States as compared with the Canadian fields, I will try and tell your readers something interesting about the young asbestos mines in Casper Mountain. The first find of asbestos made in this vicinity was made by Charles Jones, a sheep herder, about one year ago, on the top of Casper Mountain. Jones was trailing a large band of sheep across the mountain, and in rounding a butte he noticed that the sheep with their hoofs tore up something that looked like wool as they crossed a dyke of grayish-looking rock, and upon investigation he found it was some kind of a mineral. It was some time before he found out what it was, and upon learning its commercial value resigned his job and went to locating claims. Others followed Jones, and the nucleus of the present camp was formed and has steadily forced itself into recognition from that time.

The asbestos is found on the mountain in a dyke of serpentine rock extending from the western part of the mountain to the eastern part. The dyke of serpentine is about 25 ft. thick, and the asbestos is found in the middle in kind of soft serpentine rock about 3 ft. wide and pitches to the north about 48°. The quality of the asbestos found here is excellent, and the fiber is from 1 to 2 in. long at the cropping in the dyke; it is only sometimes a foot wide and in a short distance will belly out, and be 4 ft. wide, and then scatter out in countless veins, perhaps coming together in another belly 10 or 20 ft. below, giving the asbestos, when the rock is stripped away, much the appearance of an animal hide spread on the side of a house. It would kind of look that at some time there had been but one serpentine wall, and nature had come at long and posted hides at intervals the length of the serpentine dyke, and then connected them all together with small necks, and then increased the hides with a layer of serpentine rock.

In other parts of the mountain asbestos is found in clay deposits, and in some parts with iron ores. The asbestos here is sometimes three feet long, seeming to have attained a greater length of fiber in closer proximity to iron than when nearer any other mineral. This kind of asbestos seems to have no commercial value.

The reader will notice that the viens on Casper Mountain are perpendicular, while in the Canadian mines they are blanket veins, and are worked by open cuts, much after the style of working an ordinary stone quarry.

The serpentine dyke on Casper Mountain, where the best asbestos is found, about 12 miles long and the asbestos is of varying quality throughout that length; as yet no shipment has been made to market, but in the next 60 days John McConner & Co., of Pittsburg, Pa., intend to make a shipment to their factory in Pittsburg. A. T. BUTLER.

LARMINE, June, 1892.

Gold Fields of Thibet.—Russian exploration in Thibet reveals that on the northern slopes of Kuen Lun exist extensive gold fields, rumors as to the wealth of which penetrated Russia as far back as the seventeenth century. The extent of these fields, which are worked by natives, comprise about 90 square versts, but in reality their extent must be far greater. The natives at present extract the gold by two methods: by washing, and also by winnowing, without the aid of water. The outcome by the latter means is improportionate, although this is the system chiefly in vogue. The proportion of gold varies in different parts of Kuen Lun.

MAGNETIC SEPARATION OF IRON ORE.—III.

Written for the Engineering and Mining Journal by Axel Sahlin.

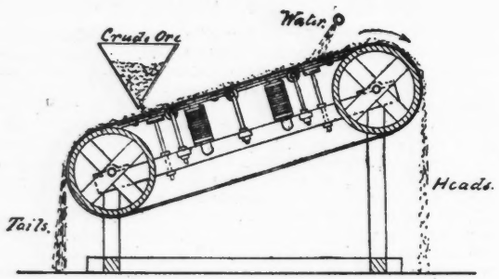
(*Concluded from Page 638.*)

PART 3—METHODS OF SEPARATION.

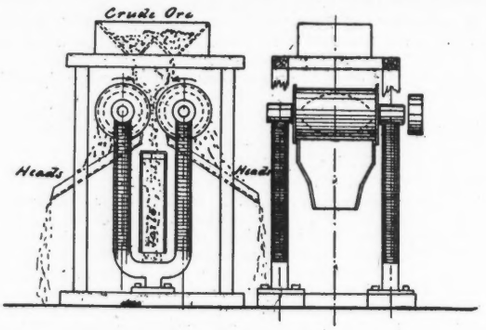
The want of a practical magnetic separator, and the general interest taken in this class of machinery, is best shown by the number of United States patents granted for separating devices, numbering 164 to date. Many of these are of no interest.

The Conkling Separator is one of the oldest machines in use, and has done a considerable amount of satisfactory work at the Tilly Foster mine and other places in New York State. It consists of an inclined endless belt, the upper part of which travels upward. Under this part of the belt are placed electro-magnets of alternate polarity. The crude ore is delivered on the lower end of the belt, up which it travels met by a flow of water, which washes the tailings downward, while the concentrates ascend and are delivered in a suitable hopper at the top of the belt. While exceedingly simple and easily handled this separator could hardly be used to advantage when treating ores containing a high percentage of semi-magnetic minerals. The machine is shown by Fig. 13. Many modifications more or less important have been made in the arrangement of the belt, provisions of scrapers and guides, etc.

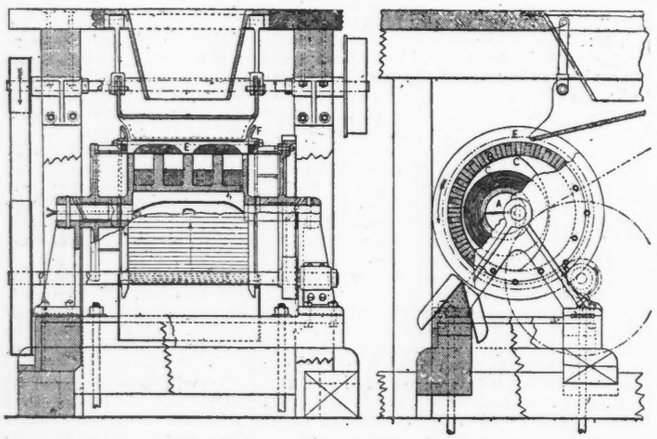
At Chateaugay, N. Y., a plant consisting of 16 Conkling separators, placed tandem in sections of four, has recently been completed. It is intended to rehandle the tailings from the water jigging plant at the same place, which tailings have for years been accumulating. They contain rom, say, 12 to 20% of iron and ought to make an excellent raw material for separation, as they are already crushed to five mesh, and only need to be passed through one pair of rolls to be ready for magnetic separation. It is stated that this plant has handled 750 tons of material in 24 hours.



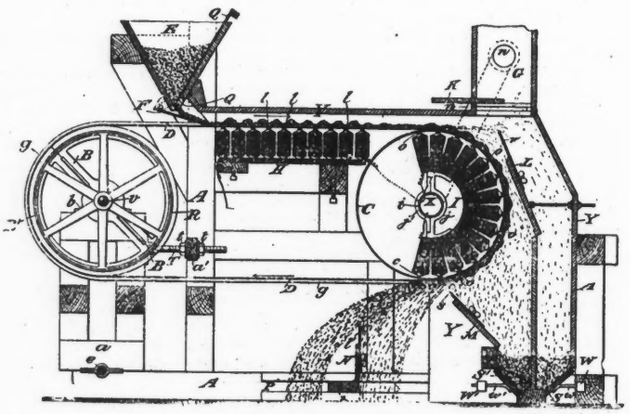
CONKLING SEPARTOR.



BUCHANAN SEPARATOR.



WENSTROM SEPARATOR.



HOFFMAM SEPARATOR.

The Buchanan Separator was originally used for separating the magnetic sands found in abundance on the shores of the Long Island Sound, on the coast of California, on the lower St. Lawrence River and in other localities. It has later been introduced for the separation of ore at Port Henry, N. Y., and at Port Oram, N. J. The machine consists of two cast iron rolls, supported by electromagnets, which form the journal boxes in which the rolls rotate. By this arrangement the rolls become the poles of the horseshoe magnet, and the lines of force concentrate on the side where the rolls approach each other. The ore being run in a thin stream between these rolls, which are about 2 in. distant from one another, the magnetic particles attach themselves to the face of the rolls, while the tailings continue on their perpendicular course. As the rolls revolve the magnetic field at the point where a particular bunch of concentrates attached themselves continues to get weaker until, when the roll has turned 180 degrees, the concentrates have been thrown off by the centrifugal force and collected in suitable receptacles. At Port Oram, where this separator in its latest form has recently been installed, two separators are placed one above the other. No provision is made for the making and subsequent treatment of middlings.

The Edison Separator, or rather separators, are, from a technical point of view, doing most excellent work on the lean ore at Ogden, N. J. The ore is reduced by crushers and rolls to 16 mesh; elevated and fed in a thin but wide stream in front of a ponderous electromagnet, formed of a heavy "I"-shaped bar of cast iron about 7 ft. long, 16 ins. wide and 9 ins. thick, wound with heavy insulated copper wire, and suitably supported. The stream of ore is so adjusted with reference to the magnetic field that the magnetic particles are deflected from their course without coming in contact with the magnet, while the non-magnetic material is under influence of gravitation only. A diaphragm is so adjusted below the separator as to send the magnetic and the non-magnetic particles into different receptacles. By this simple machine, it is stated, that concentrates containing from 50 to 54% of iron are obtained, leaving only from 1 to 1½% of iron in the tails. The concentrates thus obtained are now again reduced by means of rolls and screens to the fineness of 53 mesh, and treated on a second separator, Fig. 14, of an entirely different construction.

An endless belt 7 ft. wide travels over two pulleys placed vertically one above the other. Behind the part of belt running upward are placed in staggered order a number of powerful electromagnets of alternate popularity. Along one edge of the belt are riveted at intervals metal buckets for receiving the concentrates. Conveyor belts carry the ore to and from the separators. When the crude ore is delivered at the edge of the belt near the metal buckets the magnetite is attracted by the nearest magnets located behind the belt. The belt traveling upward tends always to bring the concentrates over new magnets of opposite polarity, causing them to turn somersaults.

When a certain bunch of concentrates are opposite the north pole they become magnetized and all the south poles are attracted while the north poles are repelled. The concentrates in consequtnce will stand out from the belt in brush like tufts. Friction prevents them from slipping on the surface of the belt, and when this has moved within the field of the adjacent south pole, the north poles of the concentrates previously repelled will be attracted, and the brush will lay flat down on the belt. Soon they will pass out of the field of the first mentioned north pole, and the south poles of the concentrates previously attracted by said north pole magnet will be repelled by the south pole magnets which they are approaching. Consequently the concentrates will again form a brush, but this time with the other end of the "bristles" next to the belt.

When the concentrates in this way have travelled across the wide belt and back again to the edge from which they started they are most effectively cleaned from all non-magnetic particles and fall into the buckets, whence they are deposited on the delivery belt ready for shipment. The concentrates produced are very pure. They contain often as high as 70% of iron, while the tailings do not analyze 2%. Mr. Edison avoids the handling of middlings by excessively fine crushing. The result from this method is in his particular case most effective, but it cannot be cheap, and the dust created is a serious inconvenience. An Edison separating plant requires a great deal of room, and is expensive. In its present form it may therefore hardly find extensive employment except in the case of very large mines.

The Wenstrom Machine is remarkable for its solidity of construction, and is therefore very suitable for separating metals from sand and slag in steel and iron works, for which purpose it has also been adopted in several places. It is also used for separating and cobbling iron ore at a number of mines, as well in America as in Sweden. It consists of a drum, the face of which is formed of insulated iron bars, extending from one end of the drum to the other. Inside of these rotating bars is placed a strong permanent magnet with segment shape pole pieces, fitting the inner circle of the case of the drum. The inner side of the bar is alternately cut away, so that only every other bar comes in contact with same pole piece when the drum revolves around the magnet. While passing over the segment shaped pole each bar thus receives an opposite

magnetism to that of its neighbor. The bars are magnetized only when in contact with the pole pieces. The ore is fed by a shaking feed tray over top of the drum, and the magnetite is at once attracted by the magnetized bars. When these have passed out of the zone of contact the concentrates detach themselves and fall into a suitable hopper. The tailings are almost immediately thrown from the drum by the centrifugal force. As will be understood, the concentrates are firmly held against the face of the drum as long as within the magnetic field. When once attached the concentrates make no somersaults, nor is there any provision made for handling semi-magnetic materials. It is stated that a barrel 27 in. in diameter, 24 in. wide, will handle five tons of crude ore per hour.

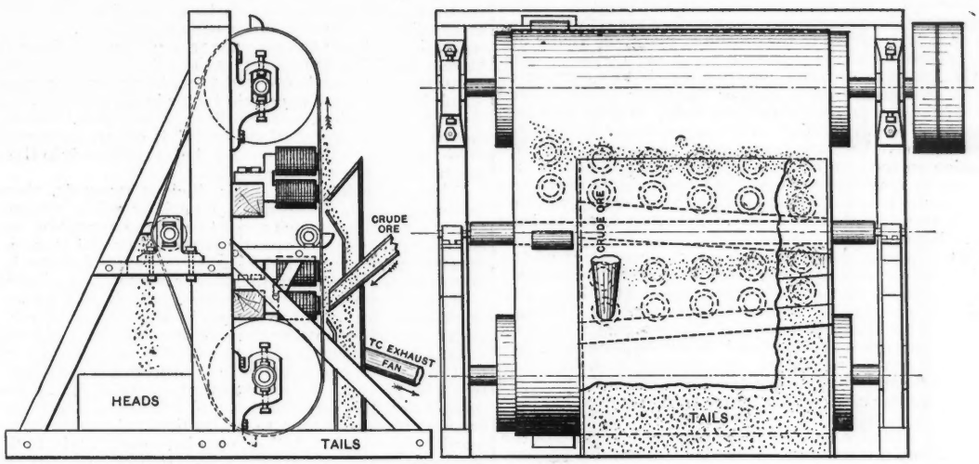
The Ball-Norton Separator consists of two drums of paper pulp, generally built 24 in. in diameter, 24 in. wide, placed tandem in a tightly closed box. Inside of each revolving drum is placed a sector holding a number of stationary electro-magnets of alternate polarity, and extending the whole width of the drum. The angle of the sector is about 120°. Guide plates or aprons, over which the ore is distributed, are placed under each drum opposite the magnets. The wooden box has three hoppers, for concentrates, middlings and tails respectively. A strong air current traveling in opposite direction to that of the concentrates is maintained by a large exhaust fan. This air current is intended to remove the dust and clean the concentrates. The drums revolve as indicated in drawing. The crude ore is fed in a regular stream from the feed hopper, falling on top of the first apron, from which the tailings are dropped into the first hopper, while concentrates and middlings are carried along by the drum until outside the magnetic field. They are then thrown by centrifugal force over the second apron on to the second drum, where they either by weaker magnetic field or by greater rapidity of motion are separated and deposited in their respective hoppers. The middlings are again crushed and returned to the separator, finally to be divided up among the heads and tails.

The Ball-Norton machine has a capacity of 15 to 20 tons per hour of crude ore. It is an effective machine, and for a dry separator does very good work. The wear on drums is said not to be excessive. When the paper drums periodically are worn out they can be replaced at a moderate cost. These separators have been on the market for upward of three years, and are working in a number of places. The largest plant fitted with this machine is that at the Benson mines in Northern New York, where as high as 312 tons of concentrates are reported to have been produced in 24 hours.

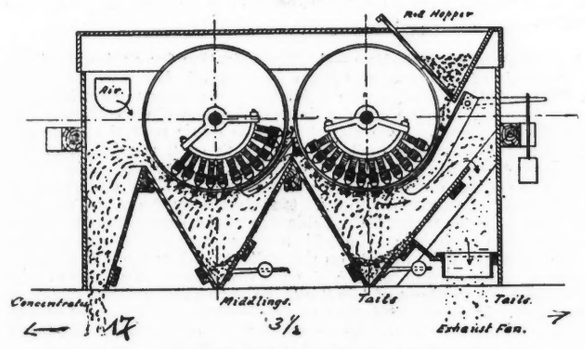
A modification of the Ball-Norton machine is the Hoffman separator, Fig. 17, which was invented and employed at the Croton mine, N. Y.

The Hoffman machine consists of a Ball-Norton drum, over which runs an endless belt to a driven pulley. To extend the magnetic field, and to arrange the crude ore for separation on the drum, a number of magnets are placed between the belts as shown by figure. When the crude ore drops from the feed hopper it is at once acted on by the poles placed below the carrying part of the belt. A tumbling action like the one previously described in the Edison machine takes place, causing the magnetic particles to place themselves nearest the belts, while the gangue remains on top of the crude ore, whence it is readily thrown off by the centrifugal action of the revolving drum. When the belt again leaves the lower portion of the drum the concentrates and middlings are thrown with a certain force and describe trajectories determined by the mass, specific gravity and magnetic affinity of the different particles. An adjustible diaphragm is supposed to be placed so as to separate the middlings, which have a short trajectory from the heads which describe a longer such.

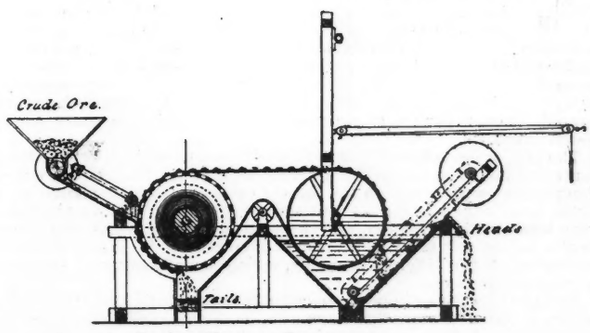
The Lovett-Finney Separator is doing good work at the Weldon mines, N. J. As originally built it possesses, though a wet machine, many features in common with the Wenstrom separator. It consists of a revolving barrel, the face of which is made up of insulated bars of alternate polarity. The head and shaft of the drum form the rotating electro-magnet. The space between the end discs being wound with insulated copper wire, one head will thus form the north pole, the other the south pole of the magnet. The bars forming the face of the barrel are alternately attached to the north and south pole heads, and receive corresponding polarity. To detach the concentrates from the permanently magnetic drum, the latter is covered by an endless canvas belt, which travels over a driven pulley, running partly submerged in water. The crude ore is washed by a flow of water down the face of an adjustable rifle board, placed below the separator. The magnetic particles are picked up by the drum, while the descending water effectively frees them from non-magnetic gangue as they are carried over the top of the barrel, and thence into the sluice-box, in which the driven pulley is running. As soon as the belt touches the water the concentrates drop to the bottom of the tank, where they are picked up by an elevator and placed direct of the cars ready for shipment.



EDISON SEPARATOR.



BALL-NORTON SEPARATOR.



LOVETT-FINNEY SEPARATOR.

At Weldon two Lovett separators are placed tandem. The first wheel is weakly magnetic, and separates only the purely magnetic concentrates. The tails from the first wheel are treated by a second wheel, the magnetism of which can be adjusted so as to pick up just such a percentage of the semi-magnetic materials as is found to be commercially advantageous. These middlings are mixed with the concentrates, or they may again be crushed and thoroughly separated. The separation under water, gives a very clean concentrate, and partly compensates for the defect which the machine as originally designed has in common with the Wenstrom separator, in not turning the concentrates over as they pass over the barrel.

The ore at Weldon analyzes about 30% Fe. and about 0.75% P., the latter in form of apatite. It is crushed to eight mesh, and yields concentrate which has averaged 67.1% Fe. and about 0.07% to 0.15%P. If finer crushing had been employed the P. would undoubtedly have been brought below the Bessemer limit. The tailings have averaged 8.5% Fe.

This separating plant has been a technical and commercial success from the day it was put in. Renewals during 14 months of actual operation have amounted to one new canvas belt and one suite of screen plates. The plant will handle eight tons of ore per hour. The concentrates very quickly free themselves from water. Only about 6% moisture remains in the ore when shipped.

The Chase Separator is a new machine recently placed on the market

by the International Ore Separating Company of New York. This machine has been adopted at the Arnold Mines, N. Y. The machine, which is shown in the cut, possesses many of the advantages prominent in the best of the older separators. At the same time it is exceedingly simple and cheap. It is constructed to be operated either wet or dry. It consists of a wooden box, enclosed in which revolve three cylindrical, spirally wound electro magnetic wheels, *A*, *B* and *C*, only a few inches in diameter. Suspended between the magnets *A* and *B* is a box containing a stationary, patented electro magnet, with the consequent poles extending the whole width of the machine. Over the magnetic wheels *A* and *B*, a driving roll, *D*, and a tightener, *E*, travels an endless cotton belt. Over the wheel *C* and a driven roller *F* runs another endless belt, the purpose of which is to remove the concentrates which are picked off from the main belt by the magnet *C*. The ore is fed in a broad and even stream on the upper part of the belt. When it reaches the magnet *A* the concentrates are formed into brushes, which closely clasp the rotating wheel, while the purely non-magnetic gangue is thrown off by centrifugal force. As the belt reaches the underside of the stationary magnet the concentrates are submitted to the tumbling and rotative action previously described in the Edison and Ball-Norton machines, and gradually free themselves from the various degrees of semi-magnetic particles and dust until they finally in pure state reach the wheel *B*, from which they after turning an angle of 90° are carried upward until they come under the influence of the wheel *C*, which delivers them on the belt *CF*, as above described. The middlings and dust fall from the underside of the belt into adjustable receptacles, whence they are either passed over a special pair of rolls, returned to the crushing plant, or finally disposed of in the tails, according to the requirements of each separate case. During the separation, the concentrates are met by either a current of air or a stream of water, issuing from a wind or sprinkler box *P*, placed near the wheel *B*. If the wet process is used the water is kept at a constant level, and drawn off by an overflow at the opposite end of the separator. Excellent results have been attained by this machine, which has also attracted attention on account of its simplicity, cheapness and the durability of all working machinery, the cotton belts being the only parts which periodically require renewal; but these belts are exceedingly cheap, and, thanks to the protecting influence of the water, they have, at least when working wet, a life of several months.

Objections have often been raised to wet separation, on account of the concentrates freezing during cold weather. At Weldon the experience has been that very little water remains after the concentrates have been loaded on cars, and that when the ore freezes it crumbles. At Chateaugay it is usual to scatter salt over the bottom of the ore cars to prevent the ore from sticking. But granted even that it would be necessary, during three months in the year to dry the concentrates, this operation would, however, prove cheaper than to dry the whole mass of the crude ore the year round, as in some cases where dry separation is used has been found necessary.

The above descriptions will give an idea of the principal features of the magnetic separators, which hitherto have succeeded in obtaining employment on a commercial basis. It can be said that, though in some cases dispensable, the production and subsequent treatment of middlings is, as a rule, a condition for the economical and successful concentration of lean ore. What treatment these middlings are to be subjected to must be determined for each separate case. When no middlings are produced, the whole mass of the ore must be crushed finer than otherwise would be necessary. Wet separation reduces the wear, prevents dust, and produces, under the same conditions, purer concentrates than is possible by dry separation. The cost of the separating process itself is very insignificant as compared with that of mining and crushing. Probably, it in no case exceeds 10 cents per ton of ore treated, but as a rule five cents per ton is a safe figure.

The author has before him hundreds of analyses of different ores, concentrates and tails, treated by different separators. Each one of the above described separators can on the basis of these analyses be shown to have given extraordinary results. But analyses without full particulars give very little real information, and therefore it has been considered advisable to give below only the general results of treatment by means of magnetic separators of the different minerals, which usually enter as components in magnetic iron ore.

Metallic iron varies in good concentrates between 64 and 71%. It mostly occurs in the ores treated as magnetite, on the magnetic affinity of which mineral the whole separating industry is based. It is perfectly feasible to extract all the pure magnetic oxide an ore may contain, except perhaps 2 or 3%, if only the ore is finely crushed, and the separation is carried on without undue haste. How far it is advisable to carry the separation, and whether the gain of a few per cent. of iron is sufficient to pay for the increased cost of crushing, are purely economical questions.

Hematite is often weakly magnetic. In ores where magnetites and hematites occur mixed, the latter usually goes into the tails. It is known that hematites by roasting can be made magnetic, but hitherto this knowledge has not been employed for the separation of impure hematites on a large scale. A company has recently been formed in Boston for the purpose of concentrating hematite ores, and the result of their operations are looked forward to with a great deal of interest. The high cost of any kind of roasting, will, however, under all circumstances act as a formidably high tax on an article of higher value than has in these days an iron ore.

Carbonates and hydrates of iron may be considered non-magnetic.

Hornblende often occurs in large quantities in magnetic ores and may contain several per cent. of iron. It is weakly magnetic and goes into middlings and tails. An unexpectedly high loss in iron can often be accounted for by the presence of hornblende, and it would be bad economy to attempt, by means of a strongly magnetic fluid, to carry this mineral into the concentrates.

Titanium is present in ores partly as rutile, partly and mostly as menachanite. The rulite is purely non-magnetic and easily removed. The menachanite possesses a varying degree of magnetic affinity, owing, the author is inclined to believe, to the varying percentage of iron contained. As well in America as in Sweden and Norway, there are enormous quantities of ore which, but for the high percentage of titanium contained, would be exceedingly valuable. The separation of menachanite has been attempted with varying success. The below analyses of tintaniferous ores, treated by the author, give an illustration of the difficulty of concentrating similar ores:

ORE.		Crude.	Heads.	Tails.
Cumberland, R. I.	Fe.	32·4	63·3	11·7
	Ti.	6·25	2·36	8·76
Moisic River Sands	Fe.	58·25	68·45	33·3
	Ti.	8·456	2·126	11·16
Rhode Island Sands	Fe.	36·93	69·97	.....
	Ti.	3·86	1·195	.....
Long Island Sands	Fe.	48·49	69·77	36·22
	Ti.	6·78	Trace.	11·4

The samples certainly do not represent the average of the deposits, but are evidently selected from the richest strata. They show the great loss of metallic iron, which is inevitable if titanium is effectively to be removed. The treatment of titaniferous ores has during the last year attracted considerable attention. The tendency of these ores to build up the walls of the blast furnace hearth has long been known, and in some cases utilized. Attempts to make the titaniferous slags liquid by excess of alumina in the flux have not as far as known led to satisfactory results. Messrs. H. M. Howe and John Birkinbine have proposed the advisability of constructing blast furnaces with removable hearth when intending to use titaniferous ores. This may be an effective expedient, but is a problem of enormous practical difficulties, and yet far from its solution.

Phosphorus occurs usually in the form of apatite, and is as such easily eliminated. When the apatite is crushed it produces, like feldspar and limestone, a large amount of fine dust. This dust is apt to coat the concentrates, and can more easily be removed wet than dry. Fine crushing is the effective means of eliminating phosphorus. As a rule it is possible by separation to lower the percentage of phosphorus from 75% to 90% or even more. Mr. Edison produces by the aid of fine granulation a Bessemer concentrate from a crude ore said to contain over 1% of phosphorus.

Sulphur is a more uncertain factor in the problem of separation. When it occurs as pyrites, not too finely distributed, these are effectively removed by fine granulation; but if it occurs as pyrrhotite or sulphuret these minerals will accompany the magnetite into the concentrates, and can be removed only by roasting.

Feldspar, epidote and other silicious minerals, though entirely non-magnetic, are often injurious, especially when separating dry, as they create a fine dust, which tends to coat the crystals of magnetite, and may either overcome the magnetic attraction or will accompany the magnetite into the concentrates, reducing the percentage of iron in these to a noticeable degree. Wet separation is a preventative against this annoyance.

Mica is sometimes troublesome, as it is not broken in the crushing machinery, but is apt to remain in the screens, where it eventually may gather in such quantities that the screening process is delayed.

At last a few words must be added to point to the enormously important role which concentrates in the future are destined to play in the direct steel process. By an abundant supply of rich, perfectly uniform and reliable ore, the introduction and success of these processes have been brought greatly nearer to realization. Concentration offers this pure, regular ore, which it hitherto has been so difficult to find, and thereby is removed the obstacle against which so frequently have stranded all efforts to work the direct processes, which, when once fully established are likely to revolutionize our iron and steel industries.

In the open hearth process concentrates also form a raw material of superior value.

A New Climbing Locomotive.—A new invention for enabling a locomotive and train of cars to ascend steep gradients is being exhibited by Messrs. Pocock & Co., London. In this device a grooved drum is keyed on the driving axle, and the groove is sufficiently wide to allow a stationary cable to be wound once round it. The drum is of the same circumference as the driving wheels, so that with each revolution of the driving wheels the drum travels a full revolution over the cable. This cable lies in the center of the track, and is secured at either end and kept in its position round curves by guides. It is shown by the model that the assistance given by the turn of the cable round the drum and the slight strain exercised at each end of the cable are sufficient to give the driving wheels the necessary grip or bite on the rails to allow them to gain the full length of their circumference at each revolution. The model now exhibited ascends a gradient of 1 in 3 and passes round a sharp curve at the same time. It is claimed that by this system the wear and tear of the cable are reduced to a minimum, as it rests on the bed of the track while the drum passes over it and at all other times lies quite inactive.

Recovery of Waste Tinning Pickling Liquors.—Two improvements in the method of recovering the sulphuric acid and hydrochloric acids have recently been adopted in England. The acid liquors obtained when the plate is pickled in sulphuric or hydrochloric acid before the galvanizing process contain either sulphate or chloride of iron in solution. They have till recently been allowed to flow away. Now it has become common to allow the liquors containing sulphate of iron to crystallize, and to use over again in the pickling vats the acid mother liquors. In order to deal with the liquors containing chloride of iron, which does not crystallize in this way, a process has been successfully supplied by Mr. Thomas Turner, Birmingham, whereby the acid liquor is made to flow slowly on to the heated bed of a reverberatory furnace. Here, under the action of heat, with access of air, the chloride of iron is decomposed, with liberation of hydrochloric acid, which is collected in condensing towers of stone filled with wet coke, resembling those of the alkali works. Except a small proportion which may be lost by leakage, etc., the whole of the acid is thus recovered, and may be used again in the pickling vats. The iron is collected in the form of red oxide, suitable either for use as a color or for metallurgical purposes. Apparatus for this purpose have been erected at three places, and about 70 tons of materials are treated every week. The other recently patented process is that of Mr. E. P. Peyton, of Birmingham. Its object is to recover the sulphate of iron formed in the sulphuric and pickling process. He effects this by causing a circulation of the hot pickle, when it attains a specific gravity of 1·300 and contains 3-4 per cent. of free acid through a series of crystallizing channels, in which the ferrous sulphate is deposited. The cold mother liquor along with the unused sulphuric acid passes back into the pickling vat, and so maintains the cycle of operations. There is thus no waste pickle, the iron is recovered as copperas, and probably the process is more economical in the use of sulphuric acid.

THE MINES AND MILLS IN PRIBRAM IN BOHEMIA.—III.

Written for the Engineering and Mining Journal by John W. Meier, M. E.

CONCENTRATION WORKS.

These are of large capacity, proportioned to the work of the mines, and among them the prominent ones are: Neues Anna Ouetschwerk, Lill Waescke Adalberti Muhlwerk, Anna Pochwerk and Thinnfeld Pochwerk, and they are distributed over the country, as ore dressing takes place at the mouths of the shafts.

It is not intended in this article to give an extensive description of these plants, as the ordinary machinery of such is so well known, but rather to show wherein they differ from our American dressing works and what they contain that is novel and interesting to some of our mining men.

The larger plants usually have separate buildings for culling, jigging, and for the concentration of slimes and sands. The culling properly belongs to the mining department, and at Pribram it is under control of it. To this great attention is paid, as should be done wherever the cost of labor will admit. Machinery has been contrived to assist in this work. Wherever it can be done the blende ores are kept separate from the silver ores and treated by themselves; the treatment of the duerrerz is also special. Wash dirt from the mines, hoisted in cars, is delivered, when it is clayey or muddy, into a washing drum, which removes mud and sand by attrition of the pieces, much water being used with it. A simple drum of this kind is shown in Fig. 5. It is conical and is built of plank 52 mm. (about 2 in.) thick, lined with tank iron 6 mm. (¼ in.) thick. At its wide end paddles are attached to the inside periphery in order to raise the ore to the top of the drum, whence it drops into a hopper with an inclined bottom and is delivered by it to the first sizing drum. This drum has two iron bands, which rest on four rollers and is driven by friction; it is 2·485 m. long, with a largest diameter of 1·896 m. and a smallest diameter of 1·264 m. This drum can be easily relined when worn out and is comparatively light.

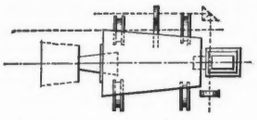
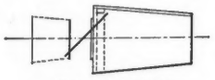


Fig. 5



WASHING DRUM.

COMBINED SIZING AND WASHING DRUM.
SECTION THROUGH CENTRE.

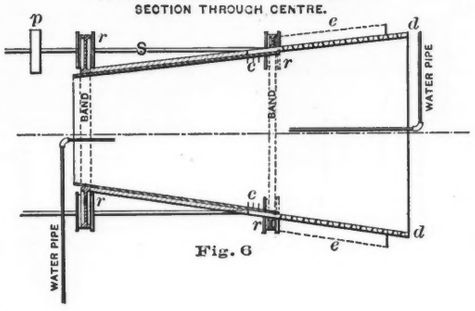


Fig. 6

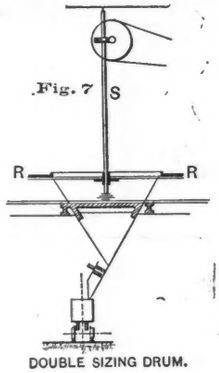


Fig. 7

DOUBLE SIZING DRUM.

A more complicated drum (used also in other places than Pribram) is shown in Fig. 6. It is a washer and double-sizing drum combined, resting on four rollers and receiving its motion by friction from two of them on a shaft *s* carrying also belt driving pulley *p*. The washer is of wood (it is better to line with iron), and has attached to its wide end a double sizing drum. Where the two drums connect, a flange wound spirally is fastened to the inside of the cast iron drum. This flange *c* somewhat retards the forward motion of the ore, giving the water more time to cleanse it, and moves it forward into a cast iron conical drum with square holes (about 1 in.), which flare out toward the outside. Enveloping this cast iron drum *d* is a second one of wrought iron plates *e* with smaller holes. The washing apparatus will thus furnish three sizes of clean ore A series of drums completes the sizing for a number of jigs, the sands and slimes too fine for jig treatment go to catch pits. Ore from the washer between 32 mm. and 64 mm. goes to culling tables or to belt culling machines. The former are of the kind commonly used on the continent (see Fig. 7), *i. e.*, a cast iron ring *R* of about 4 meters outside and 2¾ meters inside diameter is fastened to radial arms from a vertical shaft *s*. The latter being revolved by a worm gear near the top. It revolves at a very slow speed (several minutes to one revolution), giving the laborers standing around it time to cull the ores. A hopper may be placed right under the inside circle of the ring *R* to receive the tailings. The ores for further treatment or clean ore for the smelter are thrown into hoppers placed on the outside.

