

THE ENGINEERING AND MINING JOURNAL



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

Vol. LIV.

OCTOBER 8.

No. 15.

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THE SCIENTIFIC PUBLISHING CO., Publishers.

SUBSCRIPTION PRICE:

Weekly Edition (which includes the Export Edition) for the United States Mexico and Canada. \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$7.

Monthly Export Edition, all countries, \$2.50 gold value per annum. REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

THE SCIENTIFIC PUBLISHING COMPANY.

OFFICERS: R. P. BOWWELL, Pres. & Gen'l Mang. / SOPHIA BRAEUNLICH, Sec'y & Treas. / P.O. Box 1833, 27 Park Place, New York. Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition

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A CURIOUS yet profitable business in the exportation and reimportation of quicksilver has sprung up in California. Quicksilver for export is sold at \$5 less per flask, of 76½ pounds, than that for home consumption, and shrewd dealers have not been slow to take advantage of this rebate of over 6 cents per pound. They have cheerfully paid the freight to Australia and back again and have cleared nearly 5 cents per pound on the transaction.

THE demand for cheap transportation in mining regions is so great that one company alone, supplying wire-rope tramways, has erected 31 plants of one system at mines or similar works, with a total length of 137,774 ft. or nearly 26 miles. The total carriage capacity of these plants is 7,650 tons daily. Among the most remarkable plants is that of the Macarte Gold Mining Company in Peru. The line here is nearly two miles in length with a fall of 4,620 ft. or nearly 50% of its length. The Holy Moses Mining Company, of Creede, Colo., has one of 2,000 ft. in length with a fall of 1,020 ft. and a capacity of 250 tons daily.

THE SILVER PROBLEM.

The silver problem calls for a much more serious consideration in the International Silver Congress about to assemble than at the present time it appears likely to receive. There are many persons who assume that silver is a commodity exactly like copper, lead or nickel, and that the limit of its depreciation in value will be found in the average cost of producing such an amount of it annually as will supply the market demand. This view is, however, very far from being correct.

It is only because the stock of copper, lead or nickel is very small, relatively to its consumption, and that when this is exhausted the price must go high enough to leave a profit on the further production of the metal, that the market so quickly recovers from its low points. With silver the case is different. If its use in coinage, which now absorbs about 72 per cent. of the world's output, were suddenly to cease (which might be expected were the free coinage and silver basis countries to adopt the gold basis and this country to drop its purchases of silver), then a large part of the world's accumulation of the metal would be thrown upon the market and would unquestionably overstock it for many years to come, even without the production of any new silver. The general discredit of the metal in public estimation would then send its market price down to a point not dependent at all upon the cost of production, and it would remain there, in all probability, for a long time to come.

In the face of a declining market the use of silver in the arts would not grow rapidly until the price was exceedingly low. The same conditions would discourage speculative investments in it, even when its price had declined far below the cost of production. The purchases of silver by the United States Government must necessarily cease very soon, for this country is now so near the breakers of silver basis that no congressional pilot can refuse to see them or decline to change the ship's course to avoid the certain wreck a continuance on the present course would bring.

Viewing the problem solely from the mercantile point of view, the standpoint of a student of markets, it seems almost certain that, unless the Silver Congress lead to the general adoption of some fixed ratio between gold and silver, the price of silver will go so far below the actual cost of its production, and remain there so long, and for such an undeterminable time, that it will close the silver mines of the world.

The incalculable injury to industry and civilization involved in a "do nothing" policy would not by any means be confined to the silver producing industry or countries. It would probably bankrupt India, Japan, Mexico and many South American States, and through them bring incalculable losses to Great Britain, which is the bondholder or creditor of all the silver standard countries. England, more than any other nation, is interested in the maintenance of a stable value, or at least in a regulated and calculable decline in the value of silver.

We shall endeavor in another article to show further the injury a neglect on the part of the conference to bring about the general adoption of a fixed ratio between gold and silver and the countries most affected. We shall also endeavor to show the great advantages which the adoption of free coinage under international agreement would bring.

JOHN FRITZ.