A belt culling machine (see Fig. 8) used in Pribram had a speed of 15 ft. per minute. The belt is made of wire screen with meshes 10 mm. to 15 mm., or 0·4 to 0·6 in., made of wire 2 mm. (0·08 in.) thick. One of the rollers is driven by worm gear, while the other one carrying the belt is used as a tightening pulley also. This table handles 4,000 kilo. per hour, but needs more repairs than the round tables.

All mixed pieces, or middlings as we may call them, which require further treatment go to the jig house.

SCHRANZ MILL.

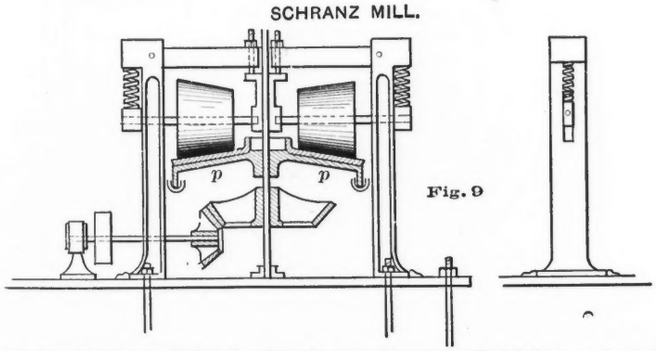
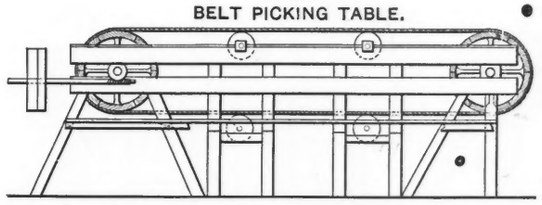


Fig. 9

Fig. 8

BELT PICKING TABLE.



The new jig houses are of four to five stories, substantially built. The ore is hoisted in cars to top floor and is there thrown into a number of Blake crushers, falling from these into screens, thence to jigs, the work being done by gravity; elevators and repairs of belts are thus saved. There is nothing remarkably new in the machinery; crushers, jigs and rolls are very much like the same machines in the United States, but the idea of having an automatic feeder to every set of rolls is much to be commended, as shells will wear more evenly and crushing must be better. These feeders are very simple; an iron apron suspended over the rolls receives a swinging motion by a cam and is thrown back violently by a strong spring, a similar contrivance to that used on percussion tables. Crushing is very gradual. There are jigs for coarse sizes, middlings from these are ground on rolls and pass down to another set of screens and jigs and so forth. For crushing middlings from finer sizes a number of mills have been tried with intent of replacing rolls, as these did not give satisfaction.

The Schranz mill is one of those numerous mills patterned after the old Chilian mill. The one used at Pribram is not the regular Schranz mill, but the general idea is the same. It has a heavy cast floor plate (ring) that is attached to a vertical shaft revolving with it, motion being imparted by bevel gear placed below the floor plate *p*. Two heavy cast conical rollers, placed opposite each other, lie on this floor plate and are made to revolve around their own axes by the turning of the plate. Where axes of these rollers pass through housings, they have a vertical motion, as a slot in each housing permits this. This end may be pressed down by means of springs or buffers (rubber and coiled steel combined). The other ends of the rollers have their bearings in a sleeve which is slipped over the vertical shaft. The ore is fed from a spout on to the plate and after it has passed under the first roller a scraper, set at a proper height, throws the coarser particles under the second roller, while jets of water wash the fines into a launder, which surrounds the floor plate After passing the roller another scraper acts as the previous one did so that the fines may be delivered into a screen, the end discharge of which delivers into the boot of an elevator, delivering again to the mill Work is therefore automatic and all ore must be crushed to pass the screen. This mill will grind successfully sizes finer than 10 mm.

The Heberle mill, also intended to grind ores and middlings, ranging from 2 mm. to 10 mm. In 1880 Mr. J. Habermann, superintendent of concentration department, published a paper favorably describing this mill and extensive experiments made with it (*Oesterreichische Zeitschrift für Berg u. Huettenwesen*, 1880, Nos. 31 and 32) at Pribram. To this paper the writer is indebted for the following details: The mill is made with two or four grinding disks (the one used in experiments had two) of 0·708 m. diameter, which are keyed to the ends of horizontal shafts (Fig. 10). A vertical plate *c*, keyed to a horizontal shaft, is placed so that the ore is caught and ground between it and the two disks. The ore is fed through hopper *h'* onto a vibrating apron *i*, which delivers a regular supply to the grinders through the tubes i^1, water being used on the apron. The vertical plate *c* is faced on the inside with a grinding ring of Bessemer steel, which is attached to it by means of four countersunk bolts and can be exchanged when worn out. There are slots in the vertical plate and corresponding ones in the grinding ring, through which the ore passes into a narrow space between the plate and disk. The grinding disks are faced with steel in a similar manner. They make 250 revolutions, while the plate makes two revolutions per minute, all traveling in the same direction. The ore caught between the grinders moves gradually forward to the periphery and finally drops out at the bottom. As soon as ground fine enough the above arrangement allows the sands to be discharged, so no excessive pulverizing can take place.

The two disks are pressed forward against the plate by two rubber buffers f_1, so that the width of open space between the grinders can be regulated by the hand wheel and screw f_{11}, according to size of grain to be ground. This varies from 0.5 mm. to 1 mm. The grinding ring has grooves in its inside face, which run in curves (Archimedian spiral) toward the periphery (see Fig. 11). The discs are also faced with steel grinding plates. The latter have four cutting edges running out from the centre

and next to periphery there are slots forming an acute angle with these four cutting edges. The advantages of a vertical position of the disks will be readily seen; one of them being that broken pieces of face plate can fall out without damage to the rest of the machinery. Wear and tear of the steel face plates has been less than in other mills of similar character, those made at Kladno of chilled Bessemer steel ran 42–72 shifts of 12 hours each. The product of the mill screened over 2 mm. screen gave the following results: On 4 mm. middlings, 1,121 kilos. per hour were ground finer than 2 mm.; of 6 mm. middlings, 622 kilos. per hour; of 9 mm. middlings, 526 kilos. per hour.

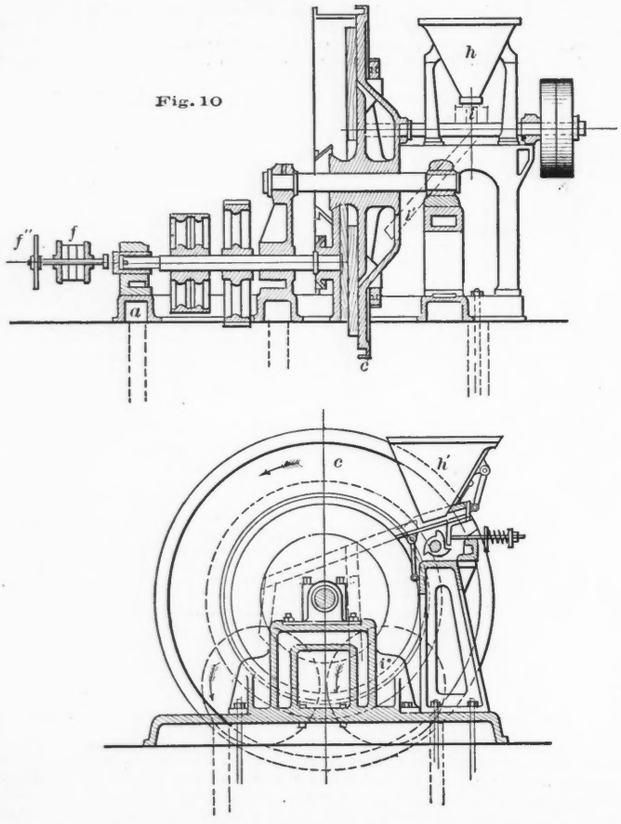
This product far exceeds that of the stamp mills used at the same works. The mill uses comparatively little water. Sand jigs yield a richer product from Heberle mill sands than from those of stamp mills, as the ore is not pulverized so fine. Labor expense is small, repairs are easily made, while the product is large.

The Dingey Mill.—Another kind of grinding mill has been used at the Lill concentration works. Its grinding plates are placed horizontally, the ground material does not fall down and out as in the Heberle mill, and is forced directly through the screens. By neglect of the millman, however, it may be crowded and the ores reduced to fine pulp. Broken pieces of face plates also will give trouble. California stamps are used extensively at Pribram.

From description and reports of Mr. Habermann it would appear that the Haberle mill is preferred to any other contrivance that has been tried

HEBERLE MILL.

Fig. 10



at these works for replacing rolls in the grinding of middlings for treatment on sand jigs and tables; it is comparatively simple in construction and will undoubtedly do well on materials not too hard, as on limestone and spathic gangue. On quartzose ores the wear may be excessive. It does not, however, appear to have been generally introduced, as the writer found none in other large concentrating works where the California stamp mill still holds its own.

RELIGHTING SAFETY LAMPS.

A long articte on this subject, written by M. Goffin, is published in *La Revue Universelle des Mines*. There are four different methods of relighting safety lamps without unlocking them. The first is that of Messrs. Durant & Hubert. Two metal pins, insulated except at their ends, penetrate into the interior of the lamp, and support a thin platinum wire, laid transversely across them and passing over the wick. The lower ends of the pins terminate in buttons, and they may readily be put into communication with any source of electricity, such as primary or secondary battery, capable of rendering the wire incandescent, and of thus lighting the wick when brought up to it. The second is the Mori & Rhodes relighter. In this arrangement the platinum wires take the form of a horseshoe, and may be moved laterally over and away from the wick by a lever, while contact with a rod is interrupted by a spiral spring, until the latter is compressed by pressing the rod on to the poles of the battery.

These twe electrical arrangements do not completely solve the problem, because they are not self-contained, and the miner has to go a certain distance to the source of electricity. This is not the case, however, with the other two arrangements, which depend on the use of matches or a band of strong paper, with fulminate detonators at intervals like those in use for a gas and a cigar lighter. The last named system is applied to the Wolf benzine lamp, used at the Zwickau collieries. A piston or plunger works tightly in a tube, which passes through the oil reservoir, and is surmounted by a sheath in the form of a niche, open toward the wick, and serving to guide the band of detonators, the distance between which corresponds with the stroke. One spring serves to deflect the detonator band toward the wick, and another, opposite, terminating in a hammer, serves to ignite the detonator by percussion, on the latter spring being released by the cam-shaped end of the plunger on its entering a slot in the spring. Sparks from the detonator ignite the vapor of benzine, which feeds the lamp.

The fourth of the systems described meets with M. Goffin's approval. This is the Catrice re-lighter, and is suitable for the vegetable oil lamps used in Belgian fiery mines. Special matches are charged in a six-chambered barrel, like that of a revolver, sunk vertically in the oil reservoir, their heads projecting, and with an arrangement for striking them and then rotating the barrel so as to bring the next match into position. When it is required to re-light the lamp, a small guided rod, butting against the bottom of the match in position for lighting, fitting closely in the bottom plate of the lamp, and maintained in its normal position by a spiral spring, is thrust upward by a smart movement of the hand, which causes the head of the match to rub against a roughened surface, at the same time bringing it on a level with the wick. The slightly increased first cost of these lamps would, contends M. Goffin, be largely compensated by the advantages afforded by a safe and ready means of re-lighting.

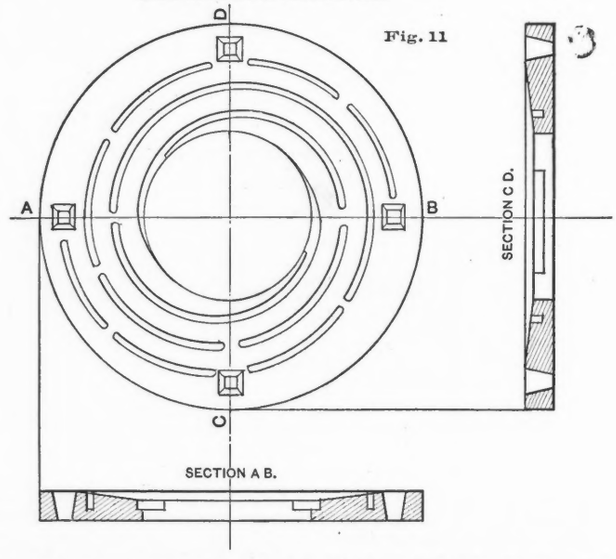
NICKEL COINAGE.

The increased cheapness of nickel owing to the large output of the Canadian mines, is leading to a more extended use of this valuable metal. Only lately it was mentioned that the French Government proposed to use 400 tons in nickel coinage. Austria, it seems, is about to follow her example.

At a recent meeting of the Austro-Hungarian Parliament, says Oberbergrath Ernst in the *Oest. Zeits. fur Berg und Huttenwesen*, it was proposed to issue 10 and twenty farthing pieces of pure nickel, and 1 and 2 farthing pieces of bronze. After mentioning several alloys that have been tried and found wanting, among others the "packfong" containing 6% silver coined in Switzerland in 1860, he instances an alloy of 25% nickel and 75% copper as one which experiments have proved with one exception to be suitable for small coin. This alloy is cheap, durable and hard to counterfeit. Its hardness, compared with that of copper, is 3 to 2. It can only be coined with powerful and well constructed machinery, and the impression is sharp and clear. The one fault to be found with it is that while bright when new, it soon becomes dull, and gives the offensive odor characteristic of copper. With the exception of Germany, all the large countries have ceased to coin this alloy.

GRINDING RING FOR HEBERLE MILL.

Fig. 11



Nickel is especially suitable for small coins on account of its cheapness, durability, sharpness of the impression, and, most important of all, its lasting brightness, but until a process for manufacturing pure nickel was devised at the Berndorfer Metallfabrik, the metal could not be coined on account of its brittleness. In 1880–81, Switzerland commenced the coinage of 20 Rappen pieces of pure nickel, the dies being furnished by Krupp, of Berndorf. Krupp also furnished the plates for Mexico and Servia for their copper-nickel coins.

He further adds, that while the former coinage of copper nickel in Switzerland, Mexico, Servia, etc., took but 200,000 kilogrammes of nickel, the proposed coinage in Austria of 42,000,000 crowns in 10 and 20 heller pieces will require not less than 1,050,000 kilos of pure nickel, and that of Hungary about 450,000 kilos.

A New and Highly Sensitive Reaction Paper is obtained by saturating white neutral filter paper in tincture of curcuma 1:7. After drying it is immersed in a bath containing 100 parts water and two caustic potash, and then washed rapidly in pure water in a flat porcelain basin. After drying the sheets are cut into strips, and these are placed between sheets of tin, which is essential, as air soon turns the paper, while it keeps indefinitely in contact with tin. This paper is extremely sensitive, as it colors in the presence of one part of H Cl in 150,000, and indicates $C O_2$ dissolved in water. The best way of using this paper is to touch it with a glass rod dipped in the solution and dried.

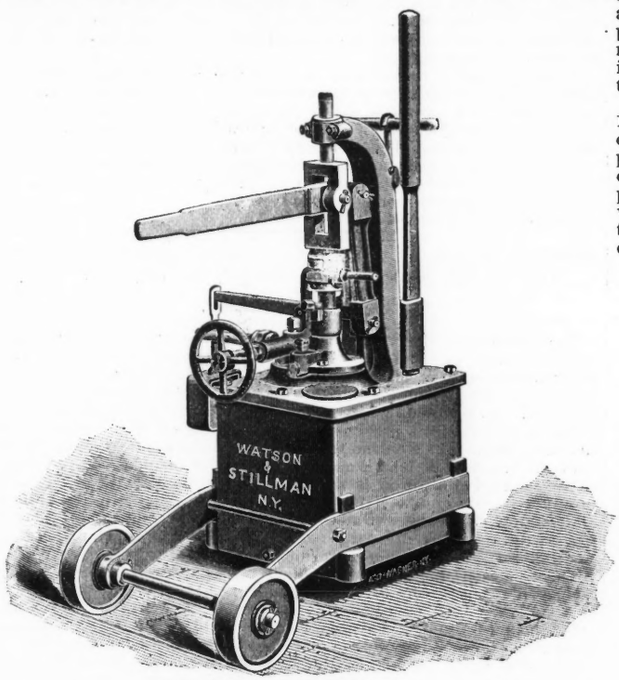
PORTABLE TESTING PUMP.

The accompanying illustration represents a portable high pressure double-plunger testing pump, made by Watson & Stillman, of this city. The pump is arranged with a tank underneath, and the entire machine is mounted on three wheels. Two wheels are so arranged that when the pump lever is operated the machine will not overturn. The third wheel is pivoted and attached to the pulling handle. The pump, when one man is working the handle, will give a pressure of 1,000 lbs. per sq. in.; with the slip lever, 2,000 lbs. The smaller piston gives 4,000 lbs. without the slip lever, and 10,000 lbs. to the square inch with its use. The change from different pistons is attained by bringing the piston clear down, and by turning an adjustable clutch. The valves are arranged where they may be readily examined, cleaned or removed for regrinding, which has to be done occasionally when using extremely high pressure.

The pressure exerted by the pump, it is claimed, can be held for hours at a time without the use of extra stock-valves. The machine is arranged with a 6 in. pressure gauge, which is fitted with safety coupling, thereby preventing shocks and injuries to the delicate mechanism. The entire machine weighs 390 lbs. The pump is claimed to be a most successful machine for use in general shopwork where high pressures have to be obtained, and is the outcome of a demand for a compact, portable, high pressure pump. Its general uses will be readily understood by all who have need for high pressure testing.

THE ACTON AUTOMATIC PUMP GOVERNOR.

The regulating device shown in the illustration is applied on the steam inlet pipe of a steam pump, whose discharge controls and actuates the valve in the steam pipe, to increase or diminsh the flow of steam in the pipe



HIGH PRESSURE PUMP.

according to the force of the discharge of the pump. The improvement is the invention of Jonn Acton, of Nos. 193 and 195 Worth street, New York city. In the valve body in the steam supply pipe is fitted to a slide piston valve connected at the upper end of its stem by a ball and socket joint, with a rod passing through a suitable stuffing box, the upper end of the rod being pivotally connected by compound levers with a rod passing through and guided in a screw in the upper end of a casing supported from the valve body. The lower end of this rod engages the hub of a piston in the casing, the under side of the piston resting on a metal diaphragm pressed upon on its under side by the fluid discharged by the working machinery. On the top of the piston is a spring whose upper end bears against a washer engaged by the lower end of the screw through which the rod passes, whereby the tension of the spring may be increased or diminished to give the desired pressure on the piston. In the pipe leading from the discharge of the working machinery to the chamber below the diaphragm is a discharge cock for draining the pipe and the chamber. The flow of the liquid discharged actuates machines or apparatus to be driven, such as elevators, etc., but when the pressure is increased beyond the normal the diaphragm is pressed upward, and, through the motion of the piston, rod and compound levers, the valve in the stem inlet pipe is partly or wholly closed. As soon as the pressure of the discharge diminishes, the diaphragm is forced downward by the spring, when the valve in the steam inlet pipe again opens, the slightest change of pressure in the discharge of the working machinery actuating the valve to increase or diminish the supply of steam. This valve is now also extensively used for regulating the pressure of water in supply pipes from pumping stations, or from elevated reservoirs where the natural pressure would be sufficient to burst the usual pipes, it having been thus employed in one instance to give 30 lbs. pressure in a service pipe and 150 lbs. pressure in a pipe to run elevators, where the original pressure was over 700 lbs. These regulators are likewise used in all the electric light stations in New York City to control the pressure from the boiler to the engines.

THE ORE DRESSING AND SMELTING WORKS AT CASAPALCA, PERU.

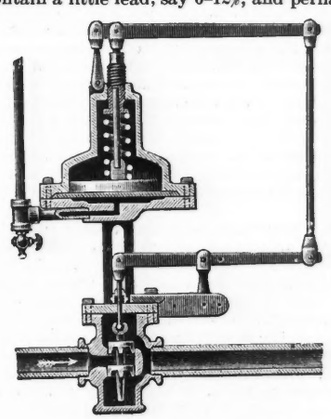
By Otto F. Pfordte.

Casapalca is situated in the Andes, 14,000 ft. above the sea, and it is connected with the coast at Port Callao by means of the Oroya Railroad. As the mines here are 2,000 ft. above the vegetation zone, it was impossible in the early days to work with profit any but the very richest of the silver ores and all the remainder was therefore thrown upon the dump. There is a great number of mines in the district which in days gone by have furnished an abundance of good silver ores, chiefly galena, copper and iron pyrites, gray copper ore, zinc-blende and oxidized ores. Most of the richest ores have gone now and attention is therefore being turned to the heaps of medium ores hitherto wasted. A special plant has been designed for dealing with this ore and it may be of interest to give a detailed description of it.

The dump of the Rayo mine assays from 15 to 25 oz. per ton, and is situated about one thousand feet above the works. The ore is lowered by means of cable cars, and ores from other parts are brought in on llamas, which take 100 lbs. at a load. The ore after being crushed passes into a Hendy feeder, and then into a 5-stamp battery. These stamps weigh 750 lbs. each, have a 7-in. drop, make 90 drops per minute, and crush about 135 tons through a 12-mesh screen in six days of 24 hours. The pulp passes by an automatic sampler, for taking the daily pulp sample, and then through a launder into a Spitz-Kasten.

The coarser parts run into a three-compartment jig with 12 or 14 mesh screens, through which the product passes into the lower part, from which it is drawn off from time to time. The tailings overflowing the last jig compartment pass into a hexagonal revolving 40-mesh screen, and the fine material passing through the same is united with the other fine matter in the settler. The product of the jigs, consisting of iron and copper pyrites, gray copper galena and zinc-blende, is weighed, sampled and dried. The fine material drawn from the lower part of the settler passes upon two Frue vanners, one of which has a plain, the other a corrugated belt, the product of the latter being larger in quantity and lower in quality than that of the former, but on the whole being more advantageous, as a higher money value and cleaner tailings are produced.

The tailings from the vanners pass on to a double-deck round buddle about 15 ft. in diameter; from this another product, though of lower grade, is obtained. The tailings then pass out into the stream. The combined products of the jigs, vanners and buddles average per week about 10 tons of concentrated ore, containing about 1,500 oz. of silver, with a small percentage of lead and copper. All the concentrates from the jigs are well mined and assay about 158 oz. of silver per ton, and the products of the two vanners are also mixed and assay about 209 oz. per ton. All the concentrates contain a little lead, say 6–12%, and perhaps 3–5% of copper.



ACTON PUMP GOVERNOR.

A third class of material, consisting of galena containing 45% of lead and 500 oz. of silver per ton, is well mixed in the proportion of two to one with each of the above mentioned classes, and charged in 1-ton charges into a reverberatory furnace, where they remain for six hours, for the purpose of roasting and slagging. The fuel per charge consists of about 300 lbs. of soft coal and 250 lbs. of dried llama dung. The product contains nearly all the metallic substances in the form of silicates. An analysis of the slagged ore gave the following result: SiO_2, 17·2%; Cu, 9·3%; Fe_2O_3, 22·5%; CaO, 6%; Pb (assay), 34·5%; S, 6·5; Ag, 0·34%; total, 96·34%.

The slagged ore is broken up into pieces from two to four inches across, and is then heated in a water-jacket furnace. The material charged into the water-jacket each day varied frequently, but may be taken to consist of 18,000 lbs. of the slagged ore; 500 lbs. of old slags found on ancient smelting works, averaging 45% Pb and 2 to 5 oz. of Ag per ton; 300 to 500 lbs. of oxidized ores; 1,500 lbs. of limestone; 1,000 lbs. of bog iron, and 1,500 lbs. of dirty slags, containing from 8 to 12% Pb. The shipping products were lead bullion, assaying 235 oz. per ton, and copper or lead matte, of which two assays gave; Lead matte, Pb 61%, Cu 27%, Ag 38 oz. per ton; copper matte, Pb 7%, Cu, 50%; Ag, 150 oz. per ton.

The slag of the water jacket, whenever it was more than 6 per cent. Pb, was recharged, and when it contained less lead it went on the dump. The following is the analysis of a fair slag: SiO_2, 37%; Fe_2O_3, 50·2%; CaO, 8·6%; Pb, 3·4%; 99.2.

The fuel used in the water jacket generally consists of English coke, which, placed on the ground, costs about $40 per ton, and the proportion used in the furnace is about one ton to every six or seven tons of charge. The soft coal used in the reverberatory is native, and costs about $16 per ton. Coking coal is also found in Peru, though at a greater distance than the soft coal; good coke is being made from it and utilized at other smelting establishments. Wood and charcoal are very expensive. A large Brückner revolving furnace and a 30-ton water jacket have been added to the works since, whereby the capacity is largely increased. The labor employed is almost exclusively Indian.

BISMUTH MINING IN AUSTRALIA.

Written for the Engineering and Mining Journal by W. Bertrand Roberts, M. E.

Not seeing any returns for bismuth in the statistical number of the ENGINEERING AND MINING JOURNAL, I am led to believe that the United States does not contain any producing mines of that metal, and as it is found rather freely in this district it has occurred to me that a short account of its mode of occurrence, mining, etc., may prove of interest.

The Degilbo division of the bismuth district of Queensland is rather remarkable for its varied geological conditions and the diversity and peculiar character of its ores, bismuth being found in the forms of telluride, sulphide, carbonate and also small quantities of "native" metal. In most cases there is a varying quantity of gold found with these ores, and in a few cases they are associated with copper, when they carry a small amount of silver.

The principal country rocks are a crystalline metamorphic slate (in places traversed by dykes of porphyry) and a coarse micaceous granite.

The first notable find of bismuth was made some six years ago in the property now held by the "Mt. Shamrock Gold Company, Limited," of London. An outcrop of gossan, evidently the decomposed capping of an extinct thermal spring, was found to be rich in gold, and associated with it was a heavy yellowish mineral that on being submitted to the local analyst was pronounced by him to be carbonate of bismuth.

The circle of the old geyser was fairly well defined, the diameter being about forty (40) feet, with a slight underlie S.E., and this has since been followed down to a depth of 225 feet, and the whole of the ore obtained therefrom milled yielding of about 15 dwts. per ton. Before the "pipe" formation was understood considerable money was expended by other companies in trying to find the combination of what they supposed be a load, but without success.

No regular vein of bismuth was found, but boulders of rich ore were met with occasionally and put aside, and a five ton shipment sent to London realized £160 per ton, the ore yielding in addition some 30 ounces gold per ton.

With depth, however, the ore became difficult to treat, the gold being to a great extent chemically combined with the bismuth and telluride--in fact, a telluride of gold and bismuth—but at the same time there was too much arsenical and iron pyrites present to permit of a payable bismuth concentrate being made, the smelters in Europe declining to purchase ore that does not carry at least 10%.

The mill tailings in Globo assayed from ½ to 1% bismuth.

Whenever a clean lump of the telluride could be got it ran extremely high for both gold and bismuth. The average of quite a number of assays done by me gave about 40% bismuth and 200 oz. gold per ton, and one lump of same, 10 lbs. weight, assayed 66% bismuth and 2,170 (two thousand one hundred and seventy) oz. gold per ton.

Finding that they were only getting a small proportion of their gold by amalgamation process, the company erected concentrators, and a chlorination plant, of the Newberry-Vautin type, but all attempts in the latter direction failed, owing, it is said, to the peculiar character of the ore, and they have since been realizing on the concentrates by selling them to smelters.

Some four miles distant from Mount Shamrock, a belt of quartz reefs, in granite country, are being worked, the remarkable feature with them being the large quantities of sulphide of molybdenum that they carry, lumps as large as hen eggs, showing out very clearly in the white quartz, and in some cases the gold being interleaved between the flakes of molybdenite.

About 10 miles from there another run of quartz reefs, in slate country, are being operated, the accompanying mineral there being a selenide of lead. Some five miles in another direction a series of lodes occur, consisting of a slate breccia cemented together with oxide of iron, and at depth iron pyrites. but as they did not run more than about 4 dwts. per ton in gold, they were abandoned after considerable development had been done.

About 12 miles east of the Mount Shamrock Company's property a local company, known as the Bigginton Mining Company, is operating very successfully for gold. The mine, situated about 100 yards from the contact line of the slate and granite, is primar ily a huge deposit of mag netite, but as iron ores are as yet valueless in Queensland this would not have attracted any notice had it not been for the bismuth ore found sparingly interspersed through it.

The bismuth, not occuring to the extent of more than 1%, and the sp. gr. of the two being very close, considerable trouble arose over the concentration of it, but this was overcome by the erection of a magnetic separator of the Ball-Norton type. Bismuth being diamagnetic, the material was found to be eminently suitable for magnetic concentration, the iron, in the absence of a market, being thrown over the dump.

A later development proved the existence of a large body of hornblende running parallel with and separated from the magnetite deposit by a slate fault of some 30 ft. in width, and this hornblende was found to contain both gold and bismuth in paying quantities. This rock runs about ¼ oz. gold per ton and 1 to 2% bismuth. From this the company pays regular monthly dividends.

The body of pay ore is, so far as yet proved, about 20 ft. wide by about 130 ft. long, another slate fault forming the hanging wall, and underlies about 60 in.

The mode of operating is as follows: The ore body is tapped by a tunnel, from which the cars are run out, and sent to the mill, 130 ft. below, by a gravity tramway. The ore is then dumped over grizzlies, the coarse lumps going to the rock breakers, of which there are three (Dodges). From the bins it gravitates into automatic feeders (Challenge), and from them into the Huntington mills—two 3½ ft. and one 5 ft. being worked, and from them over copper plates, and thence to the Frue Vanners. A mixed concentrate of magnetite and bismuth, running 10 to 12% of the latter, being obtained. It is then dried, and run through the magnetic separator, either one or two passes being given it, according to the quantity of iron present, the aim being to get it up to about 20% bismuth. It is then put up in coarse bags, carrying 100 lbs. each, and shipped, ore of this percentage netting in London about £100 per ton.

Unfortunately the market for bismuth is very limited, and the handling of the ore and metal being controlled by a "ring," only a proportionate share of ore sales per month is allowed to each of the few producing mines of the world.

Under other conditions this mine could very comfortably undertake the supplying of the total demand, and if ever a question of "survival of the fittest" should arise, she will be found "right there."

The ores of bismuth are as follows: The principle ore is the sulphide (bismuthinite) 82% Bi Sp Gr 7, also carbonate (bismutite) percentage about the same. It is also found in pockets as bismuth ochre, Bi_2O_3 Sp Gr 5·5, also in combination with tellurium, as telluride, and also as native metal, in occasional nuggets, the largest of those I have seen being 12 lbs. The sulphide of Bi is very similar in appearance to stibnite, crystallizing in long needle-like aggregations, the carbonate also very much resembling the oxide of antimony, being a dense, heavy, grayish white mineral, with a very strong tendency to take up the strain of carbonate of copper, should there be any of the latter ore in the vicinity.

The metallic bismuth is a silvery white metal with a peculiar pinkish shade, Sp Gr about 9, with a magnificent rhombohedral crystaline structure.

Exposed in a molten state to the air it oxidizes rapidly; in fact, it can, on a pinch, be very well substituted for lead in assaying operations, the only drawback being that it is apt to leave the gold or silver scattered over the cupel in minute beads.

Uses.—Its chief use is for making the various fusible alloys. Its own melting point is 507°, but alloyed with certain proportions of lead and tin, it lowers its and their melting points in a remarkable manner. The assayer who forgets this fact and uses litharge in doing a gold or silver assay of an ore containing bismuth will probably be surprised, as I was, by finding the button melt in the tongs before it could reach the cupel, in a moderately hot muffle.

Another curious property of the metal is its expansion of one thirty-second of its bulk as it cools, and this is availed of for alloying with type metal, for giving clear cut edges, and also in taking sharply cut casts of engravings, etc. The expansion is so pronounced that on pouring, say, 1 oz. of the metal into a mold that will not allow it to expand laterally, as it cools it will crack, say half an inch of slag, and a tiny pin point of metal will shoot up and continue to come till there is a head on top of the slag the size of a small marble.

A small quantity is also used in medicine as sub-nitrate, prepared by precipitating it with excess of water only from a nitric solution. A little is also used as a cosmetic under the name of pearl white. There is also another mine in Queensland that produces largely, at Baven, some 1,500 miles further north. The Kingsgate mine, at Glen Innes, in New South Wales, was also a large producer some years back, but is now shut down, and this sums up all the bismuth mines of any note in Australia, though doubtless further discoveries will be made.

MARYBOROUGH, QUEENSLAND, Australia.

IMPROVED METHOD OF DETERMINING SMALL PERCENTAGES OF SILVER AND GOLD IN BASE METALS, MATTES, ETC.*

By Cabell Whitehead.

The method here described is suitable for the assay of crude copper, copper mattes or ores, metallic zinc, iron, nickel, etc. The ore or other substance to be tested is dissolved in nitric acid; the silver is dissolved, but the gold is suspended in the solution in the form of insoluble particles. To throw down the gold, some lead acetate is dissolved in the solution, and the lead precipitated as sulphate by the addition of dilute sulphuric acid. The solution is filtered off, and the filtrate containing the gold and sulphate of lead is assayed for gold in the usual way. The silver in the remaining solution is thrown down as bromide by the addition of bromide of soda and assayed by fire. This method is much more rapid and accurate than the wet method proposed some time ago by the author, and should meet the ordinary requirements of those who wish to assay small quantities of bullion in various ores, etc.

The details of the process as applied to the assay of a crude metallic copper may be given as an example of the process. Weigh out one to four assay tons of the crude copper according to its richness, and place it in a beaker of 500 cc. capacity. Add gradually enough acid to dissolve it completely and heat until red fumes cease to come off. Then dilute with water and add 50 grains of lead acetate. When the solution is complete add 1 cc. of dilute sulphuric acid. Allow the lead sulphate and the gold to settle and filter into a 1,000 c. c. flask, filling the flask to the mark with distilled water. After the filter paper and its contents have been dried and the paper burned, the gold and the lead sulphate are scorified with test lead. The resulting button is cupelled and the gold with any trace of silver it may contain is weighed. The solution in the 1,000 cc. flask is divided into two equal portions, so that two independent estimations can be made of the silver. A saturated solution of bromide of soda is added to each solution, with constant stirring, as long as a precipitate is produced. The precipitates are then filtered and washed in cold water. The bromide is then mixed with three times the weight of carbonate of soda and a small amount of flour or other reducing agent, and it is placed in a small crucible covered with borax glass and melted down in the muffle. The resulting button is cupelled at a low temperature so that the cupel feathers nicely. Duplicate assays usually agree within one-fifth of an ounce per ton.

Silico-Carbon Compounds.—Some years ago Schützenberger and Colson described certain tertiary compounds consisting of carbon, silicon and oxygen, or of carbon, silicon and nitrogen, says *Chemical News*. They are obtained by heating crystalline silicon to a red-white heat either in an atmosphere of carbonic acid or of carbureted gas and nitrogen. All these compounds are powders of a green color, infusible, not attacked by hydrofluoric acid and by caustic alkalies even in concentrated solutions. They are attacked at nascent redness by melting caustic potash. In all, the carbon associated with silicon resists combustion at a red heat by means of free oxygen or of copper oxide. The carbon of these compounds can be burnt only on heating these compounds to redness along with basic lead chromate. Schützenberger now describes in *Comptes Rendus* a new silicon carbide, SiC. This compound is a light green powder not attacked by a boiling solution of caustic potash or by hydrofluoric acid, infusible and fixed.

* Abstract of a paper read before the Franklin Institute, May 17, 1892.

THOFEHRN'S ELECTROLYTIC REFINING PROCESS.

M. Hyppolyte Fontaine's work on Electrolysis, says our contemporary *Annales Industrielles*, gives a very full account of M. Thofehrn's process for refining copper by electrolysis. In principle the process does not differ materially from other electrolytic methods, but the arrangement of the parts and the general working out of the details makes the method, in the opinion of M. Fontaine, a new, complete and efficient system of copper refining.

In the plant at present in operation there are 120 baths in 12 series of 10 each. Each bath is a little lower than the next, and siphons are placed between them in order to obtain a constant circulation. After the electrolyte has left the last of each series it goes to a collecting basin from which it is pumped again to the distributing reservoir. Baths are made of concrete. They are lined first with wood which has been boiled in tar and with sheet lead. The surface of the concrete itself is protected by a coat of a special kind of tar. The electrolyte consists of sulphate of copper, 150 parts; sulphuric acid, 60 parts, and water, 690 parts. In order to oxidize the electrolyte and so remove the impurities which are constantly forming, jets of air are introduced into the collecting basin and the distributing reservoir, and at the same time the liquid is kept at a temperature of 35° C.

The rate of production of refined copper is 1 gramme per ampère hour, or in an average 2½ tons per day. The average drop in potential for each bath is ·15 volt. The difference in potential at the binding posts of the dynamo is just sufficient to overcome the resistance of the bath and the conductors A loss of 5 to 8% in the conductors is allowed. The section of the cable leading from the dynamo to the first vat should be such that the current shall not exceed 1 ampere per square millimetre. The anodes should be of such proportions that a current of 50 ampères should not be exceeded.

The cost of refining copper by this installation is $19.60 per ton. The original cost of the plant was $37,300; the stock in hand has always a value of $84,000, and the annual working expenses are $9,210. The interest on capital and stock and the depreciation amount to $8,130 per annum; this, together with the working expenses, is equal to $17,640. The production at 2½ tons a day is 900 tons a year, and $17,640 ÷ 900 = $19.60.

THE SURVEYING OF MINES.*

By John L. Culley.

In order to insure accurate work in the surveying of a mine the surveying party should consist of the engineer, a pilot or foresight, who goes ahead and selects the transit or angle points, two chainmen, a torch-bearer for the instrument and a backsight. The pilot should be familiar with all the mine workings, and the mine boss is therefore generally selected for this position. The hind chainman should be specially selected by the engineer, for the accuracy of the measurement depends upon his ability. The duty of the torch-bearer is to first light the plumb-bob, then the upper plate until it is level, then the vernier, then flashes the cross hairs, and finally the vernier reading. In setting or reading the vernier the engineer should stand square to the vernier with the left hand on the upper plate, and should cause the torch-bearer to pass his light over the engineer's left hand to a point slightly above and to the right of the center of the vernier. The engineer will then be able to read it without trouble.

The setting of the plates will be greatly facilitated if a small rosette be put on the outside of the lower plate directly under the 0·0 of the horizontal limb. Then to set the plate at 0·0 the engineer should pass his hand around the plate until the rosette is met and then bring it and the vernier at once together. Otherwise frequently several revolutions are made before the desired position is obtained. The flashing of the cross hairs is a very simple operation when properly done. Put the instrument in position, find the light and nail in front of it, then direct the torch bearer to "flash" and he will pass the flame of his light directly across the telescope axis 2 in. in front of the object glass until the cross hairs are in position. The position of the sight nail is more clearly defined if an ordinary surveyor's marking pin is held plumb over or in front of it. The sight lamp, nail and telescope should always be in a straight line. The angle having been obtained, the engineer notifies the chainmen to measure up to his position, then proceeds to the foresight, the backsight takes his position and the foresight seeks a new point.

Ten years ago it was the universal custom to read and note all the angles as right or left. This was a very bad practice, as it is easy to put the entry in the wrong column and to forget to place the R or L opposite the figures. It is now the usual plan to make all the entries "Right" from zero and to record them just as they are observed, even though they are as large as 359° 59′.

It is not allowable to abridge the underground work, but on the surface the operators only wish to know the location and direction of the most advanced works. This is often done by producing the first and last course of a survey to intersection and then calculating the necessary angles and distances.

As this is a very laborious process, the author has been to much trouble to devise a simpler one. After a most careful study, the following method has been adopted. An accurate map on a large scale, generally 40 ft. to 1 in., is made of the inside survey. All angles are laid off by ordinates, those less than 20° by tangents, the balance by sine and cosine and radius, with the radius not less than 10 in. There is no known protractor by which angles, for this purpose, can be successfully platted. An engine divided paper protractor may and should be used to test every angle, and each course and set of courses that run in one general direction should be repeatedly tested by scale. When the plat thus constructed has been thoroughly tested certain convenient courses are selected and produced to intersection. The lines thus produced are then measured by scale, and the angles of intersection computed from the deflections of the intervening courses, and tested by protractor. This process will give absolute results as to angles and lengths for an entire survey within the fraction of a foot. This method also affords an opportunity for a careful review, by plat, of the inside survey.

Whenever it is unavoidably necessary to use a short base in connecting the inside and outside lines in a shaft mine the following method is recommended for extending the base at both top and bottom of shaft. Place, in the direction of the first course, a timber over the top of the shaft, 5 or 6 ft. above the ground if possible, and let down the two plumb bobs from one edge of the timber at as great a distance apart as possible. When the plumb wires are at rest bring a tightly drawn fish line 15 ft. long into the vertical plane of the wires and drive a stake at a convenient distance from either wire. Repeat the operation until the points on the stakes are exactly in the vertical plane of the plumb wires. This is both quicker and more satisfactory than the usual operation of setting the instrument approximately in the plane of the wires by sighting the nearest wire, then removing it to see if the other wire is in line. However, it is a bad practice to use the short shaft base at all, nor should it be used except as a last resort, or where the shaft does not exceed 40 ft. and the extreme workings do not exceed 2,000 ft. distance from the shaft.

Band chains have given the greatest satisfaction in mine surveying. The one drawback to their use is that the feet number plates are often carried away in passing the chain through the mine débris. This could be overcome by etching the numbers into the body of the chain as is done in the printed steel ribbons.

* Abstract of a paper read before the Engineer Club of Cleveland.

Temperatures of Furnaces and Melting Points of Metals.—M. Le Chatelier gives in the *Comptes Rendus* the following melting points: White pig iron from Sweden, 1,135°; foundry pig, 1.220°; soft steel, with 0·1% C, 1,475°; half hard steel, with 0·3% C, 1,455°; hard steel, 0·9% C, 1,410°; the flame of a Robert converter when emitting sparks, 1,330°, and at the end of the operation, 1,580°; for a Bessemer converter of six tons capacity, scoria 1,580°, of the steel 1,640° and 1,580°; of a reheating furnace, 1200°; the ingot under the hammer, 1,080°; a Siemens-Martens furnace for half-hard steel—the gas at its exit from the generator 720°, at its entrance into the regenerator 400°, at its exit 1,200°, air from the regenerator 1,000°, gas and smoke at its entrance into the chimney 300°, the furnace at the end of the melting 1,420°, during the refining 1,500°. In a Siemens crucible furnace the temperature between the crucibles is 1,600°; in a rotary puddling furnace the bloom at the end has 1,330°; in the blast furnace, during the treatment of gray Bessemer pig, the temperature of the blast rises above 1,950°; the iron at the beginning has 1,400°, at the end, 1570°. Sulphur melts at 448°, gold 1,045°, palladium 15°, and platinum 1,775°.

Safety Appliance for Derrick Cranes.—Many accidents arise from the breaking and inadvertent releasing of jib chains. A new arrangement has lately been devised for preventing the falling of jibs from this cause. The extremity of the chain, by which the jib is raised and lowered, is made fast to the bolt at the jib head. This bolt is connected to a pair of pawls which take into two ratchet wheels, cast one on each side of the sheave over which the lifting chain runs into the jib head. The bolt is continuously urged forward to place the pawls into engagement by a powerful coiled spring, while it is drawn back by the tension on the jib crane. The sheave itself is cast with deep pockets into which the links of the lifting chain drop, and it runs in a casing which prevents the chain getting out of the pockets. If the jib chain breaks the jib begins to fall, and the pawls dart forward into the teeth on the sheave. The latter can now no longer rotate, and as the lifting chain cannot ride over it on account of the pockets, the weight of the jib is thrown on to the lifting chain, and its fall is arrested before it has dropped many inches. When a wire rope is used in place of the chain a modified arrangement is used which grips the rope.

A Great Engineering Enterprise in Japan.—The last mail from the Orient brings a very interesting account of the completion and successful operation of a great government work in Japan. Lake Biwa, having an area of 500 square miles, is located seven miles from the city of Kioto, and at an elevation of 143 feet. A navigable canal has been cut from this lake to Kioto, involving two miles of tunneling and an aqueduct of considerable length. At the eastern extremity of the city, to which point the canal has been brought, there is a sharp decline of 118 ft., from the base of which the canal is continued to the sea. This difference in level is overcome by inclined plane ways 2,100 ft. in length, on which boats are raised and lowered from one canal to the other. These ways are operated by electric power furnished from a Pelton water wheel connected with a Sprague motor. The fall above named affords also a very valuable water power, a part of which has already been used for various mechanical purposes by means of electric transmission. The power station is located at the foot of the incline, and consists of three 8-ft. and two 6-ft. Pelton wheels, aggregating about 600 H. P., which are supplied with water from the high level canal by three lines of 36 in. pipe 1,300 ft. in length delivering water to the wheels under a head of about 100 ft. These wheels are at present operating three Edison dynamos of 80 kilowatts each, the power from which is distributed about the city within a radius of two miles, running rice mills, spinning mills, a watch factory and various other machinery. One Thomson-Houston alternating current dynamo of 2,000 volts supplies the city with 1,300 incandescent lights, as well as many arc lights. The above works, involving an expenditure of $1,500,000, were planned by and executed under the direct supervision of Mr. S. Tenabe, an eminent Japanese engineer, and their operation is said to be a great success, both from a mechanical and financial point of view.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office:

TUESDAY, JUNE 21ST, 1892.

477,220. Process of Recovering Tin from Scrap. John J. Naef, Paterson, N. J.

477,296, 477,297. Pipe Threading Machine. Roderick P. Curtis and Lewis B. Curtis, Southport, Conn., Assignors to Curtis & Curtis, Bridgeport, Conn.

477,375. Process of Making Nitric Acid. Julius Lang, Griesheim, near Frankfort-on-the-Main, Assignor to Chemische Fabrik Griesheim, Frankfort-on-the-Main, Germany.

477,381. Air Compressor. Arthur O'Brien, Helena, Mont.

477,418. Brick Kiln. Michael J. Haynes, Toronto, Canada. Assignor to John McLean French, same place.

477,490. Method of Purifying Alloys of Iron and Chromium. Joseph Bedford, Sheffield, England.

477,527. Apparatus for Vaporizing Acids in the Manufacture of White Lead. Edward V. Gardner, London, England.

477,623. Metallurgical Furnace, Michael R. Conley, Brooklyn. N. Y.

PERSONALS.

Mr. E. C. Van Blarcom, mining engineer, of San Francisco, is in Mexico examining some of the mines of Pachuca.

Mr. H. H. Schlapp, metallurgist of the Broken Hill Proprietary Company, of Australia, is visitiug the United States, and sails on 25th for England. He will shortly return to this country on his way to Australia.

Mr. George W. Childs has offered a prize of $50 to the students passing the best entrance examination to the Scientific School of Princeton College.

Messrs. John Thompson and Edward Hooper, of the firm of Bewick, Moreing & Hooper, have finished their examination of the mines in Pachuca, Mexico.

Mr. Leo von Rosenberg, of New York, left for Colorado on Monday last, in connection with important mining business. His address will be Hotel Metropole, Denver.

Prof. Coleman and Louis B. Stewart, of the Toronto School of Practical Science, have started on a trip to Mount Brown, a peak of the Rocky Mountains, 200 miles from the town of Calgary, on the Canadian Pacific Railway.

Messrs. E. E. Olcott and John A. Church, the distinguished mining engineers, are engaged in a thorough examination of the mines of Pioche, Nev., which will probably take some months.

In September last the assignment of S. V. White & Co. was announced in Wall street, and was accompanied by many expressions of sympathy and respect for Mr. White. It is always a pleasant thing to be able to record instances of the success of honorable business men and of the public appreciation of their upright dealings. A very notable instance is that of Mr. S. V. White. The assignee of his firm has been discharged and the sureties are released from all liability, all the creditors having discharged all claims which they had against the firm. A very agreeable and noteworthy feature of the case is the fact that all of Mr. White's creditors released him voluntarily, and not one cent was paid by the assignors to them, nor was any note given. Each creditor relied absolutely on Mr. White. This is certainly an extremely gratifying testimonial to the esteem in which Mr. White is held by those with whom he has been doing business for many years, as one of the heaviest brokers in New York.

OBITUARY.

Sir James Brunlees, a past president of the Institution of Civil Engineers, of London, died recently. He was connected mostly with British railway work, but he spent some time in the service of the Emperor of Brazil.

John Whitelaw, superintendent of the Cleveland Water-Works, died on June 16th, aged 51 years. He received his engineering education under John Shier, a noted Canadian engineer. Returning to Cleveland, he entered the City Engineer's office and was himself elected City Engineer on five occasions. He was placed in charge of the water-works in 1867, when it supplied but 1,900 people. To-day it supplies 237,000 people, and has 343 miles of pipe, this increase being made under his direct supervision.

SOCIETIES.

The regular meeting of the Civil Engineers' Club, of Cleveland, was held at the club rooms June 14th. Mr. Irving Mason Wo'verton was elected an active member. The discussion of the evening was on the annual address of the retiring president, Mr. Gobeille, on the subject "The Financial Status of the Engineer."

The thirteenth regular annual meeting of the Scandinavian Engineering Society was held May 19th, 1892, in the Sherman House, Chicago, at 8 p. m., 23 members being present; the president, Mr. Allan Strale, in the chair. The minutes of the twelfth regular meeting were read and approved. Mr. H. Chr. Dreyer's application was announced as favorably passed upon by the board of directors. The committee on topical discussion presented a lengthy report and proposed topics for all meetings until Sept. 15th; also a general list of topics. The society then proceeded to the annual election of officers. The following were elected: President, Mr. Allan Strale; vice-president, Mr. Sederholm; second vice-president, Mr. Pihlfeldt; corresponding secretary, Mr. C. F. Franson; recording secretary, Mr. Alf. Garde; treasurer, Mr. Chr. Holth; librarian, Mr. A. F. Anderson.

The American Society of Civil Engineers held its annual convention at old Point Comfort, Va., on June 8th-13th. The new president, Mr. Mendes Cohen, delivered his inaugural address, the subject being the early history of the Baltimore & Ohio Railway. The papers read were "Uniform Practice in Pile Driving," by Mr. Foster Crowell; "The Iron Wharf at Fortress Monroe, Va.," by J. B. Duncklee; "The Iron Coal Pier of the Norfolk & Western Railroad at Norfolk, Va.," by W. W. Coe; "Rainfall, Flow of Streams and Storage," by D. Fitzgerald; "Black Eagle Falls Dam," by M. S. Parker; "Bridging Canyons Lengthwise," by H. V. Hinckley; "Foundations," by A. P. Boller; "Hardening Structural Steel," by A. C. Cunningham; "Tests of Full Sized Eye Bars," by F. H. Lewis; "Experiments on Iron and Steel Joints," by B. P. Flint; "Thin Floors for Bridges," by A. F. Robinson; "Motive Power for Street Railways," by A. F. Sears; "Tests of Power Required to Drive Electric Street Cars," by L. B. Bonnett; "Construction and Cost of B. & O. R. R. Tunnel in Philadelphia," by W. W. Thayer; "Railway Emergencies," by C. M. Bolton, and "Increasing Cost of Railway Tie Renewals," by B. Reece. The recent rule adopted by the council for the suppression of the publication of the proceedings in technical papers came up for discussion, and from the remarks made the rule does not obtain favor among the members. We hope it will be rescinded.

The regular monthly meeting of the Montana Society of Civil Engineers was held on May 14th, 1892, at the office of Messrs. Sizer & Keerl, Second Vice-President Keerl in the chair. Members present: Messrs. Keerl, Haven, Jones, Foss, McRae, Wheeler, Pearis, Kelly, and Mr. Neustatter as a visitor. The minutes of last meeting were read by the secretary and adopted as read. Messrs. F. P. Gutelius and Thomas Weir were elected to membership in the society. The secretary read a letter from Mr. Weston recognizing Mr. Ross' appointment as alternate, in the place of Mr. Wilson, as representative to the Engineering Societies of the World's Fair Columbian Exposition. In relation to Senator Powers' Senate bill No. 663, a letter was read from the Hon. T. H. Carter, acknowledging the receipt of the committee's report on this bill, and stating that he had previous to the receipt of this report reported in favor of the bill to the department. Mr. Keerl announced in feeling terms the death of the president of the society, Col. W. W. De Lacy, at St. Peter's Hospital, and stated that the society were requested by his nephew to name two pall-bearers for the funeral on the 15th. Also that arrangements had been made on behalf of the society to have flowers placed in a suitable manner on the casket of the deceased, as a mark of respect and esteem. Mr. Haven moved that the society meet at the hospital to-morrow and attend the funeral in a body. Carried. A discussion followed as to the best means of preparing a memorial to perpetuate the memory of the deceased, and after several facts and interesting statements had been cited relative to Col. De Lacy's history, Mr. Kelly moved: "That the presiding officer of this meeting appoint a committee of three to act in conjunction with the officers of the society in preparing a memorial of our late president, Col. W. W. De Lacy, and that it be printed with a portrait, if possible." This was seconded by Mr. Foss and carried. Mr. Keerl appointed Mr. McRae, Mr. Haven and the secretary as the committee. Mr. Foss moved: "That the secretary in sending out notification of next meeting shall notify the members to send in a letter ballot for the office of president of this society." The motion being seconded, Mr. Kelly offered as an amendment: "That the secretary notify all members of the society of the vacancy in the offices of president and trustee, and that they be requested to send in a letter ballot for the offices of president and trustee for the unexpired terms." Mr. Foss, with the permission of his second, withdrew his motion and Mr. Kelly's amendment was carried.

INDUSTRIAL NOTES.

The United Electric Securities Company has declared a dividend of $1.50 per share, payable Aug. 1st to stock of record July 20th.

A meeting of 3,000 members of the Amalgamated Association of Iron and Steel Workers was held at Homestead, Pa., on the 19th inst., to consider the proposed reduction offered by Carnegie, Phipps & Co. The speakers all counseled moderation and firmness.

Senator Morgan introduced on June 23d a resolution for printing additional copies of the report of the committee on foreign relations on the Nicaragua Canal. He added that the Committee on Foreign Relations would not report its bill until after the elections in November.

Four firms, manufacturing about 65% of the cutlery made in the United States, have formed the United States Cutlery Company, of New Jersey, with a capital of $1,600,000—one-half 8% cumulative preferred and the rest common stock. A portion of each class will be offered for subscription at par in New York and Boston June 17th to 29th.

A joint conference of the Amalgamated Association and Tin Plate and Sheet Iron Manufacturers agreed upon a scale at Pittsburg, Pa., on the 22d inst., after an all night session, and the mills will be run without interruption. The scale is the one presented by the workmen, with a few changes favorable to the manufacturers.

The Berlin Iron Bridge Company, of East Berlin, Conn., are building a new machine shop for the Solvay Process Company at Syracuse, N. Y. The building will be 50 ft. wide by 300 ft. long and three stories high. The side walls will be of iron and brick (combination construction), with iron floors and iron roof covered with the Berlin company's patent roofing.

Mr. W. H. Perry, the third in importance of the granite manufacturers at Concord, N. H., signed on June 21st the two years' bill of prices, as submitted by the National Union, to terminate May 1st, 1894. This is a victory for the union. One of the manufacturers said that if the report were true the ring was broken, and all the manufacturers would soon succumb to the inevitable and sign the bills.

The joint conference of the Amalgamated Association and the tin plate and sheet iron manufacturers agreed upon a scale on June 22d, after an all-night session, and the mills will be run without interruption. The scale is the one presented by the workmen, with a few changes favorable to the manufacturers. A conference to consider the iron and steel scales was held on July 23d.

The Cleveland-Cliffs Iron Company are looking for a new furnace site, Mr. A. Farrell, the consulting engineer, being now on the peninsula examining the relative merits of Negaunee, Escanaba, Marquette and Ishpeming. Mr. Farrell stated at a meeting of the Ishpeming Council that the plant would consist of twin stacks, each 70 ft. high, with 14½-ft. bosh. This company has already closed down its old Pioneer furnace at Negaunee.

Messrs. Curtis & Curtis, of Bridgeport, Conn., manufacturers of the Forbes patent die stocks, pipe cutting and threading machinery, have just received word from the United States Government that their heavy power pipe cutting and threading machines have been chosen, in competition with all other makes, for use in the Navy Yard at Boston. These machines have complete range from 2½ to 8 ins., and they are now engaged in filling a large order for them.

The suit brought by the Westinghouse Electric Company against the Edison Company on the Weston patent for the hydro-carbon treatment of the filaments of incandescent lamps, has been decided in favor of the Edison Company by Judge Acheson, of Pennsylvania. This has been regarded by the Westinghouse Company as one of its strongest and most important patents, and electrical people consider the decision a severe blow, following as it does the recent decision in New York against the Westinghouse interests on the broad Edison lamp patent.

The twelfth annual convention of the Boiler Makers' and Iron Ship Builders' International Union took place in Cleveland, O., on June 20th. The Monday sessions were given to the examination of credentials and the appointment of committees. The most important work was done on Wednesday, June 22d, the last day of the session. On that day the officers were elected. Action was taken on the strikes in Boston and Chicago. There the men are striking for a nine-hour day for new work and an eight-hour day for repair work. The employers are willing to give these hours for a corresponding reduction in wages.

The representative of the Carnegie Homestead steel plant and a committee of the Amalgamated Association, representing the 4,500 workmen, held an all-day's conference on the wage scale on the 23d inst., and adjourned in the evening to meet again on the following day, without reaching a settlement. The workers' committee went into the meeting with an almost unanimous protest from the employees against the acceptance of the Carnegie scale. It is understood that they will agree to a 10% reduction in the finishers' department, but will make no other concessions. At a mass meeting of the 1,600 unskilled laborers at Homestead it was decided to stand by the Amalgamated Association.

Pierce & Miller Engineering Company, 42 Cortlandt street, New York, have succeeded the firm of "Pierce & Thomas," and will continue business at the old stand. The officers are as under: F. M. Pierce, president; Jno. D. Miller, vice-president; F. M. Schmerber, chief engineer; W. B. Hadley, electrical engineer; W. H. Stalnacker, secretary and treasurer. The policy of the new company will be to cater more especially to "mine equipment" for the concentration and milling of ores, having in view economical operation of the plant, with the best engineering practice. The new company continue the agencies controlled by the old firm.

Work has been commenced on the shops of the Illinois Central Road at Burnside, Chicago, between 95th and 99th streets. Fully $500,000 will be expended this season, while the total expense, when the company's plan has reached its full outcome, will have reached the aggregate of $2,000,000. The company owns 160 acres at Burnside. About half that area will be covered by the buildings to be erected this season. They will be as follows: Machine and erecting shop to be two stories high, 550 × 160 ft.; boiler and blacksmith shop, 550 × 100 ft.; brick power house for boilers, 60 × 80 ft.; brick storehouse, two stories and basement, 60 × 300 ft.; 40-stall roundhouse, with a 40-pocket coal chute, sand houses, oil houses, etc.

The following is an official statement of the condition of the United Electric Securities Company on June 1st, 1892: Assets—Stocks, $1,026,400; bonds, $286,750; notes and accounts receivable, $20,799; accrued interest, $20,656; office furniture, $209; cash, $41,474; total, $1,396,291, less reserve of stocks in excess of capitalization, $319,193, leaves $1,077,097, to which must be added the four series of bonds deposited with American Loan and Trust Company to secure Collateral Trust 5% bonds; total, $1,497,000, giving a gross total of assets of $2,574,097. Liabilities—Capital stock, $1,000,000; Collateral Trust 5% bonds, $1,006,000; reserve of 20% of first mortgage bonds to secure Collateral Trust's

bonds, $310,648; guaranteed fund of July 31st, 1891, $26,577; surplus May 31st, 1892, $230,872, giving total of $2,514,097. On July 31st, 1891, the surplus was $50,000.

The decision of Judge Acheson in the case of the United States Electric Lighting Company (the Westinghouse) against the Edison Lamp Company, which was published a few days ago, had to deal exclusively with the Edward Weston patent with the hydrocarbon process used in the manufacture of incandescent burners. The Edison people's defense was on the ground that the Weston patent was illegal, inasmuch as the same device was invented some time before the Weston claim was made to the latter patent. The court sustained this defence. There is another patent on the same process taken out by Sawyer & Man, and also owned by the Westinghouse people. Inasmuch as this company discredited the Sawyer-Man patent in its prosecution, it would seem to indicate that it considered the Weston patent the legal one. The fact that it pleaded control under the Weston patent will forever shut it off from action against the Edison under any other patent. However, these facts do not discredit the legality of the Sawyer & Man patent, which is owned by the Westinghouse company.

The Southern Lime Association concluded a three days' session. The association formally agreed upon a comprehensive plan for the guidance of lime manufacturers and the improvement of the industry. No fixed prices were agreed upon, except in that the price at the kiln for lime shipped to the local districts shall be 60 cts. a barrel. For lime to New Orleans, which is the largest market in the South, manufacturers are left to their own discretion as to prices. At the meeting 10,000 barrels a day were represented, covering the States of Mississippi, Kentucky, Tennessee, Georgia, Alabama and Arkansas. In addition to this 3,500 barrels a day were pledged to whatever agreement. This represents a grand total of over 2,200,000 barrels a year. A committee was appointed, consisting of President F.A.Vaughan, Roanoke, Ala., and Messrs. J. D. Hardy and J. B. Randall, of Calera, and D. H. Bugro, of Erin, Tenn., to go the rounds of all the lime kilns in the association's territory and personally consult with the manufacturers. They begin their work next week. The head office of the association will be in Birmingham, and it is expected that it will be opened in two or three weeks. The management will be under the direct management of President Vaughan and the other officers of the association. The importance of the lime industry may be realized when it is stated that in Shelby County, Ala., alone 2,500 persons are dependent upon it for a living. In that county it exceeds the coal and iron industries combined.

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 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.

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

GOODS WANTED AT HOME.

2,708. Second-hand diamond prospecting drill, to go 1,000 ft.; 1 to 1¾-in. core. New York.

2,709. Second-hand Hoskins assay outfit. New York.

2,710. A riveting machine for splicing cotton hoops together. North Carolina.

2,711. A full outfit for a planing mill with a capacity of 25,000 to 30,000 ft. per day; also boilers, engine, dry kilns, etc. Pennsylvania.

2,712. A 48-in. swing lathe for turning and boring pulleys. Virginia.

2,713. Engine, boiler, elevator, heating apparatus, etc. Tennessee.

2,714. A 6-H. P. threshing outfit, consisting of a 6-H. P. mounted engine and separator, or mounted 6 horse sweep power and separator. North Carolina.

2,707. 3,000 ft. second-hand 12-lb. T-rails. New York.

2,715. A set of well-drilling tools. Florida.

2,716. 10,000 ft. 10-in. wrought iron pipe. Virginia.

2,717. A 10-H.P. marine engine. North Carolina.

2,718. 25 tons 16 to 20-lb. T-rails, fit to relay, with splice plates, bolt nuts and spikes to complete the same. Virginia.

GENERAL MINING NEWS.

ALABAMA.

Jefferson County.

Blossburg.—The mines operated at this place by Maj. E. M. Tettwiler, who leases the coal from the Sloss Iron and Steel Company, have been well opened up, and during the past two years a good business has been done. Work has been a little slack lately. They have a slope opening into the Pratt seam, which averages 3 ft. 10 ins. in thickness. The underground work is in charge of Mr. James Kelso. The coke-oven plant, with 150 beehive ovens, is in full blast. The average output from these mines has been 1,500 tons daily when in full operation. A large amount of coal is shipped to the general trade.

Sloss Iron and Steel Company.—This company opened two fine, large mines at this place, six miles south of Coalburg, several years ago. These two openings were made into a large tract of fine coal, averaging 3 ft. 3 ins. in thickness. This branch of their mine department is operated by the company under the supervision of Mr. John Byron, assisted by Mr. C. E. McMillan as mining boss. They employ 175 men at present. They also operate seven of the Ingersoll coal mining machines, each having capacity for 50 tons per day. At the tipple a large coal crusher is operated, through which the small coal is run and prepared for the coke ovens, thus improving the quality of the coke. Here they have a plant of 190 coke ovens, all in blast, shipping the coke to the North Birmingham furnaces. They are now engaged making another opening into a large tract of coal which they hope to have ready by the time the fall and winter trade opens. This opening will be made so that the coal will be brought, forwarded and loaded from the large tipple now in use.

Tuscaloosa County.

Standard Coal Company.—This company is putting up at their Brookwood mines the largest coal washer in Alabama, and the largest in the South with the possible exception of one or two in West Virginia. The capacity of this washer will be 500 tons a day, sufficient to serve 200 coke ovens, and the cost of it will be fully $30,000. It will be ready for use by August 1st, and will add greatly to the value of the Standard Company's coke.

ARIZONA.

Mohave County.

(From our Special Correspondent.)

A very promising discovery has been made near Cold Springs. An Indian brought some rich pieces of ore into a camp about 60 miles north of Kingman, and for a reward of $200 guided a party to the spot. Five veins of high grade ore were found and five locations have been made on each vein. The discovery is reported as one of the richest and largest made in the territory, the ore that has been tested running into the thousands.

CALIFORNIA.

(From our Special Correspondent.)

The discontent of the valley ranchers against the hydraulickers, recently fanned again into flame, has culminated in a convention of the valley counties being called to meet at Sacramento this week. The executive committee of the Miners' Association, at their last meeting, tried to bridge the difficulty by adopting resolutions reiterating the main facts of the controversy. A conference committee has been appointed to represent the association at the Sacramento convention to try and restore the harmonious feeling previously existing.

The valley farmers' convention that met at Sacramento did their best to reopen the chasm that has separated the rancher from the miner, but which, it was thought, had been forever closed when the appeal to Congress was made with the purpose of resuming hydraulicing in this State. A series of resolutions were adopted, embodying the feeling of the convention, which were adverse to the resumption of hydraulic mining, and a general denial made that the valley people had at any time consented to its continuance. An executive committee was appointed, consisting of 15 members, with power to take such action as they may deem proper. The members of the boards of supervisors of the various counties concerned have been requested to meet at Sacramento on August 6th for the purpose of consulting and consolidating their efforts for the prevention of hydraulic mining.

Mono County.

Bulwer Mining Company.—The following is the latest letter from the superintendent: The work done in the mine has been principally in repairs preparing to stope out ore. The main drift 100 level has been cleaned out and timbered the whole length. No. 6 chute and upraise, which has been repaired, is again in good order. Upraise from south drift from 6 upraise was extended 6 ft. in ore of fair quality. Commenced to haul ore to the Bodie mill on the 12th inst.

Bodie Consolidated Mining Company.—The last official weekly letter from this property says: Upraise 400 level was extended 5 ft.; the ore in face is from 6 to 8 ins. of fair milling. South drift upraise was extended 6 ft. The ore in this drift is about the same as in the above upraise. We are still putting in the machinery in the mill.

Mono Mining Company.—A small seam of good ore is still showing in upraise No. 2, above the 600 level.

Nevada County.

(From our Special Correspondent.)

Champion Mining Company.—A dividend of 10 cts. per share, payable on the 20th, has been declared.

W. Y. O. D. Mining Company.—A dividend of 10 cts. per share has been declared.

San Bernardino County.

Temescal Tin Mining Company.—A correspondent of the Denver "Evening Post" writes that the "average yield of ore of the Temescal mine is 2½%, and with the proposed addition of machinery the output of block tin for the coming year may amount to 500 tons (tons of 2,000 lbs. each). If in future prospecting other ore deposits are found that justify it, outlays may be made with a view of increasing this product; otherwise the work will be confined to its present limits.

COLORADO.

El Paso County.

Anaconda Gold Mining Company, Cripple Creek.—All litigation between the Work Mining Company and the Anaconda Mining Company has been settled by the formation of the Anaconda Gold Mining Company. The new corporation absorbs all the Anaconda properties, the Lone Star, the Work properties that conflict with the Anaconda, the Coronado properties, and, in fact, becomes practically the owner of all the properties along the great Anaconda vein, which has been developed for over a mile. The company has a capital stock of $5,000,000 divided into 1,000,000 shares of $5. Mr. D. H. Moffat is president, and Mr. Eben Smith, general manager. The First National Bank of Denver has been selected as the treasurer of the company, and provision has been made for capital to thoroughly develop the great vein of which the company has become the owner. The new company is now making careful and exhaustive experiments to ascertain the best mode of treating the ore from the Anaconda vein here, and it is said that these experiments will probably result in the construction of a large mill or smelter in or near Fremont.

Lone Star Mining Company, Cripple Creek.—It is reported that a deal was made on the 16th inst. by which the Rustler and Puffer lodes, owned by the Work Mining Company, were sold to D. H. Moffat, of the Lone Star Company, for a consideration said to be $275,000.

Pharmacist, Cripple Creek.—Another strike has been made in this mine on Bull Mountain. The vein has widened to 10 ft. Nine tons of ore recently shipped to Denver ran $283 per ton, or a total of $2,547 for the entire shipment.

Gunnison County.

Ruby King Mining Company, Crested Butte.—According to the local papers the most important mineral discovery made in the vicinity for a long time has been the cutting of the Forest Queen vein in the Ruby King tunnel. The mineral found is said to be rich. Wire silver is found, which is something unusual for the camp. The Ruby King Company must drift nearly 150 ft. on the vein before it gets under the rich ore chute above.

Lake County.

(From our Special Correspondent.)

A. Y. & Minnie Mining Company.—Shipments from this consolidation for the month of May will reach the total sum of 1,400 tons, consisting of an equal amount of carbonates and sulphides. This was principally mined from the Sellers upraise on No. 3 chute, where most of the work is being done at present, although some ore is being mined from the No. 2 chute and occasionally on No. 4 chute.