The demonstration in honor of JOHN FRITZ which took place at Bethlehem last week presented many features, not only notable in themselves, but also worthy to be pondered upon for the sake of the lessons they carry. I am specially desirous to call attention to some of these features because the exercises at Bethlehem were so planned as to prevent an adequate and complete presentation of the significance either of the occasion itself or of the career which it celebrated. In fairness to the gentlemen who organized the affair, it should be said that their original conception was that of a comparatively informal gathering of personal friends in moderate numbers. To a scheme of more public and pretentious character, Mr. FRITZ unquestionably would have refused his consent; and, for the social

gathering first contemplated, the proposal of giving, by way of novelty and amusement, a humorous cast to all the after-dinner proceedings, was appropriate enough. But it was impossible to restrict the proposed gathering. The "personal friends" of JOHN FRITZ were speedily found to be an innumerable host. The dining room first selected had to be exchanged for the largest hall in Bethlehem; and, this in turn proving inadequate, recourse was finally had to the opera house, which was very skillfully transformed and decorated for the banquet, and in which 250 persons sat down at the tables amid flags and flowers; while, after all, the committee was obliged to refuse, for simple lack of room, the applications of many who were as fairly entitled, as they were earnestly desirous, to take part in this spontaneous tribute to a great engineer and beloved man.

The assemblage was remarkable, however, not simply for its size, but also, and especially, for its character. To say nothing of the letters and telegrams from distinguished men at home and abroad, the number of eminent engineers present in person was extraordinary. Certainly I cannot recall anything of the kind equal to it. Even Holley, who enjoyed during his life-time a larger portion than most men of the fame he had earned, received no such testimonial at this. It was given him in such measure only after death.

For an occasion so imposing and memorable, the scheme of a humorous programme was, as I must take the liberty of saying, no longer entirely appropriate. The mock trial of Mr. Fritz was carried out with spirit, and accompanied with no end of laughter. No doubt it was more entertaining to the company than more serious addresses would have been. It is not at all likely that people would have remained for a more dignified entertainment, as they did for this one, with unabated interest, until long after midnight. Moreover, the prosecution was skillfully managed so as to bring out, indirectly and in jocose form, many of the personal virtues and professional achievements of Mr. Fritz. And there was no lack of hearty praise of him, from witnesses, council and court alike—often in defiance of the dramatic consistency of the mock situation. As I had the honor to be one of the council for the defendant, and enjoyed the fun as much as anybody, it may seem ungracious in me to criticize it now. Indeed, I am not prepared to say deliberately that on such occasions generally, a worthy record should be made at the cost of a diminution of immediate enjoyment. And I confess that this affair was thoroughly enjoyed, especially by my late client, who probably would not have enjoyed at all the more serious proceedings which might have followed some other plan.

But no matter what might have been, and no matter whether the actual result is or is not open in any respect to criticism, the fact remains that the Bethlehem gathering itself and the visit of the next day to the works of the Bethlehem Iron Co. present the true significance of the whole affair; that the proceedings of the mock trial constituted a temporary high-jinks, without further importance; and that an adequate tribute to the character and career of JOHN FRITZ has still to be pronounced.

Now, I am not going to undertake that task here. Nor am I going to inflict upon the readers of the JOURNAL the speech I would have made at Bethlehem, if I had not been obliged to sum up at 12:30, under the necessity of being brief and of trying to be funny! But I wish to emphasize one or two points, of more than personal bearing, which this extraordinary testimony of admiration and esteem seems to me to suggest.

1. There has never been a more striking and inspiring illustration of the great modern fact that the rewards of fame, even such as are manifested in the applause of multitudes, are no longer reserved for the leaders in war or in politics. The dignity of the engineer is recognized; he has a public of his own, intelligent enough to appreciate him and large enough to reward him, and the verdict of this expert public is understood and adopted by the world. The HOLLEY Memorial in this city bears silent witness to this truth, and the recent testimonial to JOHN FRITZ speaks yet more loudly, declaring that the engineer who has earned the gratitude of his generation need not even wait to have it expressed in funeral eulogy or monumental stone after he has departed. Such hints for the guidance of young ambition are indeed deeply important and beneficent.