Berdella Mining Company.—The new concentrating mill recently purchased for the Berdella has now about been put in place, and this mine will be in condition to resume operations by June 15th at the latest. A new pump station has been cut at the 170-ft. level, which, before completed, revealed a fine streak of high grade mineral. Drifting is to be commenced shortly from this point to catch the hanging wall, and another drift will soon be started from the lower level of the shaft to strike the foot wall some distance to the west.

Colorado Sellers Mining Company.—This mine has resumed operations after an idleness of several months, caused by the fact that no market could be found for the class of ore predominating in those workings. A six months' contract has, however, been made by the present lessee, Mr. Sam Nicholson, by which the total product from the Sellers for that length of time is to be shipped to the Arkansas Valley smelter in this city. The concentrating mill on the Sellers has also been started up and is treating an average of 50 tons per day of an excellent grade of lead sulphides.

Grey Eagle Consolidation.—The Pocahontas shaft was recently examined with a view to resuming operations at that point, and was found to be entirely devoid of water. This drainage is caused directly by the pumping going on at the city mines, and the Grey Eagle is affected in a similar manner. As these two mines are located near the upper portion of the great Leadville basin, but little further trouble is to be apprehended from the water nuisance so long as the pumping is continued at the city mines, which serve as an artificial outlet for the water above and underlying the city. Work is therefore to be resumed at once on the Pocahontas, which will be the first developed in its upper workings. It is not known

yet whether or not to sink the shaft deeper, as the ore found at the bottom took an abrupt pitch downward and cannot be profitably worked without much drifting and stoping.

It has been necessary to put in a pair of new 80-H.P. boilers at the Penrose shaft before attempting to lower the water in this property, which will not be effected for a week at the earliest. The water is now held at the lower level, 150 ft. from the bottom, and it is thought that with the aid of the two new boilers the water can be taken out in a few days after operations are again commenced. At the Bohn shaft one of the large pumps recently gave way, which has delayed operations at that point for several days. Two new sinkers have been put in and pumping will be commenced there again at an early date. The big station at the lower level of the Sixth Street will not be finished until next week, when pumping will again be started.

Gold Bug Consolidated Mining and Milling Company.—A fine 7-ft. vein of high grade gold ore has been opened up in the mine owned by this company, 12 miles above Twin Lakes, and a large amount of ore is now being taken out. This, however, is being stored on the dump for a short time, in order to save it until a new stamp mill has been erected on that property. Parties are now in New York City on that mission, and it is expected that the contemplated mill will be in running order within the next two months. The old mill on this ground has been closed down and will not be started again, as it has been found that this plant is much too small to handle the ore produced at that mine.

Jay Bird Mining Company.—The long drift at this property has now issued from the lime and is entering the contact. Some very good iron ore has already been encountered, the silver value of which is far above the average.

Mahala Mining Company.—About 45 ft. of sinking has so far been accomplished at the Mahala, and probably 20 ft. yet remain to be sunk before the body of sulphides recently opened up by the diamond drill at the second contact has been reached by the shaft. A new pump, however, will be put in before this sinking has been finished, so that if any amount of water is encountered the pumping plant will be entirely adequate to meet all emergencies. Shipments from the Agassiz lease on this property during the month of May aggregated 200 tons, just enough to cover the running expenses while the mine was being put in proper order to ship from the main shaft.

Mount Elbert Mining and Milling Company.—Arrangements are being made by this company for the erection of a 40-stamp mill, work upon which will commence immediately. A 4-ft. vein of fine concentrating ore has been uncovered in Nos. 3 and 4 tunnels, upon which the mill now on that property is now working. The rich ore is all sent to Denver for treatment, as the mill at the mine is of too imperfect a character to treat the ore without losing a large per cent. of its value. This company also possesses one of the greatest water powers in the State, and the new mill is to be run by electricity, the motive power of which will be furnished by water power.

A strike is said to have been made in the Gordon mine in the Twin Lakes district. One of the owners said recently the strike was in free gold and consisted of a 5-ft. vein, 1 ft. of which would run $75 to the ton, and the remainder would average $50. The company has completed arrangements for operating on an extensive scale.

New England Mining Company.—The diamond drill at the Ohio Bonanza shaft of the New England has been sunk to a depth of 850 ft. and is still in porphyry. The cores show that the formation at this depth is heavily impregnated with iron, but unless something extremely rich should be found before long the cost of sinking the shaft to that depth will be more than the venture is worth.

The drill has opened up a large body of ore at a depth of about 1,000 ft. from the surface, which has given assays of 30 oz. silver to the ton and runs 70% lead. Eastern parties interested in this property are now in the city making arrangements to sink the shaft to that depth, and this will be commenced just as soon as the necessary arrangements to that end can be completed. This body of ore was encountered at the lower verge of the porphyry, bordering on the lime, and has been expected for some time, as small stringers of galena were brought up by the drill core recently, which increased rapidly in size and value as depth was gained.

Sierra Nevada Mining Company.—This mine, since its resumption of operations three weeks ago, has turned out a total product of 200 tons of zinc sulphides, all of which was shipped to the Canyon City Zinc Works, where it finds a ready market. Operations will be resumed at this property in a few days with a much larger force of men.

Thespian Mining Company.—A new drift has been started from the main level, 200 ft. nearer the shaft than where the former work was carried on, which is now being driven through the contact on the lime in an easterly direction. Nothing of importance has as yet been encountered in that direction, and should this continue to be the case, by the time 30 ft. more has been driven operations will be changed and work be carried on in another direction. The two winzes, work upon which was recently discontinued owing to the influx of surface water, are also soon to be sunk some deeper in order to cut through the lime.

Valley Mining Company.—The Valley shaft has now reached a depth of 125 ft., and drifting has ensued from that point to the northeast to open up the ore body discovered in the old workings. It is estimated that 40 ft. of such drifting will be necessary before the chute is encountered, but the drift is being carried forward in such a position that the ore can be worked to much better advantage than formerly.

Ouray County.

Ironclad Mining Company, Ouray.—The manager of the Ironclad mine is quoted as saying that the property is showing up well. The main drift in the contact is now in 110 ft. in the mountain, with from 4 to 6 ft. of ore for the whole distance. Two car-loads of ore have just been received at the Omaha & Grant smelter, which were taken out while driving the tunnel, and show that the grade of ore is increasing steadily in the last 30 ft. The two car-loads carry from 1¼ to 2 oz. in gold, besides quantities of silver and copper. On the continuation of the cave south there is now 8 ft. of solid copper and iron pyrites worth $15 to $25 per ton.

Rio Grande County.

Little Annie Gold Mining Company, Summitville.—The sheriff will sell the property of this company at Summitville at public sale. It is understood at Del Monte that the property is to be bought in by parties representing Posey & Crawford, who will at once begin active work on the Annie property.

IDAHO.

Alturas County.

Hailey.—The Champlain mine and mill have started up; work has also been resumed in the Wolftone, and the Silver King, at Sawtooth, is yielding abundance of ore. A vein of from 4 to 15 ins. of high grade ore has been discovered in the Algent mine.

Boise County.

Milwaukee & Idaho Mining Company.—J. J. Smith, manager of this company, has his prospecting mill at the Gordon Fleece mine, a mile east of Centerville, says the Anaconda "Standard." He has placed a whim over the shaft at the mine and commenced sinking. As soon as he is deep enough to satisfy himself as to the permanency of the mine a crushing will be made to ascertain just what the ore will yield when reduced in a stamp mill. If the returns are satisfactory, the company Mr. Smith represents will purchase the mine.

Washington.—The pumps are lowering the water in this mine, in Gambrinus district, rapidly, and the owners expect to put a force of 40 or 50 men to work about July 1st.

Wolverine.—The work of sinking the Wolverine shaft at Banner from the 500 to the 600-ft. level has commenced. William Gibbs, who has the contract for running 1,000 ft. in the Banner tunnel, has a full force of miners at work. On the completion of his contract it will be in 1,800 ft.

Custer County.

Bayhorse.—The smelting works at this place and at Clayton are still idle, and it is said that they will not be "blown in" unless the price of silver advances.

Owyhee County.

Silver City.—Good ore has been struck in the south drift of the Black Jack on Florida Mountain, but the extent of the find is as yet unknown. The ore is thickly impregnated with silver. Three shifts are working in the Venus tunnel, which is in 535 ft. and near the vein. A cross-cut has developed a 2-ft. vein of good silver ore in the Dempsey.

Shoshone County.

Mother Lode.—It is reported that this mine is producing $2,700 per week, and that arrangements are being made to add 5 more stamps. Plenty of water is giving the miners a rich harvest.

KANSAS.

Cherokee County.

During the week ending June 18th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,747,910; rough ore, pounds sold, 1,052,850; zinc ore, pounds sold, 593,430; lead ore, pounds sold, 117,250. Sales aggregated a total value of $9,414.

MICHIGAN.

Gold.

Fire Center Gold Mining Company.—On this property and midway between the Beaver and Crescent properties, a quartz vein, 2 ft. wide, located in granite, has just been found. The rock is rich in free gold, says the Ishpeming "Iron Ore."

Copper.

Kearsarge Mining Company.—The fire at the Kearsarge rock house will show a loss of over $15,000, and will stop production about two months. There are strong suspicions of incendiary work.

Iron County.

Dickinson Marble Company.—This compauy has been organized to work the marble quarry near Metropolitan. The deposit is reported as being 300 ft. thick and a half-mile long. Operations will begin at once.

Marquette Range.

Brotherton Iron Company.—The Brotherton, located about 200 ft. from the workings of the Escanaba River Land and Iron Company, has reached a depth of 250 ft., and a cross-cut just completed shows 77 ft. of clean ore. They have found ore behind their shaft, which was supposed to be sunk in the foot.

Cleveland Iron Mining Company.—At last it has been definitely announced that the hard ore mines of this company have been closed down. By the suspension over 300 men are thrown out of employment. The reasons assigned are that the company have large stocks of ore on hand which cannot be sold. The demand for hard ores is weak, nad prices are so low that it is impossible to work at a profit. Two things have conspired to produce this state of affairs, viz., high freights and the dislike of furnacemen to the ore. They say that these ores are hard to work and must be crushed before being fed, and consequently they are not worth more than the hematites, although the latter contain 7 to 8% of water, whereas the hard ores contain none. These mines were the second to be opened in the Lake Sueprior district, and there is still much ore in sight, which, however, is not available at present prices and rates of transportation. The company will now turn its attention to its hematite mines, notably that under Lake Angeline, where they have for some time been making preparations for mining. The presence of 15 to 40 ft. of water over the ore of this mine necessitates careful management and a large outlay of money. It is reported that the pumping machinery is already in position.

Excelsior Furnace.—The company is making 30 tons of pig per day, says the Ishpeming "Iron Ore," and expect, with improvements soon to be completed, to add 10 tons per day to this output. They are running on a mixture of Lake Superior, Cambria and Marquette ores.

Iron Cliffs Mine.—This property, which belongs to the Cleveland-Cliffs Iron Company, has shipped but little ore this season, says the Ishpeming "Iron Ore." The ore is a non-Bessemer, but high in iron. It is reported that the company is carrying large stocks of ore and pig which cost over $1,000,000 to produce.

Lake Superior Iron Mining Company.—This company reduced its rate of wages on June 20th. They have a large stock of both hard and soft ores on hand, and prices are very low, which fact necessitated a movement of some kind, more especially as freight rates remain the same. There is some talk of building a road between Marquette and Ishpeming in order to secure cheaper rates. This company, in order to reduce the cost of marketing its product, has only recently spent upward of $1,000,000 in new boats. It employs 1,100 men, and its daily output is about 1,500 tons. Additions are being made to its section 16 mine, and prospecting shafts are being sunk to develop any ore bodies which may exist in section 21.

Winthrop Iron Company.—The greater part of the output of this company comes from the Mitchell mine, operated under lease from the Pittsburg & Lake Angeline Iron Company, the royalty being 40 cts. per ton. The Ishpeming "Iron Ore" reports the company as working under a loss, and that the royalty will have to be reduced.

Iron—Menominee Range.

Great Western.—About 10,000 tons have been shipped this year, says the "Diamond Drill," and the stock pile contains about 50,000 tons more. It is the deepest mine in the district, being opened up to the 9th level at a depth of 700 ft.

Wagner Iron Company.—Explorations continue on this property. The shaft is now down 100 ft. According to the Crystal Falls "Diamond Drill," a north drift in 80 ft. shows 32 ft. of ore discontinuing abruptly against a bed of sand. A south drift in 20 ft. is nearly all in ore, but not such clean ore as desired. It is the intention to lower the shaft 100 ft. more and continue drifting and cross-cutting.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, June 20.

Saturday evening closed a fairly prosperous week in the lead and zinc mines. The output of some of the mines was retarded on account of extremely hot weather, causing bad air where there was a lack of ventilation. Zinc ore was in good demand at an average price of $25.50 per ton, while some choice lots sold at $27. Lead ore is on the decline, and closed at $23.25 per thousand. Following are the sales from the different camps: Joplin mines, 1,174,070 lbs. zinc ore and 247,150 lead, value $20,965.60; Webb City mines, 295,860 lbs. zinc ore and 36,790 lead, value $3,618.40; Carterville mines, 1,604,820 lbs. zinc ore and 142,630 lead, value $24,106.30; Zincite mines, 341,270 lbs. zinc ore and 4,840 lead, value $4,506.20; Oronogo mines, 53,930 lbs. of lead ore, value $1,240.40; Carthage mines, 199,150 lbs. zinc ore, value $2,488; Galena, Kan., mines, 597,430 bs. zinc ore and 117,250 lead, value $9,454; district's total value, $66,378.90. Aurora, Lawrence County, mines, 435,000 lbs. zinc ore, 620,360 lbs. silicate, and 196,000 lbs. lead, value $13,483. Lead and zinc belt's total value, $79,861.90. The most noteworthy transaction of the week was the final arrangements of detail closing the sale of the Center Creek Mining Company's property at Webb City to an English syndicate. The consideration was $600,000. This sale has been pending for several months, and several trips have been made across the water by the principals in the deal. This transaction has again started the smelting scheme bubbles afloat in the air, and they are hovering around Joplin, Webb City,

and Carterville, but do not seem to have ballast enough in them to settle down at any particular point. Mr. S. C. Cook, of the Oswego Mining Company, has just returned from the East, where he has been for some time reorganizing and increasing the capital stock of the Oswego Lead and Zinc Mining Company. The company now have a capital stock of $500,000. It is understood that they intend to push work on their property stronger than ever.

MINNESOTA.

Mesaba Range.

A large and serious strike is threatened at the mines on this range. The Minnesota mine, employing 1,400 men, shut down June 17th, and the shafts are filling with water. About 300 Italians and Austrians concluded to have a holiday, the result being that the operation of the mine was somewhat crippled. This morning 315 Italians and Austrians were laid off, and all day trouble has been brewing. Shortly before 7 o'clock, when the night shift arrived at the mine, they were met by the strikers, armed with clubs, and driven down the hill. The engineers were driven from the engine rooms, the firemen and pumpmen from their positions, and the fires extinguished. G. W. Wallace, superintendent, while endeavoring to induce the engineers to remain at their posts, was fired at twice, but in the excitement escaped. A few men were hurt. Three Cornishmen were carried home. Anyone seen with a dinner pail was promptly held up and prevented from going down the shaft. President Bacon arrived on the ground at 7:30 and has asked the strikers to state their grievances. Surfacemen's wages were reduced 10% last week and they demand that former rates be restored. Strikers have been stationed at the various shafts and will probably guard them all night to prevent the starting of pumps until the company accedes to their demands. Shipping is stopped and 20 ore trains on the Iron Range Road are tied up.

MONTANA.

Jefferson County.

Montana & Bay State Mining Company.—J. J. Sherburne, general manager, is putting up a steam hoist to operate the Crossaline group of mines, located near the headwaters of the left hand fork of Indian Creek. The hoist, which is of the Lidgerwood pattern, is now upon the ground—save the boiler—and will be in full operation about the 1st of June. It has a capacity to hoist from a shaft to a depth of 500 ft. He has now one shaft down to a depth of 40 ft. and another to 60 ft. The lead at the bottom of the latter is 5 ft. wide and carries some rich gold and silver rock.

Whitetail.—The owners of the placer grounds in this vicinity have banded together and intend to open up the mines with a Chinese pump. In this way they can prospect to a depth of 30 ft. If the investigation results favorably, it is said that the present owners will form a stock company.

Lewis and Clarke County.

Belmont.—The negotiations for the sale of the Belmont mine, conducted by Hon. E. D. Edgerton, of Helena, have reached a favorable conclusion, the purchasers being Washington Becker and associates, purchasers being Washington Becker and associates, of Milwaukee, Wis., says the Montana "Mining Journal." Some months ago Mr. Edgerton obtained a bond of the property from the Frue estate and put a crew of miners at work to clean up the workings and open new ground, the work resulting in disclosing bodies of pay ore, which, under the existing conditions for economical working, can be extracted and reduced with profit. The old mill was equipped with plates only; under the present ownership pans and settlers will be added, enabling the saving of all the values of precious metals contained in the ore. The mine is extensively developed, there being a tunnel 1,250 ft. in length, the breast of which is in the vein at the depth of 600 ft. from the surface, the ore body being from 2 to 14 ft. in width.

Mountain Ruby & Sapphire Mining Company (Limited).—A force of 50 men is at work on this company's claims. The water will be taken from Trout Creek, eight miles distant. The first five miles of the ditch have already been constructed, and it is expected that the remaining two miles will be completed in two months. The ditch has a capacity of 800 miner's inches.

Silver Bow County.

Anaconda Mining Company.—One of the most serious consequences of the blockading of the railroads is the shortage of timber at the mines of the Anaconda Company, says the Anaconda "Standard." All the timber that can be obtained in the city has been purchased and old trestles are being taken down and the timber used. The mines have timber enough to last 48 hours longer, and there is a possibility of a shut-down at the end of that time in case the road to Missoula is not opened meanwhile.

NEVADA.

Elko County.

The following are the latest official reports from the Tuscarora mines:

Belle Isle Mining Company.—West cross-cut, 250-ft. level, extended 11 ft. South drift from north line, same level, has been started up and extended 8 ft. The face is looking very favorable for ore.

Coptis Mining Company.—A shipment of bullion valued at $7,000 has been made from the Coptis mine.

Found Treasure Mining Company.—The following have been elected officers of this company: P. C. Hyman, president; Thomas Cole, vice-president, and R. R. Grayson, M. A. Jackson, and J. W. Pew, directors. J. W. Pew was re-elected secretary, and the Bank of California, treasurer.

North Belle Isle Mining Company.—No. 1 north drift, 400-ft. level, extended 6 ft. No. 2 winze, No. 3 drift, same level, extended 13 ft.; vein small but good ore. West cross-cut from the top of No. 3 raise, same level, extended 23 ft., and is nearing a vein. North immediate, above the 400-ft. level, extended 8 ft., still in good ore.

Nevada Queen Mining Company.—Second level: South drift from No. 3 east cross-cut has been run 12 ft.; improved since last report, 1 ft. of ore. North drift from same cross-cut advanced 13 ft., exposing 1 ft. of good ore. From face of north drift to the face of south is 130 ft. West drift from No. 1 chute extended 19 ft., passing through 6 ft. second-class ore. South drift from No. 3 shaft extended 30 ft., showing seams of ore in face of drift. Stopes from No. 1 chute looking well; the first-class ore is extending further to south, increasing the length. Have hoisted and sent to the mill 145 cars first-class; battery assay, $199.28 per ton; also hoisted and sent to concentrator 886 carloads of second-class, average assay, $30.72 per ton. A letter from the superintendent of this company states that recently work had to be suspended in the stopes owing to a heavy inburst of water. The flow amounted to fully 500,000 gallons, but has since been under control, and the miners have gone to work in the stopes again and ore is being taken out as usual. Heavy rainstorms also rendered the roads unfit for hauling ore to the concentrating works for a few days.

Storey County—Comstock Lode.

The air currents in the Sutro tunnel connection with the Crown Point incline are being changed, and it is expected that in a short time there will be a sufficient circulation of air to enable the sinking pumps to be started by steam. The stoppage of the Alta pumps has as yet made no difference in the head of water in the Crown Point incline.

Mr. M. W. Fox has filed his bill of costs incurred in the prosecution of his suit against the Hale & Norcross Mining Company. It amounts to $18,279, and must be paid by the defendants. The largest item is for $13,040, paid to R. W. Collins for 652 days spent in examining records in Virginia City.

Belcher Mining Company.—Following is the latest official letter: The north drift on the 400-ft. level is now out 80 ft. from the switch. The face is in soft porphyry with a small seepage of water from it. There is no change of importance to report of the ore streak which we are still following and saving on the 2d and 3d floor above the 300-ft. levels.

Confidence and Challenge Consolidated Mining Companies.—The joint north drift on the 200 level is in 1,152 ft. The face shows porphyry and quartz of no value. The joint west cross-cut from the north drift on the same level is out 21 ft. The face shows porphyry. Some fair ore is being taken out from old fillings and streaks found on the upper levels, which is being shipped to the Brunswick mill for reduction.

Crown Point Mining Company.—Following is the latest official weekly letter: The west cross-cut from the end of the south lateral drift on the 600-ft. level is out 127 ft. It has reached the footwall and has been stopped. We are now engaged in cleaning out and repairing the west drift on the 230-ft. level, with the intention of advancing it to a point under the ore on the 160-ft. level. Are still following up on the pay streaks above the 160-ft. level, and are saving a few carloads per day of fair grade ore therefrom.

Consolidated California & Virginia Mining Company.—The latest official weekly letter from this mine says that on the 1,500 level, from the south drift at point of connection with the old stopes, we continue to extract some ore and fillings of average milling value. On the 1,600 level we have continued prospecting upward from the old sill floor of the old stopes, from which some ore of fair quality is being extracted, and some very good ore has been taken out along the ore streak on the east side of the old timbers. 1,650 level: Have extracted some ore of fair quality in prospecting west from the upraise.

Justice Mining Company.—The following is the latest official letter: The west drift on the 490-ft. level is out 910 ft. The face is still in hard rock. The south drift on the 722 level is out 145 ft. The face is in low grade quartz.

Kentuck Consolidated Mining Company.—The superintendent's weekly letter says: We are raising on the fourth floor above the track floor of the 100 level, on the ore streak, which presents no essential change in size or quality. Have shipped to the Mexican mill for reduction 91 tons and 400 lbs. of ore, which accumulated since last shipment, the average battery assay of which was $41.46 per ton.

Savage Mining Company.—The latest official letter from the superintendent says: We have hoisted 579 cars of ore from the 950, 1,100, 1,400 and 1,450 levels. Shipped to the Nevada mill 525 tons and milled 525 tons; average car sample assay, $22.49; average battery assay, $20. Bullion yield for the week, $7,402.50. From the sixteenth floor of the ore stopes, 500 level, we have started a new west cross-cut and advanced some 17 ft.; face is in quartz giving low assays. On the 1,100 level the west prospecting drift from fourteenth floor is advanced 73 ft.; face is in quartz giving low assays. On the 1,450 level the stopes 100 ft. north of our south boundary look about the same as last reported. The joint upraise with the Gould & Curry Company from the Sutro tunnel level was advanced 15 ft.; total height, 83 ft. Top in porphyry and stringers of quartz.

Yellow Jacket Mining Company.—This mine is shipping daily about 58 tons of ore of fair quality to the Brunswick mill. The usual prospecting is being done.

(From our Special Correspondent.)

The following is the weekly statement of ore extracted from Comstock mines and milled, with bullion, shipments, etc.:

Mine.	Tons hoisted.	Car s'mple assay.	Tons milled.	Average bat. assay.	Bullion product for week.	Bullion shipped.	Bullion retained.
		$		$	$	$	$
Con., Cal. & Va.....	*1046	32.24	980	26.44	....	‡16,288.39	....
"	†174.	....	..	23.51	....	....	....
Hale & Norcross ...	§435	30.36	437	15.17	....	....	....
Occidental.....	200	28.55	120	24.80	..	....	....
Potosi.....	412	26.	378	22.48	....	480 lb.	....
Savage.....	§579	22.49	525	20.	7,402.50	....	....
Overman.....	.....	¶	....	....	....	....	....
Yellow Jacket	.....	¶	¶	....	....	....	....

* Worked at Morgan Mill.
† Ore removed from the Eureka Mill and worked at the Vivian.
‡ First shipment on June account.
§ Cars.
¶ No report.

The old proberb runs that "when thieves fall out honest men come by their own," and it seems as if discord had been sown among the magnates of the mill ring by the recent decision of the Superior Court and the decisive utterances of the Engineering and Mining Journal. En passant, the Journal of the 11th inst. was recognized here as a veritable Comstock number, and, albeit mining men have had their eyes opened lately to many things they were unaware of before, it was with difficulty they recognized the full force of the situation when, heading the editorial column, they saw the name of the man who has posed in the East as a representative Western miner, financier and landed gentleman, U. S. Senator J. P. Jones, branded as a common, or rather as a very uncommon, thief. In bygone days he threatened the very few who had the temerity to cast aspersions on his name, and accused him of illegitimate methods, with the State's prison. The tables are turned now and he is self-convicted. All of which is cause for rejoicing here, and never was the Journal more in demand than this week.

During the week two other big Comstock suits have been filed in the Superior Court. Theodore Fox bobs up serenely as plaintiff in both cases. The defendants in the first suit are the directors of the Crown Point Mining Company, R. F. Morrow, J. H. Dobinson, A. K. P. Harmon, J. P. Jackson, W. Norris, C. S. McCoy and the Sharon estate. In the second suit the defendants are the officers and directors of the Belcher Mining Company, James Newlands, Frank G. Newlands, J. P. Martin, J. H. Dobinson, F. A. Tritle, R. F. Morrow, A. K. P. Harmon, G. W. Edwards and Fred Sharon. The allegations of the complaints are much the same as in the Hale & Norcross suit, dummy directors handling the properties at the dictation and for the benefit of the mill ring. An accounting is asked for for the benefit of the stockholders. H. G. Sieberst is attorney for Fox in both suits. Readers of the Journal have seen how Messrs. Fox and Sieberst have played a little game to their own advantage, first when they allowed themselves to be bought up by "Jim" Flood in the Gould & Curry case, and a few weeks ago when, it is more than suspected, they intended to do the same thing in the Chollar suit. In the latter case their plans were disarranged by Martin W. Fox becoming a party plaintiff. As the pugnaciously inclined Martin W. Fox is still on deck (and these two gentlemen are well aware of the fact), it has caused some wonderment as to why Fox and Sieberst should have filed these two later suits. Report has it that there is a "nigger in the woodpile;" in other words, that our runaway friend, H. M. Levy, has formed an alliance with them to protect himself. In other words, Mr. Levy has an objection to part with his share of the plunder, and unless his "pals" —who are much better off than he, although a more substantial and austere-looking building than the poorhouse is casting its shadow over him—act generously toward him he will hit back again through Messrs. Theodore Fox and Sieberst. All of which is apropos of the opening remark anent honest men and rogues, and is of comfort to the empty-pocketed stockholders.

Hale & Norcross Silver Mining Company.—With regard to this corporation things are becoming rather mixed. When first the new management took hold doubt was expressed in these columns whether "Jim" Flood was exactly the right man in the right place. As a member of the mill ring, he was called upon to sacrifice himself for the benefit of Hale & Norcross stockholders. In other words, to commit financial

hari-kari. Mr. Flood has tried to steer a medium course, or rather has made the attempt, in which he has been most unsuccessful. He not only has done little in rescuing the mine from the slough of despond into which it had sunk, but, it is shrewdly suspected, has been playing a little trick which displays all the cunning of the master hand of the millman. Apropos of this remark, a query is in order. In the Potosi mine (Chollar and Potosi adjoin the Norcross on the south) the average mine assay has not for years past ranged higher than $12 per ton, and yet the pulp assays have been recently running $27 per ton. How can this be accounted for? The allegation has been boldly made that rich rock has been taken from the Norcross, through the drifts connecting with Potosi, and credited to the latter mine. The mill crushes Potosi (?) ore at a profit of $4 per ton; the "Little Joker" runs merrily along, the Potosi (?) bullion finds lodgment in the pockets of the millmen, and Hale & Norcross stockholders once again get left.

When the Mining Stock Association made representation of the above facts, and furthermore that the exorbitant charge of $7 for milling ore must no longer be paid, a very decisive answer was made. The mine was closed down so far as taking out ore is concerned.

Judgment has been entered by Judge Hebbard in the Hale & Norcross suit. C. S. Wheeler, who was held liable for $210,000, came into court and tried to plead the "baby act." He wished to be relieved from the judgment on the ground that he was no party to the profits, but the court showed little sympathy for him. "You were a defendant in this case," remarked Judge Hebbard, "and had your day in court. Your defense should have been made then. You were found responsible for your proportion of the unlawful conversion, and your effort to get relieved from the responsibility at this time is insulting to the court." The attorneys' fees were fixed at 25% of the amount of the judgment, which, if the Supreme Court confirms the decision, will amount to $252,000. Pending an appeal, each of the defendants have to put up a bond equal to twice the amount of the judgment against him. Hayward, Levy and the Hobart estate will have to furnish securities in $6,000,000, and the other defendants between $3,000,000 and $4,000,000. Besides fixing the bond, Judge Hebbard in the decree recites: "The receiver shall have no power or authority to compromise any of the judgments or any part of any of the judgments herein given and made, nor to release any of the judgment debtors herein, except upon the order of this court to that end made. There was a tilt between opposing counsel as to when execution should be levied. The defendants intend moving for a new trial, and they asked that execution of the judgment should be stayed until the court had passed upon the motion. Finally the court granted 30 days' stay of execution in which defendants will prepare findings and make their motion for a new trial. This matter having been finished, some surprise was occasioned by Attorney-General Hart (one of the Norcross directors) presenting a petition from the directors of the company asking that he be substituted for the attorneys representing them. The court advised him to get all the attorneys to sign the substitution, when he will sign the order. As Messrs. Lloyd & Wood, Mesick and Waters and Garber, Boalt & Bishop, are special counsel to the several defendants, they will still remain in the case.

Attorney-General Hart, upon being appointed attorney for the Hale & Norcross, commenced his reign by announcing his intention of commencing suit to recover $2,818.15 cash taken from the Hale & Norcross treasury by the old board of directors to pay expenses of the defendants in the Fox suit. The following items are interesting: Cash paid Attorney W. S. Wood for H. G. Sieberst, $300; cash paid Attorney W. S. Wood individually, $200; cash paid R. S. Mesick, attorney fees, $300; cash paid R. S. Mesick, attorney fees, $350; cash paid for witness fees of defendants Hayward, Nevada Mill and Mining Company, Evan Williams, Hohart, Levy and others, $954.35; expenses of trip to Virginia City to procure testimony for defendants Hayward, Hohart, Jones, Levy and Evan Williams—cash paid expenses of W. S. Wood, $100; cash paid expenses of R. S. Mesick, $500; cash paid reporters' fee for testimony, $60.80; cash paid typewriters' bill for testimony, $45.80; expenses of defendants going to new City Hall, $7.20. Total, $2,818.15. As Attorney-General Hart is a henchman of Levy's (he confessed at the election that he was voting Levy's stock), it remains to be seen whether he actually proposes suing to recover the above amount.

As if there were not attorneys enough engaged by the Hale & Norcross defendants, W. F. Heron appeared in court last Monday on behalf specifically of Alvinza Hayward. He is the partner of Frank Newlands and attorney for the Sharon estate, but has never been recognized as a leader at the San Francisco bar. What, then, is the reason that at this time he should be given precedence over the other attorneys, several of whom are noted lawyers?

When Sarah Althea Terry was seeking to obtain recognition of her rights as wife of the deceased Senator Sharon, Mr. Heron was credited with having so arranged matters that the Supreme Court gave judgment against her. What Mr. Heron did once it is supposed he can do again, as he is credited with having three friends on the Supreme Bench. Who these three gentlemen are will, perhaps, become an interesting question at a later date.

NEW MEXICO.

The Silver City correspondent of the New York "Sun" writes that the commission which was appointed several weeks ago to investigate the mineral character of the Carrizo Mountains on the Navajo Reservation has completed its labors as far as the investigations of the mountains is concerned. The commission reached the mountains on May 18th and discovered mineral on May 25th. It was brought into camp on May 26th, and assays were made which proved the mineral to be far richer than was expected. Six leads of mineral were discovered, and samples from all of them were taken by the commission, which is now on its way to the railroad. From the reports which have been received, it is almost certain that the commission will recommend to the Secretary of the Interior that the reservation in the neighborhood of the Carrizo Mountains be thrown open to the public. Miners have believed for more than 20 years that the richest mineral district in New Mexico would be found in these mountains, and hundreds of them are ready to go there just as soon as the country is opened.

Grant County.

Flagler Reduction Works.—This company has shipped $5,600 in fine bullion gold and silver in the following proportions: Silver (990 to 996 fine), at market value, $4,667; gold, $933. This bullion was the product from tailings from the mills after amalgamation of the ore and first concentrates had been taken and shipped to smelters. The average value of the tailings, as worked by the Waring process, was about $8 per ton, and was only an experiment run to demonstrate the practical working of the new process.

Hobson, Alhambra.—At this mine, the chute of native silver which was first discovered at the surface has been followed and developed at a depth of 175 ft. The dip of the ore chute carries it away from the shaft, and a drift which was started from the 230 ft. level has struck the ore chute from above; another ore chute has been struck in the shaft at 255 ft.

Mimbres Consolidated Mining Company, Georgetown.—This company has made a shipment of 1,000 lbs. of silver bullion from the mill at the Mimbres, near Georgetown. The company is treating about 1,000 tons of ore a month and is taking out from 300 to 400 tons a month. The ore reserve is large enough to keep the mill running about three months, and then, it is reported, it will probably be closed down permanently. According to late advices, the mines have been operated at a loss for more than a year past.

Pacific Extension, Pinos Altos.—Messrs. Bell & Stephens recently shipped a gold brick valued at over $3,000 from this mine. They are driving a tunnel 350 ft. long to connect with the workings in the mine and drain off the water which has to be pumped out of the shafts. They are running their mill steadily on ore from this mine.

Pacific Gold Mining Company, Pinos Altos.—This company, which suspended work in its mill at Silver City several weeks ago because the water company could not furnish water enough to keep the mill running, has leased the Mountain Key mill at Pinos Altos for three months, and will treat the ore now out at the Pacific mine there. The Mountain Key mill has been idle since the collapse of the Mountain Key Mining Company last fall, and is not in very good repair. It has 15 stamps, with a daily capacity of between 25 and 30 tons of ore.

Lincoln County.

Old Abe, White Oaks.—The owners of this mine are working on the twelfth level, and the ore is said to improve with depth. They are crushing 1,200 tons per month. It is reported that the production for the past year of gold bullion from the mine has exceeded $500,000.

Sierra County.

The Chloride Mining and Reduction Company and the Silver Monument Mining Company, at Chloride, have been obliged to close down their mills on account of the scarcity of water. There has been no appreciable rainfall for the past six weeks, and there is very little water for milling or placer mining in southern New Mexico now, and it will be more than a month before the rainy season commences. Until that time fully half the mills in this section will have to remain idle.

PENNSYLVANIA.

Coal.

W. H. Lewis, general superintendent of the William Penn Colliery, is in New York negotiating, it is said, for the purchase of the Brock tract, adjoining the Andrew Lytle tract, in Cass Township. It consists of 300 acres, and is on the line of the Pennsylvania Railroad's new link to Primrose.

Mill Creek Coal Company, New Boston.—This company will shortly sink a new slope 900 ft. long in the Buck Mountain seam to the basin and will open the overlying seams by tunnels. A breaker to prepare the coal from this new opening will be built. All the improvements contemplated will be under the supervision of T. D. Jones, of Hazleton, the general superintendent.

SOUTH DAKOTA.

Custer County.

Keystone.—The tunnel on the lower level has been driven in 400 ft., and it has two cross-cuts in high grade ore, says the Deadwood "Daily Pioneer." The miners are now engaged in raising to strike the upper tunnel, which is in 200 ft. under ground.

Spokane.—This mine will shortly ship a carload of lead ore to the D. & D. smelter, and if the test is satisfactory regular shipments will be continued.

Lawrence County.

Golden Reward Mining Company.—Work on the incline shafts of this mine has been abandoned owing to the immense amount of water that has accumulated, says the Black Hills "Daily Times." The upper workings, which are free from water, are being worked by the full forces, and the regular shipments of ore are being made to the works daily. The Golden Reward gives notice of their 7th monthly dividend of 2 cts per share, aggregating $5,000, payable 25th inst.

Hematite Mining Company.—At this mine a body of ore has been found in the big incline, and explorations are being made to develop its extent. Great interest has been centered in the working of this mine, and if this ore body shall prove what it is expected it will cause much activity in the mining here this season.

Homestake Mining Company.—At the annual meetiug of this company, held in San Francisco, Cal., on the 14th inst., the following directors were elected: Irwin C. Stump, J. B. Haggin, Lloyd Tevis, Louis T. Haggin and George J. Henry. Louis T. Haggin was elected president, J. B. Haggin, treasurer, and Irwin C. Stump, secretary.

Mark Twain.—Forty-five men are employed constantly taking ore out of the Mark Twain mine at Bald Mountain, reports the Deadwood "Daily Pioneer," the product being shipped to the Welcome Chlorination Works at Rapid. This mine was recently purchased by the owners of the chlorination plant, and the ore, of which there is a large body, averages, it is said, about $30 a ton.

Portland.—Small shipments of ore are daily being made from this mine to the Consolidated chlorination plant in this city, and the ore bins are about full, says the "Daily Pioneer." The management hope to start the plant some time this month, but the unfavorable weather has interfered with the work.

Spokane Mine.—The owners of the Spokane Silver mine have sent a carload of ore to the D. & D. smelter for reduction. Mr. Maxon, one of the owners, states, says the Deadwood "Daily Times," that the bond of $80,000 which had been placed upon the property by a syndicate of Eastern capitalists has expired. The ore is said to assay on an average 97 oz. of silver to the ton. It also carries 37% lead and $14 gold.

Pennington County.

Welcome Chlorination Works.—It is reported that considerable difficulty has been experienced since the starting up of these works. The bricks in the furnaces were cemented with fire-clay and lime, and as soon as the heat was up the lime fluxed with the ores, causing the fire-clay to fall out, which damaged the furnaces considerably. The machinery is said not to run very smoothly at present, owing to defective shafting.

UTAH.

A. Hanauer, agent of the Director of the Mint, in Utah, gives the following statement from his report to that official of the product of gold and silver in ounces by counties for 1891: Summit, gold, 3,450; silver, 4,865,570. Salt Lake, gold, 6,950; silver, 877,610. Juab, gold, 19,504; silver, 3,010,030. Tooele, gold, 804; silver, 244,660. Beaver, gold, 110; silver, 677,160. Washington, silver, 51,629. Piute, gold, 806; silver, 14,693. Utah, gold, 10; silver, 4,000. Miscellaneous shipments from counties not enumerated above, gold, 10; silver, 5,000. Total, gold, 31,644; silver, 8,750,352. As compared with 1890 there has been a decrease in gold of 1,104 oz. and an increase in the silver product of 520,947 oz. The total coinage value was $11,967,470.

Juab County.

Mammoth Mining Company.—The Salt Lake "Tribune" reports the finding of gold ore on this property at the bottom of the shaft 1,070 ft. deep. It is thought to be a continuation of the ore body found on the 900-ft. level.

Tintic Sampling Works.—These works are undergoing improvements which, when completed, will increase the capacity and also enable them to treat low grade ores. The first-class dump of the Beck is to be worked over, says the Tintic "Miner."

Kane County.

Copper Stain Mining Company.—This company has been formed with a capitalization of $200,000 to work the old Vindicator mine. It is reported that three shifts will at once go to work. This mine has been abandoned for 17 years.

Salt Lake County.

Greeley Mining Company.—A 20-ft. drift driven in from the lower tunnel discloses a pipe of ore 30 ins. wide and 4 ft. thick. A drift is being run to get under the ore body. Five men have worked during the winter and have taken out 10 tons of shipping ore and run 230 ft. of development work.

Sevier County.

Sevier Mining Company.—The mill has been started for a 30 days' run with 10 stamps. If satisfactory, after a thorough test, it is expected to increase the reduction works to double its present capacity.

Summit County.

The Crescent has started in to make a record this season, says the Salt Lake "Mining Stock Journal." On Monday last ore and concentrates to the value of $4,000 was sold, and a $4,500 lot was marketed June 16th. The company are shipping from 30 to 40 tons of ore and concentrates daily over the Utah Central Road, most of which goes to Leadville for reduction.

Glencoe Milling Company.—The mill is running one shift and turning out concentrates at a fair rate, though not in keeping with the guaranteed capacity of the mill, says the Park City "Record." The new Wall rolls recently placed do not seem to be able to crush the ore fine enough nor in large enough quantities, and it seems impossible to make them come up to the specifications in the contract. The first car of concentrates were shipped this week over the Utah Central to the Conkling sampler at Salt Lake, where it will be sampled and sold on the open market.

Lucky Bill Mining Company.—A force of men is at work on the old Utah grade above the Daly mine getting it in condition, says the Park City "Miner." A force of men will be put at work in the 200 level shortly to cross-cut to the old shaft. The shaft is now 300 ft. deep. No sinking will be done until the work in the cross-cut is finished.

Northland Mining Company.—The management is sinking alongside the porphyry dyke which crosses the Jenny Lind and Central Hill claims. The work is being done for the purpose of making connection with the upraise made on the vein from the Northland ground. This will give good air and greatly facilitate the work of tracing the vein to the surface. The surface water that was causing so much trouble has about disappeared and no longer causes any inconvenience.

Weber County.

Ogden-La Plata Mining Company.—This company owns seevral claims on what is believed to be an extension of the Sundown ledge, the most promising of which are the Heller, the Blue Bird and the Sunside, says the Salt Lake "Daily Stock and Mining Journal." On the Heller there is a 32-ft. shaft and 44-ft. drift. The drift is being run on a ledge of copper quartz. The upper shaft in the Blue Bird is down 54 ft. While sinking this shaft a 7-ft. body of low grade carbonates was struck. In the lower workings on this property the shaft is down 15 ft., from the bottom of which a short drift has been run on a 5-ft. vein of quartz that carries gold and copper. On the Columbia, one of the company's claims, an incline has been driven a distance of 40 ft. on a 2-ft. body of talc and iron, the hanging wall being composed of shale, while the foot wall is blue lime. The claims are well located, and with development should become producing mines.

WASHINGTON.

Okanogan County.

(From our Special Correspondent.)

Columbia and Black Spanish, Loomiston.—These prospects are extensions of the Rainbow, and recent developments show a ledge of free gold in a 6-ft. vein assaying some $35 to the ton.

Everett Mining and Milling Company, Loomiston.—This company has secured 16 mining claims on the Simili Kameen, where the recent gold strike was made. The ledge is some 1,500 ft. in width. It lies along the river and back into the mountain, and includes a waterfall capable of running 500 stamps. The average assays show $10 gold to the ton, and it is claimed that the cost of mining and milling will not exceed $2 per ton.

Rainbow, Loomiston.—Seattle parties have secured this property, bonding the same for $100,000, and paying down 10%. A free gold pocket was recently discovered. It was on the Rainbow the strike was made a year ago, and from which the fine specimen valued at $400 was on exhibition at the Spokane Mining Exchange. A 10-stamp mill and concentrator is on the way for this property.

The Bridgeport Mining and Milling Company, Conconully.—Already six or eight buildings have been completed for this company, and they are now driving their shaft, which is down some 50 ft. A force of two shifts sends it down at the rate of 2 ft. a day, and by July 1st will be working drifts on the 100-ft. level. The ledge is some 6 ft. between walls, and has a 10-in. pay streak of gray copper and galena ore which is improving as developments are made. Assays of the ore extracted show $8 to $10 in gold and $50 to $75 in silver. The company intend expending some $20,000 on their claims this year. They have also bought the Columbia mine, and will develop it in connection with their other properties.

Washington Reduction Company, Ruby.—This company are putting up a mill with a daily working capacity of 50 to 75 tons. The plant is an extensive one and backed by ample capital. They will do custom work. Its manager, Mr. Waggoner, has been experimenting for some time on the diversified silver ores in this section, and is confident of handling them successfully.

Spokane County.

(From our Special Correspondent.)

Phoenix Mining and Milling Company, Spokane.—This company has just been organized, and is composed of A. M. Cannon, Louis Zeigler, H. W. Tyler, F. H. Oliver and G. B. Ide. Their properties are near the Old Dominion in Stevens County, and are known as the Phoenix and Blacktail. They have been offered $20,000 for their mines, but refused to accept it. The ore is lead-silver.

Stevens County.

(From our Special Correspondent.)

Bonanza, Marcus.—Mr. F. E. Burbridge and Dr. Pitwood, of Spokane, have secured a lease of this mine and five others near Marcus. The conditions are that they shall for the next twelve months mine not less than 1,000 tons of ore each month, for which they pay the owners $3 per ton, and in return secure an option on the mines for a year for the sum of $50,000. Work under the new lease is progressing rapidly, the ore being hauled to the Young America concentrator for treatment.

Eagle, Eureka, and Grand Prize, Chewelah.—The interest of Mr. A. C. Edwards in these mines has been purchased by the remaining partners, W. J. Shaner and S. J. Coons. These mines are well equipped with machinery. The Eagle mine has a shaft some 200 ft., which shows a fine body of ore. As soon as the necessary development is finished the mine will be put in shape for working. The ore is silver lead, and the average assay will run from 30 to 50 oz. of silver. The mines are superintended by one of the best mining men on the coast, Mr. A. R. Thompson, and are making rapid progress under his skillful management. Some 15 men are employed at present, and this force will soon be increased.

Old Dominion.—This mine is shipping from 8 to 10 cars of concentrates per month, which net them some $2,000 a car.

WISCONSIN.

Gogebic Range.

The largest shipments for any one week, says the Gogebic "Iron Tribune" were made for the week ending June 18th, 119,890 tons being shipped. The season's shipment to date amounts to 487,717 tons.

WYOMING.

Natrona County.

According to the Omaha "Bee" the discovery of a 4-ft. silver lode in the Casper Mountains has caused a stampede in that direction, the citizens of Casper rushing in a body to locate claims.

FOREIGN MINING NEWS.

CANADA.

Northwest Territory.

Canada Northwest Coal and Lumber Syndicate.—This syndicate own coal and anthracite properties at Canmore and Mitford, Alberta, Northwest Territory, and are operating a coal mine at Canmore, and also brick works and lumber at Mitford. The clay deposit at Mitford is of large area and unproved thickness. It is now in use at smelters at British Columbia, and the syndicate will shortly commence the manufacture of fire bricks which can be put on the market at from $25 to $40 per thousand according to location. The Canmore section of the syndicate's property is in two portions, the western portion only being worked at the present time. On this portion there are ten seams of coal, seven of which are of workable thickness and quality. The seam at present worked is 16 ft. thick and of good quality, it having been tested satisfactorily by the British Admiralty authorities who report it to be within 1% of the best Welsh coal. Several smelting companies in the West are at present negotiating for supplies of this coal.

Quebec.

The bill lately introduced by Mr. Flynn proposing a new mining law was passed by the legislature at Quebec on June 20th. This law classifies the metals as superior and inferior, with the object of making clearer other provisions of the law with reference to the prices of mining concessions. The law also permits the Lieutenant-Governor to impose a royalty for five years after the concession is granted. The bill contains special legislation on phosphates. The mode of acquiring mineral lands is two-fold, by purchase or permit of exploration. The purchase price varies according to the metals and according to the distance of the mine from the railroad. To insure the exploration of mining lands purchased, it is required that the purchaser, before being able to acquire his letters patent, must do a certain amount of work. A system of mine inspection has also been provided for.

MEXICO.

Chihuahua.

Cerro Colorado.—Superintendent Fleury reports the presence of an ore body at the San Gabriel mine of 70,000 tons of an average value of $19 per ton in gold. This mine is well opened up, and is capable of an output of 100 tons per day. The ore is taken by cable road to the mill, 5 kilometres distant. The total cost for mining, transportation and milling is given at $5 per ton. The mill has a capacity of 60 tons per day, and is run by a Leffel turbine 15½ ins. in diameter. Owing to the frequent stoppage of the mill in 1891, consequent upon a drought of water, steam power has been put in capable of milling 120 tons per day. During 1891 the yield per month was:

		Tons treated.	Yield in gold.	Average value per ton.
1891				
March-April,	32 days,	710	21.080	29.69
July,	30 "	1,184	25.017	21.12
August,	23 "	1,092	12.076	11.05
September,	29 "	1,425	17.289	12.13
October,	29 "	1,273	14.247	11.50
November,	28 "	748	8.335	11.14
December,	30 "	502	4.236	8.43
1892				
January,	30 "	580	5.449	9.39
February,	27 "	824	11.590	14.06
		8,338	119.319	

Value of gold in ore by assay	$135.299
Loss in treatment	15.980
Average value per ton by assay	16.22
Average amount per ton obtained	14.31

Chihuahua Mining Company.—The mill has been shut down. Work on the Santo Domingo shaft of the Santa Eulalia mines continues, the depth now being 750 ft. The ore is low grade and is said to be cheaply reduced. In fact, Mr. Isaac Requa, formerly superintendent of the Chollar Potosi Mining Company, of Virginia City, Nev., claimed that, including the transportation of 14 miles by railway from the mine to the mill, the total expenses of mining and milling would be not over $1.50 per ton.

Sangre de Cristo.—The mine is in the Guazarapas district, in the heart of the Sierra Madre Mountains. It is an old Spanish mine that was worked in the days of the Caballeros. Thousands of feet of old galleries and drifts exist, testifying to the engineering skill of the pioneer miners of Mexico. Wade Hampton, of South Carolina, is one of the owners of this mine. A large amount of money is to be expended in developing the property.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, June 24.

Heavy Chemicals.—The dullness usual at this season of the year prevails in the heavy chemical market. A slightly improved demand has been experienced for caustic soda, which otherwise remains unchanged. Bleaching powder is quiet, with some demand for future delivery. We hear that old process soda ash for this year's delivery is all sold. Prices generally remain unchanged, with the exception of American sal soda which is quoted at 1@1·12½c. Other quotations are as follows: Caustic soda, 70%, 2·95@3·10c.; 74%, 2·97½@3·12½c.; 76%, 3·12½@3·25c.; 77%, 3·12½@3·25c. Carbonated soda ash, 48%, 1·55@1·60c.; 58%, 1·47½@1·52½c. Alkali, 48%, 1·55@1·60c.; 58%, 1·47½@1·52½c. Sal soda, English, 1·05@1·10c. Bleaching powder, 2·15@2·20c. on the spot, according to quantity.

Acids.—Manufacturers continue to report a good business in acids at unchanged prices. During the week a sale of muriatic acid was made at 65c., but it is claimed that the circumstances which led to it were exceptional. Certain it is that prices for all acids are low, and there is no probability of an early advance. Sulphuric acid, despite the reports of scarcity of supplies, continues low in price. We hear of an instance where an offer of 80c. was refused by a consumer, which would make it appear that he was successful in securing his acid for even a lower figure. Chamber acid is still quoted at $8.50@$10, owing to the depressed condition prevailing among fertilizer manufacturers. We quote this week: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, $1.60@$2 according to quality; muriatic, 18°, 80c.@$1; 20°, 90c.@$1.10; 22°, $1@$1.25; nitric, 40°, $4; 42°, $4.50@$4.75; sulphuric, 85c.@$1.10; mixed acids, according to mixture: oxalic, $7.25@$7.75. Blue vitriol is quoted all the way from $3.25@$3.50; alum, lump or ground, $1.55@$1.80. Glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

Brimstone.—Brimstone is scarce and the market is firmer in consequence. Quotations for best unmixed seconds on the spot range from $24@$25. Thirds are from 75c. to $1 less. Shipments, to arrive, are held at $23.50 for best unmixed seconds and $22.50 for best unmixed thirds.

Fertilizers.—This market continues quiet. Nothing of any interest has transpired during the week. Prices are unchanged with the single exception of fish scrap, which, owing to the poor fish catch, has advanced. Our quotations this week are as follows: Sulphate of ammonia, $2.80@$2.85 for bone goods and $2.87½@$2.90 for gas liquor. Dried blood, $1.80@$1.85 per unit for high grade and $1.70@$1.75 for low grade. Acidulated fish scrap, $11@$12, factory. Dried scrap, $21.50. Azotine, $1.80@$1.85. Tankage, $17.50@$21, according to grade. Bone meal, $22.50@$23.50.

Double Manure Salts.—Quotations are as follows for lots of from 10 to 50 tons ex-vessel New York; 48-53%, $1.13½@$1.23½; 90-95%, $2.13@$2.23½.

Kainit.—There is no change to report in this article. Prices remain: $8.75 for invoice weight and $9 for actual weight, New York and Philadelphia.

Muriate of Potash.—This chemical is quiet. Dur-

ing the week arrivals amounted to 375 tons, all of which went into consumption. Prices remain as fixed by the syndicate to wit.: Fifty-ton lots or over, New York and Boston, $1.81½; Philadelphia and Baltimore, $1.84; Southern ports, $1.86½.

Phosphates.—Nothing of interest is doing in this market. Our Charleston correspondent writes that phosphate rock is quite firm at $5 for kiln dried f. o. b. at mine. One cargo was sold lately a shade under this figure by a party who needed the money, but at the present writing any bid under $5 is refused. Mr. Paul C. Trenholm sends us the following statistics showing shipments of phosphate rock from Charleston, S. C., during May, 1890, 1891 and 1892:

	1890.		1891.		1892.	
	Crude.	Ground.	Crude.	Ground.	Crude.	Ground.
Domestic.	13,878	651	13,764	641	14,182	621
Foreign...	10,571	nil	nil	nil	nil	nil
Grand t'al	24,449	651	13,764	641	14,182	621

It will be seen that this year's shipments exceed those of 1890 and 1891.

Nitrate of Soda.—Nitrate of soda on the spot is quoted at $1.70. Dealers do not care to quote future shipments. Owing to the steps taken by the recent organized combination to regulate the output of nitrate the outlook just now is favorable for an advance. We hear that even at $1.80 dealers have been unwilling to make sales of nitrate to arrive.

Liverpool. June 15.

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

The demand for heavy chemicals is dull, the only article inquired for being soda ash, which the Alkali Company now decline to quote, as they state they are fully sold for the balance of this year.

Soda Ash.—As stated the Alkali Company are declining orders for any soda ash for balance of this year except for small barrel orders, and this being the case quotations are quite nominal as follows, viz.: Caustic ash, 48%, £5 6s. 3d. per ton; 57 and 58%, £6 7s. 6d. per ton. Carb. ash, 58%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton. Ammonia ash, 58%, £6 7s. 6d. per ton; all net cash.

Soda Crystals are selling freely at £3 7s. 6d. to £3 10s. per ton, less 5%.

Caustic Soda very flat, but prices are nominally unchanged as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s. to £12 10s. per ton, all net cash. For parcels under 10 tons 5s. per ton extra is charged. There are some second-hand parcels offering on the market at a shade under above prices, but there is nothing to be had on this market for export to the States.

Bleaching Powder is in small compass and firmly held at £7 15s to £8 per ton, net cash, for hardwood for all quarters except United States and Canada.

Chlorate of potash is quiet, and nearest spot values are about 6⅝@6¾d. per lb., less 5%, while for July and December we quote 6⅛@6¾d. per lb., less 5%.

Bicarb. soda in demand at £6 15s. per ton, less 2½%, for one cwt. kegs, with usual allowances for larger packages.

Sulphate of Ammonia.—Some resale parcels are offered at low prices, but in some cases manufacturers are holding, expecting to do better when resellers are cleared out. On the spot the nearest values are about £10 2s. 6d. per ton for good gray 24%, and £10 5s. per ton for 25%, both in double bags, less 2½%, although some resales have been made at rather less money.

MINING STOCKS.

[For complete quotations of shares listed in New York Boston, San Francisco, Baltimore, Denver, Kansas City, Deadwood, Dak., Pittsburg, St. Louis, London and Paris, see pages 680 and 682.]

NEW YORK, Friday Evening, June 24, 1892.

The week at the Consolidated Stock & Petroleum Exchange has been as dull as any of its predecessors. In sympathy with the San Francisco market, our own has been depressed and quiet. Values are lower, and the demand for the various mining shares has been limited chiefly to the cheaper Leadville stocks.

The Comstocks have been quiet and, generally, lower in price. We note sales of 500 shares of Barcelona at 15@17c. and 200 shares of Best & Belcher at $1.70@$1.85 Of bullion 400 shares were sold at 40c. Transactions in Comstock Tunnel stock amounted to 1,800 shares at 13c. Julia shows a single transaction of 400 shares at 16c. Sales of Consolidated California & Virginia amounted to 600 shares at $3.70 @$3.95. Other sales were as follows: Crown Point, 100 shares at 75c.; Hale & Norcross, 300 shares at $1.35@$1.50; Sierra Nevada, 200 shares at 80c.; 200 shares of Yellow Jacket at 90c.@$1, and 300 shares of Scorpion at 12c.

Of the Tuscaroras we note sales of 800 shares of Belle Isle at 12c.@15c. No other Nevada stocks were dealt in during the week.

Of the California stocks, Bodie Consolidated shows sales of 700 shares at 18@25c. This company has levied an assessment of 25c. per share, payable at the office of Mr. E. R. Grant, 57 Broadway. Of Belmont, 1,500 shares are reported to have changed hands at 38@40c. Transactions in Brunswick Consolidated aggregated 3,100 shares at 14@15c. Mr. H. R. Lounsbery, treasurer of this company, in answer to sundry rumors that have been in circulation during the week to the effect that the company had not nough funds to prosecute work at the mine without levying another assessment, stated to a representative of the ENGINEERING AND MINING JOURNAL that the rumors were altogether erroneous. The company has money enough to carry on the work.

The ore bins, he said, were full of ore, and the mill will start next week. The following telegram dated June 21st, has been received: "The ore in the 600-ft. level is 3½ ft. wide and of good grade. The mine is looking well, especially in the west drift. Everything is working smoothly."

Of the Colorado stocks there were sales of 500 shares of Chrysolite at 18@19c.; also 2,500 shares of Leadville Consolidated at 14@18c. and 900 shares of Little Chief at 26c. Adams Consolidated had a sale of 100 shares at $1.

Of the Black Hills stocks, Caledonia shows a sale of 100 shares at 75c. and Sullivan Consolidated 800 shares at 76@85c.

Alice was quiet at 70c.; 500 shares were sold during the week.

Horn silver was in fair demand; 630 shares were sold at $3.55@$3.60.

Reported transactions in El Cristo aggregated 1,100 shares at 31@34c.

Phœnix of Arizona was firm at 50c., with total sales of 800 shares.

Boston. June 23.

(From our Special Correspondent.)

The market for copper shares continues to droop on the decline of ingot copper and the absence of orders for investment or speculation. Boston & Montana has been the principal feature, selling steadily down from 43 to 39⅝, with a recovery to 40¼. The stock was sold down on reports of heavy losses hy recent floods, but the officials say that the loss will be less than $10,000.

Butte & Boston declined to 11¾, supposed in sympathy with Boston & Montana and the general dullness.

Calumet & Hecla sold at $270 and $272, the last sale at the higher figure.

Tamarack declined to $165 on small sales.

Tamarack, Jr., was quite steady at $43 until today, when it broke down to $38.

Centennial holds quite firm at about $10, there being no stock pressed for sale.

Kearsarge dropped from 12¾ to 11¾ on account of the fire at the mine, which will reduce production for about two months.

Franklin declared a dividend of $2 per share, payable July 1st. The stock has been steady at $15¼ to $15 all the week. Osceola declined from $32 to $30½, without any special pressure to sell it.

Atlantic sold at $10¼, Allouez at $1, and Santa Fe at 12½c.

In regard to the latter mine, Mr. S. Lannon, manager of the Arizona Copper Company, who was sent to look over the property by the parties in interest, says: "I am satisfied that the property warrants the carrying out of the reorganization scheme. The mine is in good shape, and in my opinion $100,000 would pnt the mine and plant on a paying basis." Steps looking to a foreclosure of the mortgage and reorganization of the company will soon be taken.

We have not heard of a sale of Quincy during the week.

3 p. m.—Franklin sold this afternoon at $14¾, and the market was generally heavy for the entire list.

Chicago. June 22.

(Special report by Horace M. Johnson.)

Mesaba Range Mines.—Buckeye, $25; Biwabik, $22.50; Cincinnati, $3; Champion, $10; Cosmopolitan, $20; Chicago, $12; Columbus (fee), $7; Great Northern I. & S. Co., $1.35; Keystone, $10; Kanawha, $10; Lincoln, $12; Lake Superior, $3.50; Licking, $7.50; Mesaba Mt., $14.50; Mallman, $1.35; Mountain Iron, $55; Minneapolis, $12; New England, $10; Shaw, $6; Twin City, $10.

Gogebic Range Mines.—Aurora, $8.75; Ashland, $50; Anvil, $3·50; Brotherton, $2.25; Germania, $7; Gogebic I. Synd., 16c.; Iron Belt, $2.60; Montreal River, $8; Metropolitan, $75; Minnewawa, 50c.; Odanah, $15, Pence, 50c.; Section "33," $6.50.

Marquette Range.—Champion, $60; Cleveland, $18; Jackson, $100; Lake Superior, $45; Pittsburg & Lake Angeline, $160; Republic, $20.

Vermillion Range.—Chandler, $45; Minnesota Iron, $80.

Prices quoted are based on the actual selling and holding values.

The Lake Superior Iron Company has a large force of men at work at several camps and is showing up large bodies of ore in the various pits. Some 25 pits are in ore. A railroad is now building to the mines on this property, and shipments of ore will be made this season. The town of Trimhle has been platted near the "Mallman" mine. The "Mallman," the pioneer mine of the Mesaba Range, has some high grade ore in sight and the prospects are claimed to be quite favorable for the new town becoming a prosperous place. The Ohio mine has been leased to Messrs. Sheridan & Weimer for 19 years. The lease requires that at least 150,000 tons be mined annually, and the royalty to be paid the Ohio company is 65 cents per ton. The ore is of Bessemer quality.

San Francisco. June 17

(From our Special Correspondent.)

During the past week the stock market has been in a more depressed condition than for weeks past, and that is saying a great deal. While rumors of continued war are in the air, the brokers have been further annoyed by a decision of the Superior Court in which marginal transactions have again been adversely decided upon. Anna M. Sheehy indulged her passion for gambling between April 1st, 1890, and July 1st, 1891, to the extent of $602, H. H. Shinn being her broker. On the last named date her account was closed out, leaving her in debt. She at once sued to recover all moneys paid on her stock account. The facts and questions of law in the case were the same as those presented in the case of Cashman vs. Root, which was set forth at the time in these columns, and the law as therein declared was followed.

Brokers are again indignantly declaring that the constitutional inhibition was never introduced for the purpose of stopping margin trading, but referred only to time sales, etc. They have it in their power to appeal to the Supreme Court, but, despite their threatenings, the case of Cashman vs. Root has not yet come before the court of last resort.

In consequence of the above decision in what was considered hy the brokers a "dead cinch" case, and the other setbacks alluded to, the price of certain of the Comstocks have declined to a lower point than for years past. Consolidated California & Virginia ruled to-day at $3.80, a 20-ct. decline during the week; Ophir at $2.20, a decline of 25 cts.; Sierra Nevada at 80 cts.. a decline of 20 cts.; Mexican at $1.25, a decline of 20 cts.; and Union Consolidated at 85 cts., a decline of 30 cts. After the call this morning the last named stock recovered to $1, but in the afternoon again weakened.

Of the middle group of Comstocks there were declines along the line ranging from 15 to 45 cts. Best & Belcher has sold for $1.90, a 15 ct. decline; Gould & Curry for $1.10, a 25 ct. decline; Hale & Norcross for $1.15, a 30 ct. decline; Chollar 35 cts., a 15 ct. decline; Potosi for 40 cts.. a 25 ct. decline, and Savage for $1.60, a decline of 45cts. per share.

In the Gold Hill and South End Comstocks prices have not shown such a heavy decrease during the week, save in the case of Bullion, which has sold for 40 cts., a decline of 20 cts., and Yellow Jacket at 75 cts., a decline of 20 cts., and Oberman at 30 cts., a 10 ct. decline; Alta has sold for 30 cts.; Alpha for 20 cts.; Belcher for 85 cts.; Challenge, 40 cts.; Exchequer, 15 cts.; Seg. Belcher at 25 cts.

Of the Tuscarora stocks even Nevada Queen, that showed signs of revival a week ago, has again fallen back, and is now selling for 50 cts. per share. Navajo has sold for 5 cts. and Bodie for 20 cts.

After the afternoon call prices shaded off and the market was heavy at the close.

SAN FRANCISCO, June 24.—*(By telegraph.)*—The opening quotations to-day are as follows: Best & Belcher, $1.55; Bodie, 15c.; Belle Isle, 5c.; Bulwer, 40c.; Chollar, 25c.; Consolidated California & Virginia, $3.50; Eureka Consolidated, $2; Gould & Curry, 70c.; Hale & Norcross, $1.35; Mexican, $1.35; North Belle Isle, 10c.; Navajo, 10c.; Ophir, $1.70; Savage, $1.40; Sierra Nevada, 75c.; Union Consolidated, 90c.; Yellow Jacket, 80c.

DIVIDENDS.

Daly Mining Company, dividend No. 64, of 25 cents per share, $37,500, payable June 30, at the office of Messrs. Lounsbery & Company, Mills Building, No. 15 Broad street, New York.

Enterprise Mining Company, a dividend of 10 cents per share, $5.000, payable July 1st, at the office of the company, No. 33 Wall street, New York City. Transfer hooks close July 1st and reopen July 6th.

Franklin Mining Company, dividend No. 26, of $2 per share, $80,000, payable July 1st, at the office of the company in Boston, Mass.

Lexington Mining and Milling Company, dividend No. 7, of one cent per share, $3.000, payable July 1st, at the office of the company, No. 1,624 Curtis street, Denver, Colo. Transfer hooks close June 25th and reopen July 3d.

Ontario Silver Mining Company, dividend No. 193, of 50 cents per share, $75,000, payable June 30th, at the office of Messrs. Lounsbery & Company, Mills Building, No. 15 Broad street, New York.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of sale.	Amt per share
Belcher, Nev.....	44	May 17	June 21	July 12	.25
Blue Bird, S. Dak...	8	June 10	July 11	July 30	.00½
Bullion, Nev.....	38	May 24	June 28	July 19	.25
Challenge Consolidated, Nev.....	11	May 16	June 20	July 12	.25
Chollar, Nev.....	33	May 28	July 7	July 27	.50
Comm'nwealth, Nev	8	June 16	July 21	Aug. 18	.10
Cons. St. Gothard, Cal.....	5	June 9	July 14	Aug. 4	.05
Diana, Nev.....	8	May 3	June 10	June 30	.08
Gould & Curry, Nev	11	June 7	July 12	Aug. 4	.25
Himalaya, Utah....	69	June 13	July 13	Aug. 13	.00½
Justice, Nev	50	May 2	June 6	June 27	.15
Mexican, Nev.....	45	May 16	June 21	July 12	.25
Norway, Utah.....	....	Dec. 24	Feb. 1	July 21	.02
Ophir, Nev.....	58	June 3	July 7	July 27	.50
Overman, Nev.....	64	May 19	June 22	July 11	.30
Ruby Bell, S. Dak..	11	June 13	July 14	July 30	.000½
Sierra Nevada, Nev	102	June 11	July 13	Aug. 2	.25
Siskiyou Cons., Cal..	4	May 4	June 17	July 18	.01½
Summit, Cal.....	12	May 30	June 27	July 29	.05
Utah Cons, Nev...	15	June 27	July 11	July 9	.25
Yellow Jacket, Nev	51	May 0	June 14	July 18	.25

PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
June 18.....	55	55	54	54¼	4,000
20.....	53⅞	54	53⅛	54	13,000
21.....	54	54	53	53⅛	35,000
22.....	53⅛	53⅛	53	53⅜	6,000
23.....	53⅜	53¼	53	53¼	7,000
24.....	53	53	52⅝	52¾	45,000
Total sales in barrels.....					110,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, June 24th.

Statement of shipments of anthracite coal (approximated), for week ending June 18th, 1892, compared with the corresponding period last year:

Regions.	June 18, 1892.	June 20, 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region....	480,988	499,017	Dec. 18,029
Lehigh Region.....	104,314	139,599	Dec. 35,285
Schuylkill Region...	230,677	264,232	Dec. 33,555
Total.....	815,979	902,848	Dec. 86,869
Total for year to date.....	17,707,788	16,726,992	Inc. 980,796

Statement of shipments of anthracite coal for month of May, 1892, compared with the corresponding period last year, compiled from the returns furnished by the mine operators.