2. No one can fail to perceive that the traits of a manly and kindly personal character have had as truly, if not as much, to do with the achievements of JOHN FRITZ, and with their cordial recognition by others, as his professional genius and industry. This is indeed involved in the conception of a thorough engineer, for men are among the materials with which he has to work. Nobody could become a great engineer on a desert island, with whatever amount of innate genius and ambition. The engineer must convince others of his ability. He must find men to employ and support him; he must find men to obey and assist him. To say that a person thoroughly understands the laws of matter, the qualities of different substances, the mathematics of construction or the formulas of chemistry, but that he does not get along well with his employers or his workmen, is to say that he is not a good engineer, because he does not understand and skillfully apply the laws of his most important material, human nature. Mr. FRITZ was profoundly right when, in his modest and graceful speech at Bethlehem, he acknowledged his debt to the capitalists who

had firmly trusted and bravely backed him, on the one hand, and to the assistants and workmen who had loyally served him, on the other. What he did not say, I will here add, namely, that such trust and support have been, and must have been, evoked by his own personal character. Some men deserve them who do not secure them; but no man secures them without deserving them.

3. The development of such a character and history as that of JOHN FRITZ belongs peculiarly to the atmosphere and the social climate of free America, which protect individual liberty, and stimulate individual ambition. It is one of the most serious charges that can be justly brought against certain types of "organized labor," that they tend to discourage or repress such careers. They ignore individual excellence; they distrust and disapprove the ambition that would rise above the average level of a given class; they forbid extra work as a means of such advance; they demand uniform wages for all sorts of workmen in each grade; and, refusing to consider the interest of the employer, they do not seek or welcome improvements in machinery or methods which tend to cheapen production or improve product. Consequently, such organizations do not produce highly skillful or inventive men. We have many such men among us, and JOHN FRITZ is one of them. They have risen "from the ranks," but not from the ranks of "organized labor." If JOHN FRITZ had chosen, or had been obliged, to work no more than eight hours a day, and if he had spent the rest of his time in devising ways and means of getting more pay for less service, he never could have become what he is, or done for his fellow men what he has done. There is something fatally wrong in any organization of labor which hinders the natural selection and advancement of such men.

The feeling of hostility to distinct individual endeavor and success undoubtedly exists among the labor unions—especially since they have come so largely under foreign influence. It is not wholly ignoble. On the contrary, it contains an element of generosity, the conception, namely, of individual self-sacrifice for the benefit of a whole brotherhood. But this notion, however unselfish in some minds, is alien to our institutions, and therefore unsuited to effect in this country, even the end it contemplates. It is European. It comes from countries where the wage-earner is practically bound to his class, under what SPENCER felicitously calls the *régime* of status, as opposed to that of contract. The American idea of bettering the condition of the wage-earner is to give him every possible opportunity of rising out of his class—not to defeat his endeavors to do so, and bid him accept the average level of his class, trusting to occasional strikes for such betterment as may be secured for the whole multitude at once.

And this American idea is not only better for individual manhood; it is actually more beneficial to wage-earners as a class, and to each trade as a separate body. Taking the rate of wages as a test, I do not hesitate to say that, in my judgment, the greater part of the advance for which "organized labor" is accustomed to claim the credit is in fact due to other causes. The one great factor which reconciles the interest of consumer and producer by cheapening production without reducing wages is scientific improvement in methods and means. This includes such facilities as are furnished for the collection and employment of capital in large enterprises by the creation of stock corporations, as well as the application of physical science to such enterprises. These two causes have done more to raise wages than all others put together. Corporations, like the Bethlehem Iron Company, to carry on industries too vast for individual ownership, and to distribute the profits of business among small as well as large investors; and men like JOHN FRITZ, to whom such great undertakings may be intrusted, and whose genius evolves in the prosecution of them innumerable fresh contributions to human progress, every one of which is ultimately a blessing to the wage-workers of the world—these are the greatest benefactors of labor; and any system which should substitute State action for that of voluntary corporate enterprises and State regulation of work and workmen for the liberty of each man to do, to get and become what he can, would be a long step backward for the class it professed to benefit.

We should not be in haste to condemn an industrial system which has produced such men as JOHN FRITZ. On the contrary, we should by all means insist upon the maintenance of that American atmosphere in which such men grow strong.

R. W. R.

JOHN FRITZ.

Read by R. W. Raymond at the dinner in honor of Mr. Fritz, Bethlehem, Sept. 28.

Whom shall we choose the flag to hold
In our vast conquest, yet untold
Which to the New World adds the Old?
Donner und Blitz!
John Fritz!

Leaders unseen are with us met,
Nor they nor we the past forget,
The fate that took them early, yet,
Thank God, omits
John Fritz!

When doubters doubted whether we
Could beat our brethren over sea
In rolling-mill machinery,
Who gave 'em fits?
John Fritz!

Who stands before us to combine
A level head, an upright spine,
With nowhere any crooked line?
Most clearly, its
John Fritz!