Regions.	May, 1892.	May, 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region....	2,010,439.02	1,807,931. 04	Inc.232,504.18
Lehigh Region.....	518,243.03	557,314.05	Dec. 39,071.02
Schuylkill Region....	972,442.10	974,289.08	Dec. 1,846.18
Total.....	3,531,121.15	3,339,534.17	Inc.191,586.18

Regions.	For year 1892.	For year 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region....	8,503.273.03	7,480.189.11	I..1.026,083 12
Lehigh Region.....	2,269,870.11	2,312.621.10	Dec. 49,750.19
Schuylkill Region....	4,799,171.00	4,385,040.07	Inc.414,130.13
Total.....	15,575,314.14	14,184,851.08	I..1,390,473.06

The stock of coal on hand at tide water shipping points May 31st. 1892, was: 684.662 tons; on April 30th, 1892, 714,-842 tons; decrease. 30,180 tons.

PRODUCTION OF BITUMINOUS COAL for week ending June 18th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

	1892. Week.	1892. Year.	1891. Year.
Phila. & Erie R. R.....	1,361	40.607	49,996
Cumberland, Md.....	73,167	1,655,202	1,952,216
Barclay, Pa.....	4,025	95,374	84,505
Broad Top, Pa.....	10,157	272,962	241,368
Clearfield, Pa.....	78,926	1,795.231	1,948,182
Allegheny, Pa.....	26,911	566,499	632,693
Beach Creek, Pa.....	40,173	1,186,056	1,093,020
Pocahontas Flat Top.....	50,872	1,059,768	1,173,856
Kanawha, W. Va.....	40,849	1,130,832	1,100,153
Total.....	326,441	7,802,531	8,277,489

WESTERN SHIPMENTS.

	1892. Week.	1892. Year.	1891. Year.
Pittsburg, Pa.....	21,363	606,686	496,979
Westmoreland, Pa.....	36,083	757,110	865,760
Monongahela, Pa.....	12,215	262,905	241,637
Total.....	69,661	1,626,701	1,604,376
Grand total.....	396,102	9,429,232	9,881,865

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending June 18th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 98,791 tons; year, 2,600,814 tons; to corresponding date in 1891, 1,536,161 tons.

Anthracite.

It is more than probable that at the meeting of the sales agents in this city to be held on the 29th inst., the price of anthracite will be raised 25c. all round, and that the production for July will be fixed at 3.250,000 tons. During July, 1891, the transporting companies carried 3,800,000 from the mines. The official figures for the shipments during May are now published. They amounted to 3,531,121 tons, an increase of 191.586 tons being exceeded over May, 1892.

The stocks at tide water shipping points on May 31st amounted to 684,662 tons, and on April 30th, 714,842 tons, a decrease of 30.180 tons. It will be seen, therefore, that though the production has increased the stocks have decreased. The table also shows that the Lehigh production is still decreasing.

Nothing further has transpired about the Reading combine, either in the law courts or on the exchange. A journey through the manufacturing regions gives some insight into the state of the anthracite demand; on all sides great stores of coal are to be seen, so that it is not to be wondered at that manufacturers are not yet seriously considering how they are to defeat the deal.

Last week, in speaking of the low price of pea coal, we stated that Downing Brothers had obtained the contract for supplying the mint at Philadelphia with 5,000 tons of pea coal at $2.59. This firm writes to say that though it is a fact that they tendered at this figure, the contract has not yet been awarded, and that it was for 1,500 tons of pea coal, and not 5,000 tons. They have also been so kind as to send us a list of the tenders made by various firms for the supply of Highland broken, pea and stove to the mint. Jennings & Sons bid $4.85, $2.59 and $4.85, respectively; Patrick & Lipsett, $4.73, $2.73 and $4.69; Downing Brothers, $4.72, $2.59 and $4.72; Robert Henderson, $5.50, $2.98 and $5; William Bryant bid $2.70 for pea only, and W. C. Kirk & Co. $2.70 for pea and $4.70 for stove.

Bituminous.

The trade in bituminous coal is considered fair for the time of year. A few inquiries for bituminous and coke are reported as having been made by users of anthracite, but as yet no definite arrangements have been made.

Boston. June 23.

(From our Special Correspondent.)

There is very little transpiring that is of interest in anthracite coal circles here. Practically there is nothing doing, as the coal producing companies have all the orders they can fill up to July 1st. Since June 15th there has been very little doing, as by that time companies were refusing to guarantee delivery this month and would not at any time this month sell coal to be delivered after July 1st; that prices are firm goes without saying. The coal trade of this city is commencing to believe that the law of the coal combination is inexorable. That is probably so as long as its laws are founded on a wise policy. As the combination's policy is understood in this market it intends to advance the price of coal from now until October or November, when trade is brisk and the highest prices are usually obtained. It is rumored around here that the combination proposes to make an advance at its meeting next Thursday of 25 cents per ton on stove and egg. If the Reading has its way it will advance the price that much, but it would seem to us that 10 cents advance, making stove $4.25, would be more reasonable, for if large advances, such as 25 cents per ton, are to be made, it can last but a few months and there will probably be several months at the end of the season when prices cannot very well be advanced, and the retail dealers will lose confidence in the market. It seems as though it would be by far the wisest policy for the combination to keep the confidence of their customers.

We quote net prices f. o. b.: Stove, $4.15; egg, $3.90; free burning broken, $3.75; chestnut, $4.05; Lykens Valley net at Philadelphia, free broken, $4.50; egg, $4.90, stove, $5.40; chestnut, $4.50.

There is little that is interesting to note in freight rates. Vessels are still rather scarce at some points and rates are firm.

We quote: From New York to Boston, 60c.@65.: from Philadelphia to Boston, 75@85c.; to Portland, 80c.; to Bath, 85@90c.; to Providence, 70@75c.; from Baltimore to Boston, 85c.; Newport News to Boston, 70c.@75c.; Sound points, 70c.

In soft coal there is practically nothing doing. Prices under the circumstances are low. Clearfield here on the cars is steady at $3.15. Georges Creek coal can be had for $3.45.

The demand for coal from the retailers has floundered. Consumers have as much confidence in the market as they have had at any time as far as we can learn; therefore they must be well stocked for the present at least. Prices are firmly held by all retailers as they see only prospective advances before them on the price of wholesale coal and consequently believe the coal they hold at present good property; and so it is.

We quote: Stove, $6; nut, $6; egg, $5.75; furnace, $5.50; Franklin, $7.25; Lehigh egg, $6; Lehigh furnace, $6. Wharf prices are 50c. per ton less than the foregoing.

The receipts of coal at this port for the week ending June 18th were: 76,949 tons of anthracite and 20,053 tons of bituminous, against 47,200 tons of anthracite and 18,969 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 924,849 tons of anthracite and 332,485 tons of bituminous, against 813,581 tons of anthracite and 12,382 tons of bituminous for the same time last year.

Chicago. June 23.

(From our Special Correspondent.)

Politics and business are about as hard to mix as oil and water, and Chicago at this writing is a perfect hot-bed of the former; as for the latter and so far as regards anthracite it is as thin as water. Demand is exceedingly light and dealers as well as consumers appear to be in a waiting mood. Inactivity is a marked feature and is caused by the very pronounced hesitation on the part of the people to lay in supplies. The uncertainty as to further advances also adds very much to the perplexity of the situation. The anticipated further rise July 1 only adds fuel to the fire and will without doubt stir up public opinion to the boiling point. Then again there is the discontent of the miners in the Luzerne, Lehigh, Shamokin and Schuylkill anthracite coal fields, which is taking definite shape. In the event of these men becoming properly organized as part of and belonging to the United Mine Workers of America, there is no saying what they cannot accomplish in the way of securing steady work, as against short hours, at low wages and other minor evils complained of. The effect on the market would be immediately felt, as the output from the regions mentioned would be greater, and from the present attitude of jobbers, dealers and consumers, how would the shippers dispose of the product? Salesmen on the road are sending in a few desultory orders, and state that the country trade are content to wait awhile, and are buying only for the actual requirements of customers; as to any stocking up, that apparently is not thought of for a moment. That they are perfectly willing to take all chances is clearly defined by the policy they are adopting. Should this continue for two months longer, and it may, it will be a question of can we get the coal? and not one of price. Retail business is very quiet, and until the combine and associated individual operators show their hands there will be very little done in this line.

All rail shipments are very light, and have been throughout June, but vessel coal is active and a good tonnage is going into docks and yards. Wholesale prices are very firm, but retail figures are scaled down somewhat on 50 to 100 ton lots.

Bituminous coal is quiet as far as actual shipments are concerned, but contracts are being made each week so that the general buying movement is fairly steady. There is, however, no activity even in the matter of contracts, but as June and July are usually dull months, no one is surprised at the quietude now reigning.

The soft coal outlook, though, is very encouraging and demand for steam sizes from industrial plants will show a large increase over that of last year. As to prices they are at the bottom notch, and the circular rates are shaded very freely on nearly all grades.

Coke is without any improvement locally. Such demand as there is is steady, and no radical change is expected until after the close of the heated term. Laundry work after that time usually receives some impetus, when increased inquiry may be expected.

Quotations are: $4.65 furnace; $5.05 foundry, crushed; $5.40 Connellsville; West Virginia, $3.90 furnace, $2.10 foundry; New River foundry, $4.90; Walston, $4.65 furnace, $5 foundry.

Circular prices are unchanged at the following rates: Lehigh lump, $6.35; large egg, $5.35; small egg, range and chestnut, $5.60. Retail prices per ton are: Large egg, $6.75; small egg, range and chestnut, $6.75.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are; Pittsburg, $3.15; Hocking Valley, $3; Youghiogheny, $3.25; Illinois block, $1.90@$2; Brazil block, $2.35.

Pittsburg. June 23.

(From our Special Correspondent.)

Coal.—There has been no further coal shipments by the Ohio River; there is not sufficient water for that purpose. The mines on the Monongahela will be worked only for local wants. The coal men are well satisfied that the river shipments have been suspended; the season has been a long one, the crews need a rest. Prices rule low. Many coal men say that very little money has been made. The lower markets are all well supplied, having more than sufficient to last until the fall trade opens. The big tow boats have returned home; they will undergo the necessary repairs and be ready for the open of navigation in the fall. There has been no change in prices for some time and there is not likely to be any soon. The railroad mines are doing a big business and no immediate shutdown is apparent. Messrs. H. A. Blood, G. N. Smalley, and W. N. Chapman, of Boston, and C. Bardstow, Jr., of Providence, R. I., together with Engineer Pettigrew, returned from the Little Kanawha River. They have been on an inspecting tour for the purpose of determining the advisability of building a railroad up the Little Kanawha to Parkersburg, and are well pleased with the prospects. Fine coal and timber were found along the route.

Connellsville Coke.—Though coke production increased but 1,700 tons, the shipments run up 516 cars or about 10,000 tons. Ovens in blast, 11,510; idle, 5,723. During the two previous weeks, when shipments dropped so low, there was some stock coke laid up; some of this is being worked off. There is not a large stock in the region at present. During the last decade the number of ovens have more than doubled. Since the beginning of 1891, over 1,000 ovens have been built; the number keeps on increasing all the time. The coke trade is not getting any less but the region is getting bigger. Week's shipment amounted to 6,239 cars, aggregating 112,302 tons, distributed as follows: To Pittsburg, 1,855 cars; points next of Pittsburg, 2,988 cars; points east of Pittsburg, 1,396; total, 6,239 cars. Prices show no change.

METAL MARKET.

NEW YORK, Friday Evening, June 24th, 1892.

Prices of Silver Per Ounce Troy.

June.	Sterling Exch'ge.	London. Pence.	N. Y. Cents.	Value of sil. in $1.	June.	Sterling Exch'ge.	London. Pence.	N. Y. Cents.	Value of sil. in $1.
18	4.88	40¾	89⅛	.689	22	4.88	40⅝	88⅛	.681
20	4.88	40⅝	88⅞	.687	23	4.88	40⅛	87⅝	.677
21	4.88	40⅛	88⅛	.684	24	4.88	40⅛	87⅝	.675

Owing to lower Eastern Exchanges and a smaller volume of business, the price of silver has rapidly receded. The reduction in price has created some demand for shipment, and market closes steady.

The United States Assay office at New York re-

ports the total receipts of silver for the week to be 116,000 oz.

Gold and Silver Exports and Imports.

	Imports.		Exports.	
	Week ending June 18.	Since Jan. 1.	Week ending June 18.	From Jan. 1.
Gold.....	$7,282,500	$34,416,602	$30,179	$6,168,015
Silver	327,600	10,873,731	57,017	706,195
Totals.. ..	$7,610,100	$45,290,333	$87,196	$6,874,210

The gold shipped this week amounts to $3,500,000. The exports and imports for the corresponding period of 1891 from Jan. 1st were: Exports, gold, $62,944,829; silver, $6,969,982. Imports, gold, $1,680,868; silver, $800,350.

The greater part of the gold shipped during the last two weeks has gone to Germany, their hanks paying a premium for it. It is announced that shipments to that place will now cease.

The dailies have not failed to comment npon the decrease in silver hullion held hy the Mercantile Trust Company. When the silver law of 1890 was passed this company held a stock of 6,000,000 oz. Since the hreak in the price speculation in this commodity never active or enlisting any general interest has grown less and less, until now but little attention is paid to it hy either professionals or outsiders, only 384,000 oz. having been traded in during the month of May.

This, we take it, is the true explanation of the smallness of the stock on hand.

There being no speculative need for it, it has been withdrawn and sold to the government or for export.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars.....	$ .68	$ .70
Peruvian soles and Chilian pesos.....	.67	.70
Victoria sovereigns.....	4.86	4.90
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.76
Spanish 25 pesetas.....	4.81	4.83

Copper.—The week has been entirely featureless, the market continuing in its listless condition, both buyers and seliers having shown little desire to do anything. The values have remained steady, hut with a tendency toward lower prices for what little there is doing. Though the larger companies have not yet met present prices, this has not had a favorahle effect for the reason that consumers are supplied for a few weeks to come, and the demand from elsewhere has been small.

Business in lake ingots has again been reported at 11⅝, hut wire hars are in exceedingly good demand and command 11¾. The husiness in electrical supplies is still in a good condition, and should there be a general revival of trade, we have no douht it would be felt in the prices. Casting copper we still quote at 11@11⅛, with Arizona pig a trifle easier at 10@10⅛.

In London, against last week's closing figures of £45 12s. 6d. for spot and £46 2s. 6d. for three months, we have to quote to-day £45 2s. 6d. and £45 10s. respectively, with manufactured sorts as follows: English tough, £47@£47 10s.; best selected, £49 10s. @£50; strong sheets, £55@£55 10s.; India sheets. £52 10s.@£53; yellow metal, 5⅛d.

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

To Liverpool—	Copper Matte.	Lbs.	
S. S. Saint Pancras.....	2,184 bags	240,385	$12,000
To Havre—	Copper.	Lbs.	
S. S. La Bretagne.....	81 casks	100,801	$10,800
" "	407 pigs	111,775	$12,000
To Antwerp—	Copper Matte.	Lbs.	
S. S. Westernland.....	18 casks	22,400	$5,950
" "	194 bars	33,618	.....
To Rotterdam—	Copper.	Lbs.	
S. S. Werkendam.....	859 pigs	266,193	$27,000
" Feendam.....	328 "	113,924	11,900

A correspondent of the London *Daily News* of June 14, signing himself "Chilenos," says of the Chilian copper mines:

"Of the three Chilean copper companies known on the London Stock Exchange, Copiapo alone seems to be in a satisfactory condition, and even there we have no indications of increased production, while Panulcillo yields less than formerly. Outside these English companies it is well known that some most important Chilian mines are becoming exhausted, while it is now evident that many, if not most, of the smaller Chilian sets have been ruinously worked, first to meet the very low prices of 1886-87, and afterward to secure all possihle benefit from the very high prices due to the manipulations of the French syndicate. The result is that these mines have now become much more costly to work. and consequently require a much higher level of prices; a condition of things which seem to exist, more or less, just now throughout the world, and to justify the conclusion that the general cost of producing copper has heen increased. This will explain the origin of the combination just concluded between the American and Spanish producers, who, with some reason, have considered Chili "une quantité négligeable." It is probahly within bounds to say that a rise here ef £5 to £10 per ton in copper prices would not do more than arrest the decreasing production of Chili, unless new discoveries are made. Indeed, that country is just now suffering from low values for its four chief articles of export, viz., nitrate, wheat, copper and silver, the depression in which goes far to explain the present low Chilian exchange.

Tin has undergone quite marked fluctuations during the week just closing, in fact, just such fluctuations as we have often to witness after an advance such as we have recently had. The market, after closing last week at 22¼ for spot and June, and 21⅛ for later months of the year, dropped to 21.15 in consequence of the lower London cables, though it had already been helow the parity of the market ahroad. Since then it has, the same as London, recovered and closes at 21.75 for spot June and July and at 21.90 for later deliveries.

This reaction was necessary to get the article on a sounder hasis, as there were many weak speculators who, having now been frozen out, cannot again show their anxiety to realize at the ruling prices, higher than those at which they bought. It is only natural to expect such declines from time to time. as it is that the market must go higher, considering the prospective duty in addition to the fact that stocks here will have to be increased, to the detriment of those held abroad, the production in the East, if anything, showing a falling off.

In London the market opened considerably lower than it closed last week, the opening figures being £101 17s 6d@£102 for spot and £1 lower for futures. On the 22nd it had declined to £99 5s@£10 and £97 15s@£98 respectively, and closes at £101 5s. and £99 15s.

Lead has attracted hut little attention, the prices remaining steady at 4⅛@·15c. Consumers huy just sufficient to meet their wants, which are rather limited, and with the usual falling off of consumption during the heated term, and the increasing supplies of raw material, it is no more than natural to look forward to declining values.

London is lower than last week, and we have to quote £10 8s. 9d. for Spanish and 2s. 6d. more for English lead.

St. Louis Lead Market.—The John Wahl Commission Co. telegraphs us as follows: "Lead is considerahly firmer with sales of June and July delivery on a moderate scale at 3·95c. Market closed with 3·95 bid and 3·97½ to 4c. asked."

Spelter remains firm for early deliveries, but the husiness doing is limited, most of the manufacturers being well suppiied with their purchases made for deliveries far into the year. The galvanizing trade appears to he very good indeed, and should it continue so there is no reason why, with present supplies of metal, not yet excessive, prices should not be kept up. The falling off in production during the prevalence of the Western floods is still felt, hut it is to be supposed that in a few weeks more production will again be on the increase, as is the capacity of the producers of the country, owing to developments of new mines and the erection of new smelters.

As the European market is rapidly declining in consequence of rumors that the agreement to maintain prices, made by the foreign makers, will not he continued, at least not in its present form, it is only to he expected that later on in the year, when production here has resumed its usual course, which is in excess of the demand, that values will then have to adjust themselves more in accordance with the market ahroad, where to-day's values are equal to a figure which would not permit of more than about 4¼ being paid to smelters here.

The quotation in London for good ordinaries is £21 5s., and for specials, £21 7s. 6d.

Antimony continues about the same as last week, Cookson's at 14¼, L. X. at 12¾, and Hallett's 11½@¼.

Nickel, too, is about the same, at 60c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, June 24, 1892.

The threatened strike of the iron workers in the Pittsburg district is the chief topic of interest among merchants in this city. It is generally helieved that neither side will give way at present, and that a protracted struggle will commence on July 1st. The masters are not trouhling very much to hring matters to an immediate settlement, as it is customary to close the works during the first fortnight in July for repairs. As that fortnight draws to a close the plot will no douht become thicker. As an indication of the feeling among the masters we may mention that in some cases orders are being refused for July and August delivery. The helief which we expressed last week that the impending strike would have some effect in strengthening the demand for Eastern pig seems to he shared here, for makers are generally postponing any action on the question of a reduction of prices, and are waiting for developments. The Thomas Iron Company, who were reported to he desiring to lower their price hy $1 per ton have decided to postpone the step for the present.

Spiegeleisen & Ferro-Manganese.—There continues to he little or no inquiry for spiegeleisen The only item of husiness to report in ferro-manganese is that business has been done in Cleveland to the extent of 500 tons. The prices of ferro-manganese are being shaded a little, the price quoted being $59.

Steel Rails.—The only large sale of Eastern mill product that we hear of this week is a lot of 2,000 tons for the Pennsylvania Railroad. Otherwise there is nothing of interest in this market, which continues moderately duil. On Tuesday the railmakers held their meeting at Sparrows Point, and they decided to uphold the present arrangements. Prices are $30 at mill and $30.75 at tide water.

Rail Fastenings.—The state of the market does not alter at all, hut still retains its dullness. Prices are given as follows: Fish and angle plates, 1·35@ 1·65c., at mill; spikes, 1·90@2c.; holts and square nuts, 2·50@2·70c.; hexagonal nuts, 2·70@2·80c., deliivered.

Merchant Iron and Steel.—As yet there is no change in the market for merchant iron and steel. Things are steady and quiet. The prices are as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6½@7½c.; special grades, 13@18c.; crucihle machinery steel. 4·75c; crucihle spring, 3·75c.; open hearth machinery, 2·25c.; open hearth spring, 2·50c.; tire steel, 2·25c.; toe calks, 2·25@2·50c.; first quality sheet, 10c.; second quality sheet, 8c.

Tubes and Pipes.—Nothing new is to be reported in this line. Prices continue the same and the ruling discounts are as follows: Butt, hlack, 57½%; butt, galvanized, 47%; lap, hlack, 67%; lap, galvanized, 55%; hoiler tuhes from 3 in. to 6 in. 60%; ahove 6 in. and helow 3 in., 55%. The agreement which has heen arrived at hetween the copper producers here and in Europe is such a mild one that its influence on the market will not he sufficient to drive the users of copper tubes to ahandon them in favor of iron. Unless the ring adopts more violent methods any increase in the use of steel tubes need not he expected.

Structural Material.—Last week we said that the threatened strike in Pittsburg would have a heneficial effect on the demand in this district. This expectation is now heing reached in some departments. Steel beams have felt this influence, as they are generaiiy reported stronger and in some cases a slightly higher price is heing quoted. Business in other manufactures is rather greater, though close prices are still the rule. This city is about to become the seat of a strike which, though not so formidahle as the one at Pittshurg, will cause great trouble. As a result the local building and constructional iron manufactures will become stagnant for a while. A strike was recently ordered on the Criminal Court Building hy the housesmiths hecause the iron works making the material refused to discharge a non-union engineer. The Iron League, the local association of iron manufacturers, have determined to lock out all the union men unless they declare the strike off. To-day the masters are meeting with difficulties. When they go their rounds asking who are union and who are non-union, all the men say non-union. It is difficult to say, at the time of writing, what will be the outcome. The masters feel inclined to lock everybody out, hut this would he manifestly unfair.

Prices are as follows: Beams, 2·25@2·65c.; angles, 1·85@2·10c.; sheared plates, 1·90@2·10c.; tees, 2·40@ 2·60c.; channels, 2·35@2·50c. Universal plates, 2@ 2·10c.; bridge plates, 2@2·10c. on dock.

Buffalo. June 24.

(Special report by Rogers, Brown & Co.)

During the week past several large contracts have heen placed for extended deliveries, both for foundry and malleable irons.

Considerahle interest is heing manifested hy huyers in the future of the market. In fact salesmen are now more frequently met hyquestions as to the outlook than for many months. The general situation is exceedingly quiet with a curtailed consumption as well as production.

We quote for cash f. o. b. cars at Buffalo, No. 1 X Foundry Strong Coke Iron Lake Superior ore, $15.75; No. 2X Foundry Strong Coke Iron Lake Superior ore, $14.75; Ohio Strong Softener No. 1, $15.75; Ohio Strong Softener No. 2, $14.75; Jackson County Silvery No. 1, $18.00; Jackson County Silvery No. 2, $17.00; Lake Superior Charcoal, $16.50; Tennessee Charcoal, $17.00; Southern Soft No. 1, $14.65; Alabama Car Wheel, $19; Hanging Rock Charcoal, $20.50.

Chicago. June 23.

(From our Special Correspondent.)

Political matters and the situation at Pittsburg are prominent topics of conversation in the Garden City, hut they are not so all-ahsorhing as to interfere to any alarming extent with the pig iron trade. Some very good deals were closed during the past week for Southern coke iron, and a very good tonnage was placed under contract. Quite a number of them have heen pending for several weeks, and those which came in under the head of quick delivery and cash were at trifle lower rates than those for scattered forward shipments. With regard to the holler makers' strike here, the action of the American Boiler Manufacturers' Association in session at Buffalo last week has done much to strengthen the position of the master boiler makers who will steadfastly resist the demand of the strikers. Demand for manufactured iron—bars, sheets, etc., is by no means large and agents are no longer anxious for big orders and accept only such as mills can get out and ship by July 1st. The gravity of the situation in Pittsburg and the valleys is now recognized hy all and only the most conservative measures will have to he adopted to avert a strike. Structural steel continues active, hut plates are dull; the same may be said of sheets. Merchant and special sheets are quite active from dealers and manufacturers. Steel rails are quiet, though the outlook is deemed good. Old material and scrap are stagnant.

Pig Iron.—Local iron is in moderate demand in quantities ranging from 50 to 500 tons, several contracts for the latter amount having been placed during the week, and the steadiness in prices continues

a feature. This phase of the market has enabled furnace agents to close business with more than ordinary quickness. Lake Superior charcoal iron is selling in small quantities of several hundred tons or so at $16.50@$16.75, according to brand, and high chilling grades are higher. Some inquiry from malleable iron makers is noted for round lots of 2,500 to 3,000 tons for extended deliveries, and quotations are steady at $16.50 on this class of business. Consumers still look for $16 charcoal iron, but apparently furnaces are a unit in declining to meet their overtures. Contracts for about 10,000 tons of No. 2 Foundry and No. 2 Southern Soft iron were closed during the past few days; a fair amount of No. 1 Soft was also taken. On several round lots for prompt shipment and cash prices were shaded 25c., but on those for scattered deliveries the figures were very close to our quotations, and in a few instances were at even figures. These sales have materially strengthened the position here.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, $16.50@$17; Lake Superior coke, No. 1, $14.50@$15; No. 2, $14@$14.25; No. 3, $13.75@$14; Lake Superior Bessemer, $16.50; Lake Superior Scotch, $15.50@$16; American Scotch, $17@$17.50; Southern coke, foundry No. 1, $14.75; No. 2, $14.25; No. 3, $13.75; Southern coke, soft, No. 1, $13.50; No. 2, $13.10; Ohio silveries, No 1, $17; No. 2, $16.50; Ohio strong softeners, No. 1, $17; No. 2, $16.50; Tennessee charcoal, No. 1, $17; No. 2, $16.50; Southern standard car wheel, $20@$21.

Steel Billets and Rods.—Billets are in fair inquiry and 4 × 4 are held firmly at $24.50. Steel rods are in good demand at $34.50.

Structural Iron and Steel.—While business is large in Chicago and St. Louis, it is below the average in other large Western cities, and prices are badly demoralized, so much so, that some reputable contractors refuse to submit bids. Regular quotations, car lots f. o. b. Chicago, are as follows: Angles, $1.80@$2; tees, $2.20@$2.30; universal plates, $1.95@$2; sheared plates, $1.95@$2; beams and channels, $2.05@$2.25.

Plates.—Most of the boiler shops are working, though short-handed, with non-union help. Demand is fair from outside towns, but very little doing in city. Prices on all material are weak. Steel sheets, 10 to 14, $2.30@$2.40; iron sheets, 10 to 14, $2.20@$2.30; tank iron or steel, $2.10@$2.15; shell iron or steel, $2.75@$3; firebox steel, $4.25@$5.50; flange steel, $2.75@$3.00; boiler rivets, $4.00@$4.15; boiler tubes, 2¾in. and smaller, 57½%; 7 in. and upward, 67½%.

Merchant Steel.—There is still a large and active demand for merchant steel both for season's contracts and for early shipment. The possibility of a strike July 1st has stimulated inquiry for prompt delivery. Tool steel is active. We quote: Tool steel, $6.50@$6.75 and upward; tire steel, $2.25@$2.30; toe calk, $2.40@$2.50; Bessemer machinery, $2.10@$2.20; Bessemer bars, $1.75@$1.80; open hearth machinery, $2.40@$2.60; open hearth carriage spring, $2.25@$2.30; crucible spring, $3.75@$4.

Galvanized Sheet Iron.—Business from warehouse is only fair, though up to date it has been excellent since June, 1891. Mill orders are taken subject to contingent deliveries and not solicited to any extent. Discounts are 70 and 10% on mill lots and 70% off on Juniata and 70 and 5% off on charcoal from warehouse. An extra 2% to 5% is given on large orders.

Black Sheet Iron.—Mill agents are very conservative about acceptance of orders for future delivery, and some decline to quote on the lighter gauges. Quotations are firm at 2·85@2·90c. basis of No. 27 Chicago, for delivery before July 1st. Steel sheets are 10c. higher. Dealers quote 3·10@3·20c. from stock same gauge.

Bar Iron.—New business in a general way, outside of season's contracts, is quiet and will probably remain so for some few weeks. Mills in this vicinity quote 1·55 Chicago, and Valley Mills, 1·58@1·63c., with half extras, and 1·65 for all muck bar iron. Warehouse orders are now filled at 1·70@1·80c., as to quality, etc.

Nails.—The best trade is quoted at $1.65@$1.70 from standard mills, and Western inquiry is fair. Jobbing price is the same from stock. Steel cut nails are in moderate demand at $1.60 from mill. Jobbers quote $1.65 from stock.

Steel Rails.—Railroads will scarcely feel like giving out large orders until the corn crop is assured. This they will know with some degree of certainty 60 days hence, and if the average is fair they will undoubtedly get their roads in good shape before winter, and for the immense traffic for the World's Fair next year. Demand at present is quiet and prices unchanged at $31@$32.50 as to quantity, etc. Fastenings, etc., are quiet at $1.70 for iron or steel splice bars; spikes, $2.05@$2.15 per 100 lbs.; track bolts, hexagonal nuts, $2.65; square, $2.55.

Scrap.—The movement is exceedingly light, and large holders look for no improvement for 30 days and are not pressing sales. Quotations are nominal only. No. 1 railroad, $16; No. 1 forge, $15; No. 1 mill, $10.50; fish plates, $18; axles, $21; horseshoes, $16.50; pipes and flues, $7; cast borings, $6.50; wrought turnings, $9; axle turnings, $10.50; machinery castings, $10; stove plates, $8.50; mixed steel, $10.50; coil steel, $14; leaf steel, $15; tires, $15.

Old Material.—In the absence of sales to gauge the market prices are nominal. Old iron rails, $18; steel rails, $12@$13, as to length and conditions; car wheels, $14.50@$15.

Louisville. June 17.

(Special Report by Hall Brothers & Co.)

There is little or nothing new in the situation of iron since our last report: a few sales having been made at lower figures than previously; 1,000 tons Grey Forge sold on basis of $8.25 at furnace. Politics has its weight to hinder improvement. Demand for iron is of the humdrum sort, similar to the old country. Some advocate a stimulation seemingly because some consumer happens to get an order for finished goods that requires a little iron to fill their orders, though buyers for any sized amount are few and far between. There is but little encouragement for any improvement in the immediate future. We continue to quote as at the last report:

Hot Blast Foundry Irons.—Southern coke No. 1, $14@$14.25; Southern coke No. 2, $13@$13.25; Southern coke No. 3, $12.75@$13; Southern charcoal No. 1, $16@$17; Southern charcoal No. 2, $15.50@$16; Missouri charcoal No. 1, $17@$17.50; Missouri charcoal No. 2, $16.50@$17.

Forge Irons.—Neutral coke, $12.50@$12.75; cold short, $12.25@$12.50; mottled, $11.50@$12.

Car Wheel and Malleable Irons.—Southern (standard brands), $20@$21; Southern (other brands), $18.50@$19.50; Lake Superior, $19.50@$20.50.

Philadelphia. June 23.

(From our Special Correspondent.)

Pig Iron.—There is very little change in the market the past week, the very warm weather having interfered quite a little with business. It has been said that the reduction of output has been such as to bring production down to what will be quickly and steadily absorbed. Southern iron is in this market in good supply. We are anxiously awaiting the adjustment of the labor troubles in the West. Some local brands of iron are being freely offered, but for best brands prices are firm. The opinion is freely expressed that there will be a much heavier demand a little later in the season. No. 1 Foundry is quoted at from $15 to $16.25. No. 2, $14.50 to $15.75. Forge iron is commanding more attention at present, and is quoted at $12.75 to $14. Very little can be said of Bessemer. Quotations for Bessemer pig at furnace, $15.50 to $16.

Muck Bars.—Not much muck bar is selling, and prices remain as formerly quoted, $24 to $24.50; in some cases sellers are asking a trifle more.

Steel Billets.—There is considerable more inquiry this week for steel billets, but large orders are not being placed. A few small lots, however, have been taken at old prices, namely, $24.50 to $25. Prices may go a little higher if there is any unusual stoppage, but the policy of consumers seems to be to hold off.

Manufactured Iron.—There is some little improvement in bar iron at this time, and mills are generally well off for orders. Mills will be closed for repairs about July 1st, as usual. Quotations are for city delivery 1·70 to 1·75; interior points, 1·60 to 1·65.

Sheet Iron.—The sheet iron market presents a little more activity. Quotations for best refined 2·40 to 3·50. Best soft steel, 3 to 4c. Galvanized, best bloom, discount 70%.

Skelp Iron.—Mills are preparing to shut down as stock taking time is drawing near, and there will be very little done in this branch until after July 1st. Sheared, 1·75 and grooved, 1·65.

Wrought Iron Pipe.—The market is irregular and inactive. Boiler tubes are said to be in fair demand, however, but only small orders.

Merchant Steel.—The demand for both tire and spring steel has fallen off the past week. Tire is quoted firm at $2.40 and spring $2.60.

Plate and Tank Iron.—The demand for plate has improved decidedly, and mills are quite full of work. This is due to a better consuming demand, and also to the fear of scarcity in the West. Tank plates are held at from $1.80 to $1.90; shell, $2.10; firebox, 3@4c.

Structural Material.—Quite a number of inquiries are coming in, which it is thought will lead to much business in a short time. The demand has improved somewhat, and some good sized orders have been placed. Beams, channels and tees are held at $2@$2.10, $1.80@$1.85 for bridge plates.

Steel Rails.—Some fair sized lots have been taken the past week, and demand seems to be gradually improving. Quotations remain at $30.

Old Rails.—Quotations $20.50 for iron, and $16 for steel. No. 1 railroad $17.50@$18. Very little business.

Pittsburg. June 22.

(From our Special Correspondent.)

Iron and Steel.—The unsettled condition of the labor question here and throughout the Shenango and Mahoning valleys is calculated to seriously interfere with business at the present time. There are all kinds of rumors afloat, but up to this date nothing of a definite character has been decided on. Both sides have been holding meetings with closed doors, so that, in a great measure, the public are kept in the dark in regard to what has been done. The 1st of July is not far off; about that time some decision is likely to be made. The men and manufacturers differ so widely in their views as to the wages scale next year as to give rise to the suspicion that both parties are prepared to yield something, and that the adoption of a compromise may satisfactorily settle the controversy. In the meantime the uncertainty is causing some consumers to place contracts at other points which would otherwise have been made here, and certain Western manufacturers are insisting upon strike clauses in their contracts. Until this matter is definitely arranged the trade will be disturbed, and but little progress can be made toward a permanent improved condition of affairs. A well informed Eastern dealer thus describes the situation:

"In nearly every branch of the track conditions are as unsatisfactory as it is possible for them to be, the close competition for business among the various producers making the margin of profit on sales extremely narrow. When consumers insist upon a special brand of iron prices are more satisfactory, but even with all the advantages of efficient and economical plants there are many furnaces that find it difficult to make iron for prices now ruling. The principal pressure to sell is chiefly of brands that are not so well known as to be classed among the standards, the leading furnaces reporting a demand sufficient to absorb the larger part of their current output, and are therefore not anxious to offer concessions in prices or in date of delivery to secure orders outside their regular line of customers. Notwithstanding the liberal quantities of iron that are offered for various deliveries, at prices below anything ever before reported in this market, there appears to be a better feeling manifested. This is probably due to the fact that the more active demand of the past few weeks has resulted in a reduction of accumulated stocks, showing that production and consumption are more nearly equalized." Southern brands of iron continue to be a disturbing factor in the market. Owing to the special quotations which are made by many of the Southern plants, and the numerous brands offered, it is difficult to accurately name the prices ruling. The outlook for new steel rails is reported satisfactory; orders are steadily increasing at prices that are satisfactory, the same that have been current the past year. Sales reported from January 1 to June 1, of the present year, have aggregated 133,000 tons more than during the same period of last year. This fact is of itself one of great encouragement.

Another encouraging fact in connection with our steel rail trade is the possibility that an order for 40,000 tons of rails for a new road west of the Alleghenies will soon be placed. The situation of the steel rail trade has greatly improved within the last 30 days.

The demand for Bessemer pig has been well maintained; within a few days a block of 10,000 tons was sold to a Bellaire mill at current rates. Steel billets are in good demand; sales during the month of June were the largest for any month since the first of the year. Muck bar dull; demand restricted. Skelp iron and steel firm; narrow and wide grooved show an advance.

Coke Smelted Lake and Native Ores.

5,000 Tons Bessemer, August, September, October	$14.00	cash.
3,000 Tons Grey Forge	12.75	cash.
2,000 Tons Grey Forge	12.75	cash.
1,500 Tons Grey Forge	12.75	cash.
1,500 Tons Grey Forge	12.75	cash.
1,500 Tons Grey Forge, prompt	12.85	cash.
1,000 Tons Bessemer	14.00	cash.
1,000 Tons Bessemer	14.20	cash.
1,000 Tons Bessemer	14.15	cash.
1,000 Tons Bessemer, August	14.00	cash.
1,000 Tons Grey Forge, July	12.65	cash.
500 Tons Bessemer	14.20	cash.
500 Tons Grey Forge	12.85	cash.
250 Tons Grey Forge	12.75	cash.
150 Tons Silvery	16.75	cash.
150 Tons No. 2 Foundry	14.00	cash.
100 Tons No. 1 Foundry	15.00	cash.

Charcoal.

200 Tons Cold Blast	26.00	cash.
100 Tons No. 2 Foundry	20.00	cash.
100 Tons Warm Blast	20.00	cash.
75 Tons Cold Blast	26.50	cash.
50 Tons Cold Blast, Southern	24.00	cash.

Steel Slabs and Billets.

1,500 Tons Steel Billets at Mill	22.90	cash.
1,200 Tons Steel Billets and Slabs, delivered	23.10	cash.
1,000 Tons Steel Billets	23.00	cash.
1,000 Tons Steel Billets at Mill	23.00	cash.
1,000 Tons Steel Billets at Mill	23.15	cash.
500 Tons Steel Billets, Spot	23.25	cash.
500 Tons Steel Billets, July	24.00	cash.

Iron, Skelp.

460 Tons Sheared Iron	1.80	4m.
400 Tons Narrow Grooved	1.60	4m.
350 Tons Wide Grooved	1.62½	4m.

Steel, Skelp.

500 Tons Wide Grooved	1.45	4m.

Muck Bar.

500 Tons Neutral, prompt	24.85	cash.
400 Tons Neutral	24.50	cash.

Ferro-Manganese.

100 Tons 80%, Imported Seaboard	59.25	cash.
50 Tons 80%, f. o. b., New York	59.00	cash.

Steel Wire Rods.

650 Tons American Fives, July	32.10	cash.

Spelter.

300 Tons Spelter, balance this year	4.70	cash.
100 Tons Spelter, June-July	4.77½	cash.
100 Tons Spelter, spot	4.78	cash.

Beams, Blooms R. and C. Ends.

1,000 Tons, July, August and September	16.50	cash.

Old Iron and Steel Rails.

1,200 Tons American Ts	20.00	cash.
500 Tons Old Steel Rails, Mixed	15.25	cash.
300 Tons Old Steel Rails, Mixed	15.50	cash.

Scrap Material.

500 Tons No. 1 R. R. W. Scrap, net	14.00	cash
300 Tons No. 1 R. R. W. Scrap, net	15.00	cash.
200 Tons No. 1 R. R. W. Scrap, net	14 90	cash.
200 Tons Cast Iron Rungs, net	6.75	cash.
100 Tons Cast Scraps, gross	11.50	cash.

Mill Cinder.

1,000 Tons Mill Cinder	2.40	cash.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	June 18.		June 20.		June 21.		June 22.		June 23.		June 24.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams			1 00										100
Alice, Mont	.70								.70		.70		500
Amador													
Atlantic, Mich													
Belcher, Nev													
Belle Isle, Nev	.12		.13				.15						800
Bodie Cons., Cal			.18				.25	.20			.19		700
Bos. & Mont., Mont													
Breece, Colo													
Bulwer, Cal													
Caledonia, S. Dak									.75				100
Catalpa													
Chrysolite, Colo					.18						.19		500
Colorado Central, Colo													
Commonwealth, Nev													
Comstock T. bonds, Nev													
" scrip, Nev													
Cons. Cal. & Va., Nev			3.90		3 75		3.95				3.70		600
Crown Point, Nev					.75								100
Daly													
Deadwood, Dak													
Eureka, Cons													
Father de Smet													
Freeland, Colo													
Gould & Curry, Nev													
Grand Prize													
Hale & Norcross, Nev			1 50		1 35						1 45		300
Homestake, Dak													
Horn-Silver, Utah	‡3 60	3.55	3.60										630
Independence, Nev													
Iron Hill													
Iron Silver													
Leadville Cons., Colo	.18		.17				.16	.14			.15		2,500
Little Chief, Colo	.26		.26								.26		900
Martin White													
Moulton													
Mt. Diablo, Nev													
Navajo, Nev													
N. Belle Isle, Nev													
Ontario, Utah													
Ophir, Nev													
Overman													
Plymouth, Cal													
Quicksilver, Pref., Cal													
" Com., Cal													
Quincy, Mich													
Robinson Cons., Colo													
Savage, Nev													
Sierra Nevada, Nev							.80						200
Silver Cord, Colo													
Silver King, Ariz													
Small Hopes													
Standard													
Ward Con													
Yellow Jacket, Nev					.90		1.00						200

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	June 18.		June 20.		June 21.		June 22.		June 23.		June 24.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alpha													
Alta													
American Flag, Colo													
Andes, Cal													
Astoria, Cal													
Augusta, Ga													
" bonds													
Barcelona, Nev							.17	15					500
Belmont, Cal	.39	.38	.39		.40		.39		.39		.38		1,500
Best & Belcher, Nev							1.85				1.70		200
Bonanza King, Cal													
Brunswick, Cal	.15		.15	.14			.14		.15	.14	.15		3,100
Bullion, Nev	.40												400
Butte & Bost., Mont													
Castle Creek, Idaho													
Chollar													
Comstock T., Nev	.13												1,800
Con. Imperial, Nev													
Con. Pacific, Cal													
Crescent, Colo													
Del Monte, Nev													
El Cristo, Rep. of Col	.40								.31	.29			1,100
Emmett													
Exchequer, Nev													
Hollywood, Cal													
Julia	.16												400
Justice													
King & Pembroke													
Lacrosse, Colo													
Lee Basin, Colo													
Mexican, Nev													
Middle Bar, Cal													
Monitor, Colo													
Mutual S. & M. Co., Wash													
Nevada Queen, Nev													
N. Standard, Cal													
N. Commonwealth, Nev													
Occidental, Nev													
Oriental & Miller													
Phœnix Lead, Colo													
Phœnix of Ariz							+.50		+ 50		+.50		800
Potosi, Colo													
Rappahannock, Va													
S. Sebastian, S. Sal													
Santa Fe, N. M													
Scorpion, Nev	.12												300
Seg. Belcher, Nev													
Shoshone, Idaho													
Silver Queen													
Sullivan Con., Dak							.77	.76	.80	.78	.81		800
Sutro Tunnel, Nev													
Syndicate													
Tornado Con., Nev													
Union Cons., Nev													
Utah, Nev													

*Ex-dividend. †Dealt in In New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 8,130. Non-dividend shares sold, 10,900. Total shares sold 19,000.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	June 17.†	June 18.	June 20.		June 21.		June 22.		June 23.		SALES.
Atlantic, Mich			10.25								100
Bodie, Cal											
Bonanza Development											
Bost. & Mont., Mont		43.00	42.25	42.50	42.25	42.25	42.00	42.00	39.88	40 75	39.63	3,337
Breece, Colo											
Calumet & Hecla, Mich				272	270			272	270			45
Catalpa, Colo											
Central, Mich											
Cœur d'Alene, Id											
Con. Cal. & Va., Nev											
Dunkin, Colo											
Eureka, Nev											
Franklin, Mich						15.00		15.25	15.00	15.00	14.75	645
Honorine, Utah											
Horn Silver, Utah											
Kearsarge, Mich			12 50		12.50	11.25	12.00	11.75	11.75			700
Lake Superior, Iron											
Little Pittsburg, Colo											
Minnesota Iron					76.50							100
Napa, Cal											
Ontario, Utah											
Osceola, Mich					32.00				31.75	31.00	30.50	315
Quincy, Mich											
Ridge, Mich											
Sierra Nevada, Nev											
Silver King, Ariz											
Stormont, Utah											
Tamarack, Mich					166				165			20
Tecumseh, Mich											

NAME OF COMPANY.	June 17.†	June 18.	June 20.		June 21.		June 22.		June 23.		SALES
Allouez, Mich									1.00		200
Arnold, Mich											
Aztec, Mich											
Brunswick, Cal											
Butte & Boston, Mont		12.50			12.25		12.00	11.75			881
Centennial, Mich			10.00	9.88	10.00		10.00		10.00		545
Dolchis											
Copper Falls, Mich											
Crescent, Colo											
Dana, Mich											
Don Enrique, N. M											
Geyser											
Hanover, Mich											
Humboldt, Mich											
Hungarian, Mich											
Huron, Mich											
Mesnard, Mich											
National, Mich											
Native, Mich											
Oriental & M., Nev											
Phœnix, Ariz											
Pontiac, Mich											
Rappahannock, Va											
Santa Fe, N. Mex		.13									100
Shoshone, Idaho											
South Side, Mich											
Star, Mich											
Washington, Mich											
Wolverine											

†Local Holiday. Dividend shares sold, 5,262. Non-dividend shares sold, 1,726. Total shares sold, 6,988.

COAL STOCKS.

NAME OF COMPANY.	June 18.		June 20.		June 21.		June 22.		June 23.		June 24.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Cambria Iron									77				
Cameron Coal & I. Co													
Ches. & O. R. R													
Chic. & Ind. Coal R. R													
Do. pref													
Col. C. & I	53¾		33⅞	33⅝	33¾	33	33⅛		33¼	33			760
Col. C. & Hocking C. I													
Consolidation Coal									29				100
Del. & H. C	137½	137	136⅞	136⅝	137¼	136¼	137		136½				711
D., L. & W. R. R			156¾	156¾	157¾	156¼	157¾	156¾	157	156⅝	157	156¼	7,166
Hocking Valley	36¾	36⅝	37	36¼	37¼	36¼	37⅜	36¼	36¾	36¼	36¼	36	2,860
do. pref			77		77¼								210
Hunt & Broad Top	35⅝				35¼								150
Do. pref			54¾		54¾		55¼						181
Illinois C. & Coke Co					54¾								
Lehigh C. & N	53¾	53¾	53¾	53⅝	53¾	53¾	53¾	53¾	53⅝				716
Lehigh Valley R. R	61	60⅞	60¾	60⅝	60¾	60⅝	60⅞	60¾	60⅞	60¾			3,304
Lehigh & Wilk. Coal													
Mahoning Coal													
Do. pref													
Maryland Coal													
Morris & Essex													
New Central Coal													
N. J. C. R. R					137¾								925
N. Y. & S. Coal													
N. Y., Susq. & West	14¾		15	14⅝	14¾		14¾		14⅜		14¼	14¼	974
Do. pref			65¼	64¼							64½		55
N. Y. & Perry C. & I													
Norfolk & West. R. R													
Do. pref					46¾								100
Penn. Coal													
Penn. R. R	55¾	55¼	55¾	55⅜	55¾	55⅜	55¼	55⅜	55⅛	55¼			3,434
Ph. & R. R. R	59¼	59⅛	60¾	59⅝	60¾	59¼	60¾		59½	60	59⅝	59¼	107,883
Sunday Creek Coal													
Do. Pref													
Tennessee C. & I. Co			37	36	36¾	35⅝			37				750
Do. pref													
Westmoreland Coal													

Total shares sold, 130,229.

San Francisco Mining Stock Quotations.

NAMES OF STOCKS.	CLOSING QUOTATIONS. June 17.	June 18.	June 20.	June 21.	June 22.	June 23.
Alpha						
Alta	.25	.15	.15	.15	.10	
Belcher	.10	.10	.10		.10	.05
Belle Isle	1.90	1.75	1.75	1.75	1.75	1.60
Bodie	.15	.15	.15	.15	.15	.15
Bulwer	.40	.40	.40	.40	.40	.40
Challar	.30	.30	.25	.35	.25	.30
Commonwealth						
Cons. Cal. & Va	3.80	3.80	3.65	3.85	3.65	3.50
Cons. Pacific						
Crown Point	.75	.80	.90	.80	.70	.70
Del Monte, Nev	2.00	2.00	2.00	2.00	1.60	1.50
Eureka Consolidated	.85	.80	.75	.70	.65	.70
Gould & Curry	1.20	1.30	1.25	1.40	1.35	1.20
Hale & Norcross						
M. White						
Mexican	1.50	1.40	1.40	1.40	1.40	1.40
Mono	.35	.35	.35	.30	.25	.25
Mt. Diablo	1.15	1.15	1.10	1.15	1.15	1.10
Navajo	.05	.05	.05		.05	.05
Nev. Queen	.45	.45	.45	.45	.45	.45
N. Belle Isle		.05	.05		.10	.10
N. Commonwealth						
Ophir	2.15	1.90	1.90	1.90	1.80	1.75
Potosi	.40	.40	.40	.50	.50	.40
Savage	1.50	1.45	1.45	1.50	1.45	1.35
Sierra Nevada	.85	.75	.75	.85	.75	.70
Union Cons	.90	.90	.90	.85	.75	.70
Utah	.10	.05	.05	.05	.05	.05
Yellow Jacket	.75	.80	.80	.85	.70	.75

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last			Dividends. Total paid.	Date & amount of last.		
1	Adams, s. l. c.	Colo.	$1,500,000	150,000	$10	*				$687,500	Jan.	1892	.05
2	Alice, s.	Mont.	10,000,000	400,000	25	*				975,000	Nov.	1891	.06¼
3	Alma & Nel Wood., g	Idaho	300,000	30,000	10	*				60,000	Jan.	1889	.50
4	Amador, g	Cal.	1,250,000	250,000	5	*				31,250	Aug.	1890	.12½
5	American, g	Colo.	3,000,000	300,000	10	*				225,000	Mar.	1892	.05
6	American Belle, s.g.c	Colo.	2,000,000	400,000	5	*				50,000	April	1891	.12½
7	Americ'n & Nettie, g.s	Colo.		300,000						175,000	Mar.	1892	.05
8	Atlantic, c.	Mich.	1,000,000	40,000	25	$280,000	April	1875	$1.00	700,000	Feb.	1891	1.00
6	Argenta, s.	Nev.	10,000,000	100,000	100	335,000	July.	1889	.10	40,000	Feb.	1880	.20
10	Argyle, g.	Colo.	1,000,000	1,000,000	1	*				20,000	Mar.	1892	.01
11	Aspen Mg. & S., s. l.	Colo.	2,000,000	200,000	10	*				700,000	June	1892	.10
12	Aurora, i.	Mich.	2,500,000	100,000	25					855,000	April	1891	1.00
13	Badger, s	Ont.	250,000	50,000	5					37,500	Mar.	1890	.25
14	Bald Butte	Mont.	250,000	250,000	1	*				72,500	Mar.	1892	.03
15	Belle Isle, s.	Nev.	10,000,000	100,000	100	190,000	Dec.	1889	.15	300,000	Dec.	1879	.25
16	Belcher, s. g.	Nev.	10,400,000	104,000	100	3,160,000	May	1892	.25	15,397,000	April	1876	1.00
17	Bellevue, Idaho, s. l.	Idaho	1,250,000	125,000	10	120,000	Dec.	1889	.25	200,000	Jan.	1890	.10
18	Best Friend	Colo.	1,000,000	1,000,000	1	*				90,000	Feb.	1892	.01
19	Bi-Metallic, s. g.	Mont.	5,000,000	200,000	25					1,800,000	Nov.	1891	.35
20	Bodie Con., g. i.	Cal.	10,000,000	100,000	100	550,000	June	1890	.25	1,602,572	April	1885	.50
21	Boston & Mont., g.	Mont.	2,500,000	250,000	10	*				520,000	June	1886	.15
22	Boston & Mont., c. s.	Mont.	3,125,000	125,000	25	*				2,075,000	Nov.	1891	1.00
23	Brooklyn Lead, l. s.	Utah	500,000	50,000	10					127,000	July.	1887	05
24	Bulwer, g.	Cal.	10,000,000	100,000	10	130,000	Aug.	1889	.25	185,000	April	1892	.10
25	Bunker Hill & S. s.l.	Idaho	3,000,000	300,000	10	*				150,000	Oct.	1888	.06¼
26	Caledonia, g.	Dak.	10,000,000	100,000	100	505,000	May.	1885	.15	192,000	Oct.	1890	.08
27	Calliope, s.	Colo.	1,000,000	1,000,000						140,000	Jan.	1891	.00½
28	Calumet & Hecla c.	Mich.	2,500,000	100,000	25	1,200,000				37,350,000	June	1892	5 00
29	Centen'l-Eureka, s.l.	Utah.	1,500,000	30,000	50					562,500	April	1892	.50
30	Central, c.	Mich.	500,000	20,000	25	100,000	Oct.	1861	.65	1,970,000	Feb.	1891	1.00
31	Champion, g	Cal.	340,000	34,000	10					89,100	May.	1892	.10
32	Chrysolite, s. l.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
33	Clay County, g.	Colo.	200,000	200,000	1	*				56,000	Nov.	1891	.02
34	Cœur D'Alene, s. l.	Idaho	5,000,000	500,000	10					310,000	Nov.	1891	.02
35	Colorado Central, s.l.	Colo.	2,750,000	275,000	10	*				475,000	July.	1892	.05
36	Commonwealth, s.	Nev.	10,000,000	100,000	100	170,000	Nov.	1888	.50	20,000	Nov.	1890	.20
37	Confidence, s. l.	Nev.	2,496,000	24,960	100	1,575,000	Nov.	1891	.75	199,680	April	1889	1.00
38	Cons. Cal. & Va., s.g.	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.20	3,682,800	Aug.	1891	.50
39	Contention, s.	Ariz.	12,500,000	250,000	50					†2,587,500	Dec.	1884	.25
40	**Cop. Queen Con., c.	Ariz.	1,400,000	140,000	10					210,000	Feb.	1889	.50
41	Cortez, s.	Nev.	1,500,000	300,000	05	*				687,000	Mar.	1892	.50
42	Crescent, s. l. g.	Utah	15,000,000	600,000	25	*				228,000	Oct.	1888	.03
43	Crown Point, g. s.	Nev.	10,000,000	100,000	100	2,675,000	Mar.	1892	.50	11,898,000	Jan.	1875	2.00
44	Cumberland, l. s.	Mont.	5,000,000	500,000	10	*				15,000	Nov.	1889	.08
45	Daly, s. l.	Utah	3,000,000	150,000	20					2,437,500	June	1892	.25
46	Deer Creek, s. g.	Idaho	1,000,000	200,000	5	*				20,000	June	1889	.05
47	Deadwood-Terra, g.	Dak.	5,000,000	200,000	25	*				1,110,000	June.	1892	.05
48	DeLamar, s. g.	Idaho	2,000,000	400,000	5					316,000	May.	1892	.25
49	Derbec B. Grav., g.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	260,000	Aug.	1891	.10
50	Dunkin, s. l.	Colo.	5,000,000	200,000	25	*				390,000	Oct.	1889	.05
51	Elkhorn, s. l.	Mont.	1,000,000	200,000	5	*				¶658,500	Mar.	1892	.50
52	Enterprise, s.	Colo.	100,000	10,000	10	*				450,000	July.	1892	.10
53	Eureka Con., s. l. g.	Nev.	1,000,000	50,000	100	550,000	June	1889	.50	5,017,500	Jan.	1892	.25
54	Evening Star, s. l.	Colo.	500,000	50,000	10	*				1,450,000	Dec.	1889	.25
55	Father de Smet, g.	Dak.	10,000,000	100,000	100	200,000	Nov.	1878	1.00	1,125,000	Dec.	1885	.20
56	Franklin, c.	Mich.	1,000,000	40,000	25	220,000	June	1871		1,100,000	July	1892	2.00
57	Freeland, s. g.	Colo.	5,000,000	200,000	25	*				190,000	July.	1886	.10
58	Garfield Lt., g. s.	Nev.	500,000	100,000	5					90,000	April	1888	.12½
59	Gould & Curry, s. g.	Nev.	10,800,000	108,000	100	4,591,200	June	1892	.25	3,826,800	Oct.	1870	10.00
60	Grand Prize, s.	Nev.	10,000,000	100,000	100	785,000	Jan.	1890	.30	495,000	Mar.	1884	.25
61	Granite, s. l.	Idaho	500,000	500,000	1	*				83,400	Nov.	1890	.02
62	Granite Mountain, s.	Mont.	10,000,000	400,000	25					12,040,000	June.	1892	.20
63	Green Mountain, g.	Cal.	1,250,000	125,000	10	*				212,000	Nov.	1881	.07½
64	Hale & Norcross, g. s.	Nev.	11,200,000	112,000	100	5,478,800	Mar.	1892	.50	1,822,000	Aug.	1888	.50
65	Hecla Con., s. g. l. c.	Mont.	1,500,000	30,000	50					1,815,000	May.	1892	.50
66	Hel'a Mg. & Red, s.l.g.	Mont.	3,315,000	663,000	5	*				197,970	July.	1886	.06
67	***Holmes, s.	Nev.	10,000,000	100,000	100	370,000	May.	1890	.25	75,000	April	1886	.25
68	Homestake, g.	Dak.	12,500,000	125,000	100	200,000	July.	1878	1.00	4,853,750	June.	1892	.10
69	Honorine, s. l.	Utah	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept.	1887	.05
70	Hope, s.	Mont.	1,000,000	100,000	10	*				233,252	April	1888	.25
71	Horn-Silver, s. l.	Utah	10,000,000	400,000	25	*				4,500,000	Mar.	1892	.12½
72	Hubert, g.	Colo.	1,000,000	1,000,000	1	*				247,000	Dec.	1889	.00½
73	Idaho, g.	Cal.	310,000	3,100	100					2,353,350	May.	1892	2.00
74	Illinois, s.	N. M.	100,000	100,000	1	*				45,000	April	1889	.20
75	Iron Hill, s.	Dak.	2,500,000	250,000	10	134,000	July.	1889	.03	156,250	Nov.	1887	.07½
76	Iron Mountain, s.	Mont.	500,000	500,000	1					175,000	May.	1892	.03
77	Iron-Silver, s. l.	Colo.	10,000,000	500,000	20	*				2,500,000	April	1889	.20
78	Jackson, g. s.	Nev.	5,000,000	50,000	100	237,500	Nov.	1880	.20	60,000	Jan.	1891	.10
79	Kearsarge, c.	Mich.	1,000,000	40,000	25	190,000	Oct.	1887	1.00	80,000	Jan.	1890	2.00
80	Kennedy	Cal.	10,000,000	100,000	10					387,000	May.	1892	15
81	Kentuck, s. g.	Nev.	3,000,000	30,000	100	454,180	Oct.	1891	.15	1,350,000	Dec.	1886	.10
82	La Plata, s. l.	Colo.	2,000,000	200,000	10	*				610,000	Sept.	1882	.30
83	Leadville Con., s. l.	Colo.	4,000,000	400,000	10	*				435,500	Dec.	1891	.03
84	Lexington, g. s.	Mont.	4,000,000	40,000	100	*				609,000	Jan.	1890	2.00
85	Little Chief, s. l.	Colo.	10,000,000	200,000	50	*				820,000	Dec.	1890	.05
86	Little Rule, s.	Colo.	500,000	500,000	1					220,000	Dec.	1891	.02
87	Mammoth, s. l. c.	Utah	10,000,000	400,000	250	110,000		1882	.25	1,040,000	Dec.	1891	.10
88	Martin White, s.	Nev.	10,000,000	100,000	100	1,275,000	Jan.	1892	.25	140,000	Dec.	1886	.25
89	Mary Murphy, s. g.	Colo.	350,000	3,500	101	*				175,000	May.	1888	5.00
90	Matchless, s. l.	Colo.	500,000	500,000	1	*				15,000	Feb.	1890	.00½
91	Maxfield	Utah.	3,000,000	300,000	10					117,000	April	1892	.03
92	May Mazeppa, s. l.	Colo.	1,000,000	100,000	1					205,000	Oct.	1891	.03¾
93	Minas Prietas, g. s.	Mex.	1,000,000	100,000	10	*				350,000	Dec.	1890	.50
94	Minnesota, c.	Mich.	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar.	1876	
95	Mollie Gibson, s.	Colo.	5,000,000	1 000,000	5					1,800,000	June	1892	.15
96	Monitor, g.	S.Dak	2,500,000	250,000	10					45,000	Oct.	1890	.03
97	Mono, g.	Cal.	5,000,000	50,000	100	760,000	Sept.	1890	.25	12,500	Mar.	1886	.25
98	Montana, Lt., g. s.	Mont.	3,300,000	660,000	5	*				2 619,075	June.	1891	12½
99	Morning Star, s. l.	Colo.	1,000,000	100,000	10					925,000	April	1891	.25
100	Morning Star Drift, g	Cal.	240,000	2,400	100					61,400	May.	1892	3 00
101	Moulton, s. g.	Mont.	2,000,000	400,000	5	*				380,000	Dec.	1887	.07½
102	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	June	1880	2.00	210,000	July.	1891	.10
103	Napa, q.	Cal.	700,000	100,000	7					480,000	July.	1892	.20
104	Navajo, g. s.	Nev.	10,000,000	100,000	100	520,000	May.	1891	20	229,950	April	1889	.10
105	New California, g.	Colo.	800,000	160,000	5	*				48,800	May.	1890	.12½
106	New Guston, s.	Colo.	550,000	110,000	5					1,877,500	April	1892	.75
107	N. Hoover Hill, g. s.	N. C.	300,000	120,000	2½	*				30,000	Dec.	1885	.06¼
108	North Belle Isle, s.	Nev.	10,000,000	100,000	100	445,000	Aug.	1891	.25	230,000	May.	1888	.50
109	North Star, g.	Cal.	1,000,000	100,000	10					300,000	April	1889	.50
110	Omaha Cons., g.	Cal.	2,400,000	24,000	100					41,000	May.	1892	.15
111	Ontario, s. l.	Utah	15,000,000	150,000	100					13,950,000	June.	1892	.50
112	Ophir, g. s.	Nev.	10,000,000	100,000	100	4,210,640	April	1890	.50	1,595,800	Jan.	1880	1.00
113	Original, s. c.	Mont.	1,500,000	60,000	25	*				138,000	Jan.	1889	.05
114	Oro, s. l. g.	Colo.	500,000	100,000	5					95,000	July.	1890	.20
115	Osceola, c.	Mich.	1,250,000	50,000	25	480,000	April	1876	1.60	1,597,500	May.	1892	1.00
116	Pacific Coast, b.	Cal.	1,500,000	15,000	100					270,000	June.	1892	1.00
117	Parrot, c.	Mont.	1,800,000	180,000	10					1,532,000	May.	1892	.10
118	Plumas Eureka, g.	Cal.	1,406,250	140,625	10					2,643,559	April	1892	.18
119	Plymouth Con., g.	Cal.	5,000,000	100,000	50	*				2,280,000	Feb.	1888	.40
120	Quicksilver, pref., q.	Cal.	4,300,000	43,000	100					1,823,911	June	1891	1.25
12	" com., q	Cal.	5,700,000	57,000	100					643,867	July.	1882	.40
122	Quincy, c.	Mich.	1,250,000	50,000	25	200,000	Dec.	1862		6,170,000	Feb.	1892	4.00
123	Reed National, s. g.	Colo.	500,000	500,000	1	*				50,000	Dec.	1890	.01
124	Rialto, g.	Colo.	300,000	300,000	1	*				50,250	April	1892	.01½
125	Richmond, s. l.	Nev.	1,350,000	54,000	25	*				4,346,323	Ang.	1891	.25
126	Ridge, c.	Mich.	500,000	20,000	25	219,939	Mar.	1886	.50	99,785	Feb.	1880	.50
127	Robinson Con., s. l.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
128	Running Lode, g.	Colo.	1,000,000	1,000,000	1	*				36,000	May.	1892	.00 1-10
129	Savage, s.	Nev.	11,200,000	112,000	100	6,772,000	Feb.	1892	.50	4,460,000	June	1869	3.00
130	Sheridan, s. g.	Colo.	300,000	3,000	100	*				300,000	Oct.	1891	2.50
131	Shoshone, g.	Idaho	150,000	150,000	1					7,500	April	1883	.01
132	Sierra Buttes, g.	Cal.	2,225,000	122,500	10					1,507,257	April	1892	.12
133	Sierra Nevada, s. g.	Nev.	10,000,000	100,000	100	6,411,910	June	1892	.25	102,000	Jan.	1871	1.00
134	Sierra Nevada, s. l.	Idaho	1,000,000	1,000,000	1	*				40,000	May.	1889	.02
135	Silent Friend	Colo.	500,000	500,000	1					60,000	Aug.	1891	.02½
136	Silver Cord, s. l. g.	Colo.	4,500,000	450,000	10					265,000	April	1889	.10
137	Silver King, s.	Ariz.	10,000,000	100,000	100	130,000	Nov.	1890	.30	1,950,000	July	1887	.25
138	Silver Mg. of L. V., s.l.	N. M.	500,009	500,000	1					300,000	Dec.	1891	.05
139	Small Hopes Con., s.	Colo.	5,000,000	250,000	20	*				3,162,500	Oct.	1890	.10
140	Spring Valley, g.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan.	1881	.25
141	Standard, g. s.	Cal.	10,000,000	100,000	100	100,000	June	1890	.50	3,625,000	April	1892	.10
142	Stormont, s.	Utah	500,000	500,000	1	*				155,000	Nov.	1881	.05
143	St. Joseph, l.	Mo.	1,500,000	150,000	10	*				1,974,000	Dec.	1890	.02
144	Tamarack, c.	Mich.	1,250,000	50,000	25	520,000	April	1885	3.00	2,960,000	June	1892	4.00
145	Tombstone, g. s. l.	Ariz.	12,500,000	500,000	25	*				1,250,000	April	1882	.10
146	United Verde, c.	Ariz.	3,000,000	300,000	10	*				207,500	Jan.	1892	.10
147	Viola Lt., s. l.	Idaho	750,000	150,000	5					337,500	Nov.	1888	.37½
148	Ward Con., s.	Colo.	2,000,000	200,000	10					20,000	Dec.	1889	.05
159	Woodside, s. l.	Utah.	100,000	100,000	10					25,000	Oct.	1889	.25
150	W. Y. O. D.	Cal.	30,0,00	15,000	2	22,500	May.	1891	.10	21,000	May.	1892	.10
151	Yankee Girl, s.	Colo.	1,300,000	260,000	5					1,405,000	April	1891	.50
152	Yellow Jacket, g. s.	Nev.	12,000,000	120,000	100	5,778,000	May.	1892	25	2,184,000	Aug.	1871	2.50
153	Young America, g.	Cal.								175,000	Jan.	1889	10

NON-DIVIDEND PAYING MINES

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and am't of last.		
1	Alliance, s. g.	Utah.	$100,000	100,000	$1	$120,000	Feb.	1891	.20
2	Allouez, c.	Mich.	2,000,000	80,000	25	737,000	Jan.	1890	.70
3	Alpha Con., g. s.	Nev.	3,000,000	30,000	100	198,500	Jan.	1892	.15
4	Alta, s.	Nev.	10,080,000	100,800	100	3,869,880	Jan.	1892	.10
5	American Flag, s.	Colo.	1,250,000	125,000	10	300,000	June	1887	
6	Amity, s.	Colo.	250,000	250,000	1				
7	Anchor s. l. g.	Utah.	3,000,000	150,000	20	410,000	June	1890	.20
8	Anglo-Montana, Lt.	Mont.	600,000	120,000	5				
9	Astoria, g.	Cal.	200,000	100,000	2				
10	Barcelona, g.	Nev.	5,000,000	200,000	25	*			
11	Belmont, g.	Cal.	500,000	500,000	1	*			
12	Belmont, s.	Nev.	5,000,000	50,000	100	735,000	April	1886	.10
13	Best & Belcher, s. g.	Nev.	10,080,000	100,800	100	2,380,075	Mar.	1892	.25
14	Black Oak, g.	Cal.	3,000,000	300,000	10	*			
15	Boston Con., g.	Cal.	10,000,000	100,000	100	170,000	Nov.	1883	.25
16	Brownlow, g.	Colo.	250,000	250,000	1				
17	Brunswick, g.	Cal.	2,000,000	400,000	5				
18	Buckeye, s. l.	Mont.	1,000,000	500,000	2				
19	Bullion, s. g.	Nev.	10,000,000	100,000	100	2,865,000	May.	1892	.25
20	Butte & Boston, c. s.	Mont.	5,000,000	200,000					
21	Butte Queen, g.	Cal.	1,000,000	100,000	10	6,000	Jan.	1892	.04
22	Calaveras, g.	Cal.	500,000	500,000	1	*			
23	California, g.	Cal.	1,000,000	100,000	10	9,000	Mar.	1892	.03
24	Carisa, g.	Wy.	500,000	100,000	5	*			
25	Carupano, g. s. l. c.	Ven.	200,000	100,000	2	*			
26	Cashier, g. s.	Colo.	500,000	250,000	2	*			
27	Cherokee, g.	Cal.	1,500,000	150,000	10				
28	Chollar, s. g.	Nev.	11,200,000	112,000	100	1,820,000	May.	1892	.10
29	Cleveland, t.	Dak.	1,000,000	500,000	2	*			
30	Colchis, s. g.	N. M.	500,000	50,000	10				
31	Colorado Silver	Colo.	1,625,000	325,000	5				
32	Comstock Tun.	Nev.	10,000,000	100,000	100	35,000	Mar.	1887	.15
33	Con. Imperial, g. s.	Nev.	5,000,000	50,000	100	2,062,500	Jan.	1892	.25
34	Con. New York, s. g.	Nev.	5,000,000	100,000	50	110,000	Mar.	1892	.10
35	Con. Pacific, g.	Cal.	6,000,000	60,000	100	198,000	June	1890	.10
36	Con. Silver, s.	Mo.	2,500,000	250,000	10				
37	Crescent, s. l.	Colo.	3,000,000	300,000	10	*			
38	Crocker, s.	Ariz.	10,000,000	100,000	100	160,000	Jan.	1892	.10
39	Crowell, g.	N. C.	500,000	500,000	1				
40	Dahlonega, g.	Ga.	250,000	250,000	1	*			
41	Dandy, s.	Colo.	5,000,000	500,000	10				
42	Decatur, s.	Colo.	1,500,000	300,000	5	*			
43	Denver City, s.	Colo.	5,000,000	500,000	10	*			
44	Denver Gold, g.	Colo.	300,000	60,000	5				
45	Dickens-Custer, s.	Idaho	2,100,000	420,000	5				
46	Durango, g.	Colo.	500,000	500,000	1	*			
47	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	1.00
48	El Dorado, g.	Cal.	1,000,000	250,000	4	*			
49	El Talento, g.	U.S.C.	1,000,000	500,000	2				
50	Emmons, s. l.	Colo.	2,000,000	2,000,000	1				
51	Empire, s.	Utah	10,000,000	100,000	100				
52	Eureka Tunnel, s. l.	Nev.	10,000,000	100,000	100	*			
53	Exchequer, s. g.	Nev.	10,000,000	100,000	100	940,000	Jan.	1892	.25
54	Found Treasure, g. s.	Nev.	10,000,000	100,000	100	130,500	Jan.	1892	.10
55	Gogebic I. Syn., i.	Wis.	5,600,000	200,000	25				
56	Gold Cup, s.	Colo.	500,000	500,000	1	*			
57	Golden Era, s.	Mont.	2,000,000	200,000	10	*			
58	Gold Flat, g.	Cal.	1,000,000	100,000	10	5,000	Mar.	1892	.05
59	Gold Rock, g.	Cal.	1,000,000	500,000	2	*			
60	Goodshaw, g.	Cal.	10,000,000	100,000	100	*			
61	Goodyear g. s. l.	Mont.	1,000,000	200,000	5	13,000	Feb.	1892	.01
62	Grand Belt, c.	Tex.	12,000,000	120,000	100				
63	Grand Duke	Colo.	800,000	80,000	10				
64	Gregory Con., g.	Mont.	3,000,000	300,000	10				
65	Harlem M. & M. Co., g.	Cal.	1,000,000	200,000	5				
66	Hartery Con., g.	Cal.	1,000,000	100,000	10	22,000	Oct.	1890	.05
67	Head Cent. & Tr., s. g.	Ariz.	10,000,000	100,000	100	16,981	Mar.	1892	.03
68	Hector, g.	Cal.	1,500,000	300,000	5	45,000	Jan.	1889	.15
69	Highland, c.	Mich.	500,000	25,000	20				
70	Holywood	Cal.	200,000	100,000	2				
71	Hortense, s.	Colo.	2,000,000	200,000	10				
72	Huron, c.	Mich.	1,000,000	40,000	25	280,000	May.	1885	3.00
73	Ironton, i.	Wis.	1,000,000	40,000	25				
74	Iroquois, c.	Mich.	1,250,000	50,000	25				
75	J. D. Reymert, s.	Ariz.	10,000,000	100,000	100				
76	Julia Con., g. s.	Nev.	11,000,000	110,000	100	1,463,000	Jan.	1889	.10
77	Lacrosse, g.	Colo.	1,000,000	100,000	10				
78	Lee Basin, s.	Colo.	5,000,000	500,000	10	*			
79	Lone Star Cons., g.	Cal.	500,000	500,000	1	10,000	April	1892	.00½
80	Madeleine, g. s. l.	Colo.	750,000	150,000	1	4,500	Feb.	1892	.00½
81	Mammoth Gold, g.	Ariz.	245,000	49,000	5	*			
82	Mayflower Gravel, g.	Cal.	1,000,000	100,000	10	*			
83	Medora, g.	Dak.	250,000	250,000	1	585,000	Mar.	1890	.54
84	Merrimac Con., g. s.	Colo.	5,000,000	500,000	10				
85	Mexican, g. s.	Nev.	10,000,000	100,000	100				
86	Middle Bar, g.	Cal.	400,000	200,000	2	2,892,960	May.	1892	.25
87	Mike & Starr, s. c.	Colo.	1,000,000	200,000	5	*			
88	Milwaukee, s.	Mont.	500,000	500,000	1	*			
89	Monitor, g.	Colo.	100,000	100,000	1	12,500	May.	1891	.01
90	Montreal, g. s. l.	Utah.	750,000	150,000	5	4,500	Feb.	1892	.00½
91	Mutual Mg. & Sm.	W'sh.	100,000	100,000	1	*			
92	Native, c.	Mich.	1,000,000	40,000	25				
93	Neath, g.	Colo.	1,000,000	100,000	10				
94	Nevada Queen, s.	Nev.	10,000,000	100,000	100	200,000	Oct.	1889	.25
95	New Germany, g.	N. S.	100,000	100,000	1	*			
96	New Pittsburg, s. l.	Colo.	2,000,000	200,000	10	*			
97	North Standard, g.	Cal.	10,000,000	100,000	100	20,000	Nov.		
98	Oneida Chief, g.	Cal.	500,000	125,000	100	*			
99	Oriental & Miller, s.	Nev.	10,000,000	400,000	100				
100	Original Keystone, s.	Nev.	10,000,000	100,000	100	250,000	Mar.	1892	.10
101	Osceola, g.	Nev.	5,000,000	500,000	10	*			
102	Overman, g. s.	Nev.	11,520,000	115,200	100	4,001,840	May.	1892	.10
103	Park, s.	Utah	2,000,000	200,000	10				
104	Peer, s.	Ariz.	10,000,000	100,000	100	190,000	Feb.	1892	.10
105	Peerless, s.	Ariz.	10,000,000	100,000	100	405,000	Oct.	1890	.15
106	Pennsylva'a Cons., g	Cal.	5,150,000	515,000	10	36,050	Feb.	1892	.10
107	Phœnix	Ariz.	500,000	500,000	1	*			
108	Phœnix Lead, s. l.	Colo.	100,000	100,000	1	*			
109	Pilgrim, g.	Cal.	600,000	300,000	2	*			
110	**Pioche M.&R., s.g.l.	Utah.	20,000,000	2,000,000	10				
111	Potosi, s.	Nev.	11,200,000	112,000	100	1,573,000	Mar.	1890	.50
112	Proustite, s.	Idaho	250,000	250,000	1	*			
113	Puritan, s. g.	Colo.	1,500,000	150,000	10	*			
114	Quincy, c.	Colo.	3,000,000	300,000	10				
115	Rappahannock, g. s.	Va.	250,000	250,000	1	*			
116	Red Elephant, s.	Colo.	500,000	500,000	1	*			
117	Red Mountain, Ltd., s	Colo.	300,000	60,000	5	*			
118	Ropes, g. s.	Mich.	2,000,000	80,000	25	167,200	Feb.	1891	.50
119	Ruby & Dun., s. l. g.	Nev.	25,300	506	50				
120	Russell, g.	N. C.	1,500,000	300,000	5				
121	Sampson, g. s. l.	Utah.	10,000,000	100,000	100	288,15[illegible]	July.	1888	1.08
122	Silver Age, s. l. g.	Colo.	2,000,000	200,000	10	*			
123	Silver Queen, c.	Ariz.	5,000,000	200,000	25	*			
124	South Bulwer, g.	Cal.	10,000,000	100,000	100	100,000	May.	1881	.25
125	South Hite	Cal.	10,000,000	100,000	100	195,000	Jan.	1883	.05
126	South Pacific	Cal.	500,000	100,000	5				
127	Stanislaus, g.	Cal.	2,000,000	200,000	10				
128	St. Kevin, s. g.	Colo.	100,000	100,000	1	*			
129	St. Louis & Mex., s.	Mex.	[illegible],000,000	500,000	10	*			
130	St. Louis & St. Elmo.	Colo.	[illegible]	200,000	10				
131	St. L. & St. Felipe, g.s.	Mex.	[illegible],000	150,000	10				
132	St. L. & Sonora, g. s.	Ariz.	3,000,000	300,000	10	*			
133	Sunday Lake, i.	Mich.	1,250,000	50,000	25				
134	Sullivan Con., g.	Dak.	600,000	200,000	3	*			
135	Sylvanite, s.	Colo.	5,000,000	500,000	10	*			
136	Taylor-Plumas, g.	Cal.	325,000	65,000	5	3,575	Mar.	1892	.01½
137	Telegraph, g. s.	Mex.	100,000	100,000	1	70,000	Feb.	1892	.10
138	Teresa, g. s.	Cal.	1,000,000	200,000	5	10,000	Feb.	1888	.10
139	Tioga Con., g.	Nev.	10,000,000	100,000	10	295,000	May.	1888	.25
140	Tornado Con., g. s.	Nev.	100,000	100,000	1	*			
141	Tuscarora, s.	Nev.	10,000,000	500,000	20	2,385,000	Jan.	1892	.25
142	Union Con., g. s.	Nev.	10,000,000	100,000	100	370,000	June	1892	.25
143	Utah, s.	Nev.	10,000,000	100,000	100	245,000	Aug.	1890	
144	Ute & Ulay, s. l.	Colo.	1,000,000	500,000	2	1,500	Mar.	1892	.0018
145	Wall Street, g. s. l.	Colo.	500,000	500,000	1				
146	Washington, c.	Mich.	1,000,000	40,000	25				
147	West Granite Mt., s.	Mont.	500,000	100,000	5	*			
148	Whale, s.	Mont.	5,000,000	500,000	10	*			
149	Yuma, c. s. g.	Ariz.	10,000,000	400,000	25				
150	Zelaya, g. s.	C. A.	600,000	300,000	2	*			

G. Gold. S., Silver. L., Lead. C., Copper. B. Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. §The Deadwood previously paid $275,000 in eleven dividends and the Terra $75,000. Previous to the consolidation in August, 1884, the California had paid $31,320,000 in dividends, and the Con Virginia 10,000,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid $1,350,000 in dividends. ¶ This company paid $190,000 before reorganization in 1890. **This company acquired the property of the Raymond & Ely Company which had paid $3,075,000 in dividends. *** Previous to this company's acquiring Northern Belle, that mine declared $2,400,000 in dividends, against $425,000 in assessments.

STOCK MARKET QUOTATIONS.

Aspen. June 20.

The closing quotations were as follows:

Agnes C.	$....
Argentum Juniata	.95
Aspen Deep Shaft	.11
Aspen Contact	4.50
Best Friend	.22
Bimetallic	.35
Bushwacker	.31
Carbonate Chief	.11
Della S.	....
Homer & Alta	....
Justice	.10
Little Annie	.23
Mollie Gibson	11.30
Nolan Creek	....
Park, Mamie & Queen	....
Pontiac	.16
Sheep Mountain S. & M. Co	.25
Smuggler	15.00
St. Joe & Mineral Farm	.17
Yellow Boy	.20

Baltimore, Md. June 23.

COMPANY.	Bid.	Asked.
Atlantic Coal	$....	1.00
Balt. & N. C.	.05	.13
Big Vein Coal	....	....
Conrad Hill	....	....
Cons. Coal	.27@.27½	.29
Diamond Tunnel	....	....
George's Creek Coal.	....	....
Lake Chrome	....	.15
Maryland & Charlotte	....	....
North State	....	....
Silver Valley	.65@.73	75@80

Pittsburg, Pa.

Prices highest and lowest for the week ending June 23:

COMPANY.	H.	L.
Allegheny Gas Co.	$....	$....
Bridgewater Gas Co.	28.00	26.20
Chartiers Val. Gas.	12.75	11.50
Columbia Oil Co.	....	....
Consignee Mining Co.	....	....
Consolidated Gas Co.	....	....
East End Gas Co.	....	....
Fisher Oil Co.	....	....
Forest Oil	....	....
Hazlewood Oil Co.	....	....
Hidalgo Mining Co.	....	....
La Noria Mining Co.	....	....
Luster Mining Co.	9.75	9.38
Mansfield C. & C. Co.	....	....
Manufacturers Gas Co.	....	....
Nat. Gas Co. of W. Va.	....	....
N. Y. & Clev. Gas Coal Co.	50.50	50.00
Ohio Valley Gas Co.	....	....
Pennsylvania Gas Co.	....	....
People's Natural Gas Co.	18.00	16 50
People's N. G. & P. Co.	12.63	11.25
Philadelphia Co.	19.00	18.25
Pine Run Gas Co.	....	..
Pittsburg Gas Co.	....	....
Red Cloud Mining Co	....	....
Silverton Mining Co.	....	....
South Side Gas Co.	....	....
Sterling Silver Mining Co.	....	....
Tuna Oil Co.	....	....
Union Gas Co.	....	....
Washington Oil Co.	....	....
W'moreland & Camb.	....	....
Wheeling Gas Co.	21.00	18.50
W'house E. Light	19.00	11.50
W'house Air Brake Co.	145.00	126.00
W'house Brake Co., Ltd.	90.00	85.00

Deadwood. June 18.

	Bid.	Asked.
Bullion	.06	.07
Caledonia	.75	.80
Calumet	.08	.10
Cambrian	....	.02
Carthage	.01	.01½
Deadwood Terra	....	2.30
De Smet	.25	.30
Double Standard	....	.16
Elk Mountain	.00½	.01
Emmett	.01	.02
Equitable	....	.04
Florence	....	.06
Golden Reward	....	1.50
General Merritt	.08	.10
Harmony	.09	.10½
Hester A	.02	.03
Homestake	13 50	14.00
Hermit	.01½	.02½
Iron Hill	....	....
Isadorah	.20	.25
Maggie	.07	.10
Monitor	....	.08½
Rainbow	.01½	.02½
Retriever	....	....
Ross-Hannibal	....	....
Ruby Bell	....	.22
Ruby Wilkes	.01	.02
Seabury-Calkins	....	.06½
Silver Queen	.02	.02½
Stewart	....	.15
Tornado	.12	....
Troy	....	.01½
Uncle Sam	....	....

St. Louis. June 22.

CLOSING PRICES.

	Bid.	Asked
Adams, Colo	$.87½	$1.10
American & Nettie, Colo.	.55	....
Bi-Metallic, Mont.	....	20.00
Central Silver	....	.00½
Elizabeth, Mont.	.51½	.53¾
Granite Mountain, Mont.	11.00	12.00
Hope	....	4.00
Leo	....	.07
Little Albert	....	.03
Montrose Placer, Colo.	....	.10
Mickey Breen	....	....
Pat Murphy, Colo.	.01	.02½
Small Hopes, Colo.	.85	1.25
Silver Age	....	....
Silver Bell	....	....
Yuma, Ariz.	.01	.05

Helena, Mont.

(Special report by SAMUEL K. DAVIS.)
Prices highest and lowest for week ending June 18, 1892:

	H.	L.
Bald Butte (Mont.)	$1.75	$1.50
Benton Group, Mont.	.25	.25
Bi-Metallic, Mont.	.55	.50
California (Castle), Mont.	.20	.15
Champion (Oro Fino), Mont.	.15	.10
Combination (Philipsb'g), Mont.	1.00	.92½
Copper Bell (Cataract), Mont.	....	.05
Cornucopia, Mont.	.25	.20
Cumberland (Castle), Mont.	1.00	.90
Elizabeth (Philipsburg), Mont.	.45½	.42½
Florence (Neihart), Mont.	.40	.30
Fourth of July, Wash.	.10	.08
Glengary (Butte), Mont.	.65	.57½
Helena & Victor, Mont.	1.50	1.25
Ingersoll, Mont.	.15	.10
Iron Mountain (Missoula), Mont.	.95	.90
Jersey Blue (Butte)	.10	.07½
Lone Pine Consolidated	3.00	2.75
Moulton, Mont.	2.00	1.75
Poorman (Cœur d'Alene), Idaho.	.95	.92½
Queen of the Hills (Neihart)	1.20	1.10
SouthernCross (DeerLodge), Mont.	....	....
Whitlach Union & MacIntyre	.25	....
Yellowstone (Castle). Mont.	.30	.25

Foreign Quotations.

London. June 11.

	Highest.	Lowest.
Alaska Treadwell	£2½	£1½
Amador, Cal.	3s. 3d.	2s. 9d.
American Belle, Colo.	2s. 9d.	2s. 3d.
Appalachian, N. C.	...	....
Can. Phosphate, Can.	....	....
Colorado, Colo.	1s. 6d.	1s.
Cons. Esmeralda, Nev.	....	....
De Lamar, Idaho	27s.	25s.
Dickens Custer, Idaho.	9d.	3d.
Eagle Hawk	2s. 6d.	1s. 6d.
East Arevalo, Idaho.	....	....
Eberhardt	1s.	6d.
Elkhorn, Mont.	£2	£1½
Elmore, Idaho	....	....
Emma, Utah	.... 9d.	6d.
Esmeralda	9s.	3s.
Flagstaff, Utah	3s. 9d.	3s. 3d.
Garfield, Nev	....	....
Golden Feather	17s.	16s.
Golden Gate, Cal.	5s. 9d.	5s. 3d.
Golden Leaf, Mont.	2s. 6d.	2s.
Golden River, Cal.	....	....
Guston	£2¾	£2½
Idaho	....	....
Jay Hawk, Mont.	10s. 6d.	9s. 6d.
Josephine, Cal.	....	....
Kohinoor, Colo.	....	....
La Luz, Mex.	3s. 3d.	2s. 9d.
La Plata, Colo.	1s.	6d.
La Valera, Mex.	....	....
Maid of Erin, Colo.	20s.	17s. 6d.
Mammoth Gold, Ariz.	1s. 9d.	1s. 3d.
Mount McClellan	4s.	3s.
Montana, Mont.	6s. 6d.	5s. 6d.
Mona Lake Gold	....	....
New California, Colo.	....	....
New Consolidated	....	....
New Eberhardt, Nev.	....	....
New Gold Hill, N. C.	....	....
New Guston, Colo.	....	....
New Hoover Hill, N.C.	....	....
New Russell, N. C.	....	....
New Viola, Idaho	....	....
Old Lout, Colo	£⅜	£⅛
Parker Gold, N. C.	....	....
Pittsburg Cons., Nev.	....	....
Poorman	5s. 3d.	4s. 9d.
Plumas Eureka	£⅝	£½
Richmond Con., Nev.	£⅜	£½
Ruby, Nev	....	....
Sam Christian, N. C.	....	....
Sierra Buttes, Cal.	£⅜	£¼
" Plumas Eur., Cal.	....	....
Silver King	....	....
United Mexican, Mex.	2s.	1s.
West Argentine, Colo.	....	....
Yankee Girl, Colo.	8s.	7s.

Paris. June 9.

	Francs.
East Oregon, Ore.	0.75
Forest Hill Divide, Cal.	42.00
Golden River, Cal.	130.00
" " parts	30.00
Laurium, Greece	725.00
Lexington, Mont	132.00
" parts	2.90
Nickel, New Caledonia	950.00
Rio Tinto, Spain	433.25
" " oblig	520.00
" " "	510.00
Tharsis, Spain	125.00
Vieille-Montagne, Belgium	560.00

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Acid—Acetic, No. 8, pure, 1,040, ℔ lb. 06@.08
Commercial, in bbls. and cbys. .015@.016
Carbonic, liquefied, ℔ lb. .30
Chromic, chem. pure, ℔ lb 1.00
for batteries .40
Hydrobromic, dilute, U. S. P. .25
Hydrocyanic, U. S. P. .45
Hydrofluoric .20
Alcohol—95%, ℔ gall. $2.30@$2.40
Absolute $3.80
Ammoniated $2.80
Alum—Lump, ℔ lb. .016@.017
Ground, ℔ lb. .0165@.0175
Powdered .04½@.05
Lump ℔ ton, Liverpool £5
Aluminum Chloride—Pure, ℔ lb. $1.25
Amalgamating solution, ℔ lb. .60
Sulphate .015¾@.03
Ammonia—Sul., in bbl. lots, ℔ lb. .02½@.03
Carbonate, ℔ lb., English and German .07¾
Muriate, white, in bbls., ℔ lb. .08½
Aqua Ammonia—(in cbys) 18° ℔ lb. .03@.04
20°, ℔ lb. .04@.05
26°, ℔ lb. .04¾@.05
Antimony—Oxymur, ℔ lb. .04@.06
Regulus, ℔ ton, London £42½@£43½
Argols—Red, powdered, ℔ lb. .15
Arsenic—White, powdered ℔ lb. .02¾@.03
Red ℔ lb. .05@.065
Yellow .08@.09
White at Plymouth, ℔ ton £12 2 6
Asbestos—Canadian, ℔ ton $50@$300
Italian, ℔ ton, c. i. f. L'pool £18@£60
Ashes—Pot, 1st sorts, ℔ lb. 4.75@5
Pearl .06@.06¼
Asphaltum—
Prime Cuban, ℔ lb. .04@.05¼
Hard Cuban, ℔ ton $28.00
Trinidad, refined, ℔ ton $30.00
Egyptian, ℔ lb. .08@.09
Californian, at mine, ℔ ton $12.00
at San Francisco, ℔ ton. $15.00
Barium—Carbonate, pure, ℔ lb. .45
Carbonate, commercial, ℔ lb. .05@.10
Chlorate, crystal, ℔ lb. .75
Chloride, commercial, ℔ lb. .05@.10
pure, ℔ lb. .16
Iodide, ℔ oz. .40
Nitrate, ℔ lb. .07@.07½
Sulph., Am. prime white, ℔ ton. $18@$19
Sulph., foreign, floated, ℔ ton. $21@$23
Sulph., off color, ℔ ton $11.50@$14.00
Carb., lump, f. o. b. L'pool, ℔ ton £6
No. 1, Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " £3 15 0
Bauxite—℔ ton $10.00
Bichromate of Potash—Scoteh, ℔ lb. .10¼@.11
American, ℔ lb. .10¼@.11
Bichromate of Soda—℔ lb. .09½@.10
Borax—Refined, ℔ lb., in car lots .08@.08½
San Francisco .08½
Concentrated, in car lots .08@.08¾
Refined, Liverpool ℔ ton £29
Bromine—℔ lb. .15@.22
Cadmium Minion—℔ lb. $2.00
Cadmium Iodide—℔ lb. $5.50
Chalk—℔ ton $1.75@$2.00
Precipitated, ℔ lb. .05@.06
Chiua Clay—English, ℔ ton. $13@$18.00
Domestic, ℔ ton $9@$11
Chlorine Water—℔ lb. .10
Chrome Yellow—℔ lb. .10@.25
Chrome Iron Ore—℔ ton, San Francisco $10.00
Chromalum—Pure, ℔ lb. .40
Commercial, ℔ lb. .12
Cobalt—Oxide, ℔ lb. $2.50@$2.90
Copper—Sulph. English Wks. ton £20@£21
Vitriol (blue), ordinary .03¼@.03¾
" " extra .04½
Nitrate, ℔ lb. .40
Copperas—Common, ℔ 100 lbs. 73@90
Best, ℔ 100 lbs. .85@$1.00
Liverpool, ℔ ton, in casks £2
Corundum—Powdered, ℔ lb. .04½@.09
Flour, ℔ lb. .03
Cryolite—Powdered, ℔ lb., bbl. lots. .07
Emery—Grain, ℔ lb. (℔ kg.) .04½@.05
Flour, ℔ lb. .02½@.10
Epsom Salt—℔ lb. .01¼
Feldspar—Ground, ℔ ton $20.00
Crude $10@$14
Fluorspar—Powdered, No. 1, ℔ ton. $30.00
French Chalk—
Fuller's Earth—Lump, ℔ ton. $20@$25
Glauber's Salt—in bbls., ℔ lb. .01@.0125
Glass—Ground, ℔ lb. .10
Gold—Chloride, pure, crystals, ℔ oz. $12.00
pure, 15 gr., o. v., ℔ doz. $5.40
liquid, 15 gr., g. s. v., ℔ doz. $5.50
Chloride and sodium, ℔ oz $6.00
15 gr., c.v., ℔ doz. $2.88
Oxide, ℔ oz. $27.25
Gypsum—Calcined, ℔ bbl. $1.25@$1.50
Land Plaster
Iodine—Resublimed $3.30@$3 35
Iron—Nitrate, 40°, ℔ lb. .01½
47°, ℔ lb. .02½
Kaolin—*See China Clay.*
Kieserite—℔ ton $9@$10
Lead—Red, ℔ lb. .06¾@.07¼
White, American, in oil, ℔ lb. .06½@.07½
White, English, ℔ lb., in oil .08½@.08¾
Acetate, or sugar of, white .12@.13
Granulated
Nitrate .09@.10
Lime Acetate—Am. Brown. $1.00@$1.05
Gray. $1.75@$1.87½
Litharge—Powdered, ℔ lb. .06¾@.07½
English flake, ℔ lb. .09@.09½
Magnesite—Crude, ℔ ton of 1,015 kilos $14.75
Calcined, ℔ ton of 2,240 lbs. $22.00
Brick, ℔ ton of 2,240 lbs. $47.50
Manganese—Ore, per unit. 23@.28
Oxide, ground, ℔ lb. .02½@.06½
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb. .66@.69
Powdered, ℔ lb. .64
Marble Dust—℔ bbl. $1.29
Metallic Paint—Brown ℔ ton. $20@$25
Red $20@$25
Mineral Wool—Ordinary slag .01½
Ordinary rock .02½
Ground, ℔ ton
Mica—In sheets according to size, 1st quality, ℔ lb. .25@$6.00
Naphtha—Black
Nitre Cake—℔ ton $10.00
Ochre—Rochelle, ℔ lb. $1.50@$1.55
Washed Nat Oxf'rd, Lump, ℔ lb. 06¼@.06¾
Washed Nat Oxf'rd, Powder, ℔ lb. 07@.07½
Golden, ℔ lb. .03¾@.04
Domestic, ℔ lb. .0¾@.01¼
Oils, Mineral—
Cylinder, light filtered, ℔ gal. .14@.16
Dark filtered, ℔ gal. .10@.13
Extra cold test, ℔ gal. .26@.24
Dark steam refined, ℔ gal. .09@.12
Phosphorus—℔ lb. .55@.60
Precip., red, ℔ lb. .88@.90
white, ℔ lb. .93@.97
Plumbago—Ceylon, ℔ lb. .04@.05
American, ℔ lb. .05@.07
Potassium—Cyanide, ℔ lb., C. P. .70
67%, ℔ lb. .45
50%, ℔ lb. .40
Bromide, domestic, ℔ lb. .23@.25
Chlorate, English, ℔ lb. .12¾@.13
Chlorate, powdered, English, ℔ lb. .13@.13¼
Carbonate, ℔ lb., by casks, 82% .04½@.05¾
Caustic, ℔ lb., pure silck. .06½@.07
Iodide, ℔ lb. $2.58@$2.63
Nitrate, refined, ℔ lb. .06@.08
Bichromate, ℔ lb. .10@.11
Yellow Prussiate, ℔ lb. .23½@.24½
Red Prussiate, ℔ lb. .40@.45
Pumice Stone—Select lumps, lb. .04@.15
Original cks., ℔ lb. .01½@.02
Powdered, pure, ℔ lb. .01¾@.02¼
Pyrites—Non-cupreous, p. units. .12@.15
Quartz—Ground, ℔ ton. $12.50@$17.50
Rotten Stone, Powdered, ℔ lb. .03¼@.03¾
Lump, ℔ lb. .06@.07
Original cks., ℔ lb. .04½@.05½
Rubbing stone, ℔ lb. .03½@.04
Sal Ammoniac—lump, in bbls., ℔ lb. .80½
Salt—Liverpool, ground, ℔ sack. .700
Domestic, fine, ℔ ton $7@$7.5
Common, fine, ℔ ton $4.50@$5
Turk's Island, ℔ bush. .26@.28
Salt Cake—℔ ton $10.00
Saltpeter—Crude, ℔ lb. .03¾@.04¼
Soapstone—
Sodium—Prussiate, ℔ lb. .22@.24
Phosphate, ℔ lb. .06@.08
Stannate, ℔ lb. .08@.15
Tungstate, ℔ lb.
Hyposulphite, ℔ lb., in casks. .0235@.0245
Strontium—Nitrate, ℔ lb. .09@.09½
Sulphur—Roll, ℔ lb. .02¼
Flour, ℔ lb. .02¼
Sylvinit, 23@27%, S.O.P., per unit. 40@.42½
Talc—Ground French, ℔ lb. .01¼@.01¼
American No. 1, ℔ lb. .01@.01¼
Terra Alba—French, ℔ lb. .75@.80
English, ℔ lb. .70@.75
American, No. 1, ℔ lb. 1.00
American, No. 2, ℔ lb. .45@.50
Tin—Crystals, in kegs or bbls. .14@.15
feathered or flossed. .25
Muriate, single .0 @.08
Double or strong, 54° B. .1@.12
Oxy. or nitro .19
Tin Plates, ℔ box, Swansea, best charcoal .18@.19
best coke .15@.16
Vermilion—Imp. English, ℔ lb. .90@.95
Am. quicksilver, bulk .65
Am. quicksilver, bags .68 @ .72
Chinese .95 @$1.00
Trieste .90 @ .95
American .11½@ .13
Zinc White—Am., Dry, ℔ lb. .04½@ 05
Antwerp, Red Seal, ℔ lb. .07¼
Paris, Red Seal, ℔ lb. .08@.08½
Muriate solution .06
Sulphate crystals, in bbls., ℔ lb. .03¾

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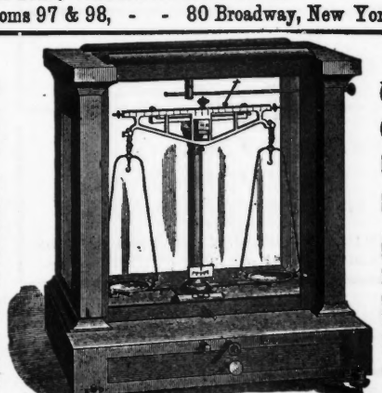

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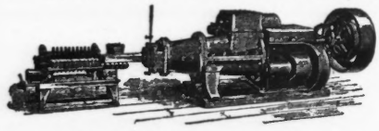

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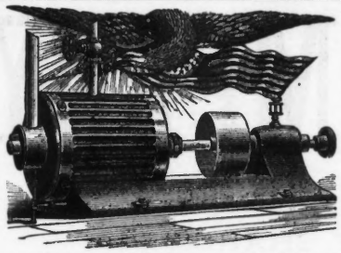

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W. R. VARKER,
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A dividend of fifteen cents per share ($150,000) has been declared, payable June 15th, 1892, to stockholders of record June 8th. Transfer books close June 8th, and reopen June 16th.

H. P. LILLIBRIDGE,
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AN AMERICAN (AGED 40) DESIRES PERmanent position; has some technical education; is machinist by trade; has had 12 years' experience in general mining work; understands hydraulic mining, shaft sinking, timbering, masonry, etc. For past five years been engineer in charge of gas work construction, building tight masonry holder tanks, erecting water gas and other gas apparatus, foundations for power engines, for electric light plant, etc. Address CAPTAIN, ENGINEERING AND MINING JOURNAL.

AN ELECTRO-METALLURGIST OF EXPErience desires a position. Understands the manufacture of ornamental metal work, seamless copper vessels (such as air chambers bali floats), cylinders and tubing, by electro-deposition. Can produce sound workable metal without the aid of any burnishing or other patented device. Address ELECTRO, ENGINEERING AND MINING JOURNAL.

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MINING ENGINEER AND SUPERINTENDent of a mining company seeks a similar position elsewhere. Member Am. Inst. M. E., 10 years' practical experience in all branches of mining and metallurgy. Twenty years' experience in general business management. First class references. Address BOX 617, Butte, Mont.

METALLURGIST AND CHEMIST—MANUfacture of spelter a specialty; experience in designing, erecting and superintending zinc; works; dressing, concentrating and mining zinc ores; extensive experience in smelting zinc-bearing lead ores; open to engagement. Address SPELTER, ENGINEERING AND MINING JOURNAL.

POSITION WANTED AS SUPERINTENDent or foreman of smelting works; twelve years practical experience in copper, silver, and lead smelting; best of references furnished and perfect satisfaction guaranteed; will go anywhere; age 35. Address GUNDERSON, ENGINEERING AND MINING JOURNAL.

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WANTED—OPENING BY YOUNG MAN, 26, college graduate, junior member American Society Mining Engineers; machine shop practice; three years draftsman; knowledge of chemistry. Address LOCK BOX 606, Andover, Mass.

WANTED—AN EXPERT ON DRAINAGE, sewerage, street paving, water-works, town site, and timber surveys; also expert in manganese mining and prospecting, and in erecting and operating washers, wants position. Will go anywhere; owns a fine set of instruments. Address W. B. KELLOGG, Milford, Ill.

WANTED—POSITION AS ACCOUNTANT at a Mine or Smelting Works, seven years' experience with an influential firm. Highest references. Address N. H., ENGINEERING AND MINING JOURNAL.

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☞ The *Tradesman*, of Chattanooga, Tenn., in a personal letter, says: "Please accept the congratulations of the *Tradesman* on your splendid Annual Statistical Number. It is with no little degree of pleasure that we note this magnificent achievement in trade journalism, and as fellow workers in the same line we desire to tender our cordial congratulations."

☞ The *Industrial World*, of Chicago, says: "Thanks for your encyclopædia of statistical facts and figures for 1891. A handsome notice will appear in our issue of January 14th, of the 'Treasures' it contains."

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