Whose heart is warmer than his blast?
Whose faith more steadfast to the last
Than any steel he ever cast?
That figure hits
John Fritz!

Whose fame commands our homage, such
As bears of envy not a touch,
Because we love the man so much?
Why, there he sits—
John Fritz!

BOOKS RECEIVED.

- Manual of Qualitative Blowpipe Analysis and Determinative Mineralogy.* By F. M. Endlich, S. N. D. Pages, 456. Illustrated. Price, \$4. New York: The Scientific Publishing Company, 1892.
- Poor's Directory of Railway Officials and Manual of American Street Railways.* Published by H. V. & H. W. Poor, New York, 1892. Pages 592.
- Questions and Answers About Electricity.*—Edited by E. T. Bubier, 2d. Published by the D. Van Nostrand Co., New York, 1892. Pages 100. Price 50c. Illustrated.
- Recent Progress in Electric Railways.* Compiled by Carl Hering. Published by the W. J. Johnston Company, L^{td}., New York, 1892. Pages 389. Illustrated.
- Report on the Internal Commerce of the United States for the Year 1891.* Being Part II. of Commerce and Navigation. The Commerce of the Great Lakes, the Mississippi River and its Tributaries. By S. G. Brock, Chief of the Bureau of Statistics. Published by the Government, Washington, D. C., 1892. Pages 96, with map.
- The Engineer's Epitome,* a collection of figures, facts and formulæ. By N. J. Smith. Published by the Mason Regulator Co., Boston, Mass., 1892. Pages 135. Price 50 cents. Illustrated.
- Third Annual Report of the Geological Survey of Texas.* 1891. By E. T. Dumble, F. G. S. A., State Geologist. Published by the State. Austin, Texas, 1892. Pages 410. 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 responsible for the opinions expressed by correspondents.

Gas Furnaces for Copper Smelting.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In your issue of September 24th you publish an article on the use of gas furnaces in copper smelters, and you remark upon the scarce number of metallurgists who have adopted the method with success.

May I be permitted to say that in the year 1885 Capt. G. G. Vivian, late of the Freeland Mines, and at present senior member of the firm of Vivian & Barber, of Idaho Springs, Colo., used a modification or improvement of the McNair Gas Reverberatory Furnace at the Plutus Smelter here with thorough success.

In view of the above, I think this gentleman is entitled to be classed with those metallurgists who have successfully coped with these conditions. I am, yours very truly,
E. C. A. BARBER.
IDAHO SPRINGS, September 27th.

The Cyanide Process.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Mr. Alexander Benham, of Boise, Idaho, states in the JOURNAL Oct. 1st, that he has saved 98 per cent. (of precious metals) by cyanide process and that the consumption of cyanide was very small. These statements are valueless to any one who is looking to the adoption of this process, but he can render very valuable testimony and assistance to mine owners by answering the following questions with regard to some actual ores which he has thus treated, grouping the answers for each ore separately:

1. What base metals (iron, lead, zinc, copper) did the ore contain, with their approximate percentages, and were they sulphides or carbonates or oxides?

2. In what form were the precious metals?

3. What was the consumption of cyanide per ton of ore?

A few ores that I have experimented with failed to yield even a trace of silver, either to a weak or strong solution of cyanide. If the patentees persist in the absurd claim that it will treat most ores, and fail to point out the chemical constitution of such ores as experience has proved can be successfully treated by them, they stand in their own light, and make enemies where they might make friends who would assist their success.
CHICAGO, Oct. 3, 1892. C. WADE STICKNEY.

The "Census" Cost of Mining Pocahontas Coal.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I notice criticisms of the cost account of Pocahontas coal as given by the Census report of Mr. Jos. D. Weeks. They are widely copied from the late numbers of the ENGINEERING AND MINING JOURNAL. The report is open to criticism, not because I think it at all "doctored," but because not given in detail to explain the item of "deadwork." It would be strange indeed if the only two expenses connected with coal mining were mining and dead work besides royalty. I take it that in the figures given, dead work includes all expenses not included in mining. Your correspondent says the actual cost of mining is 30 cents per ton. It is very probable that under some unfavorable conditions extra expense is incurred in the shape of a bonus to the miners. This extra expense in most mines will add from one to two cents to the cost per ton of all coal mined; we would then have the cost of mining, taking your correspondent's own figures, say 31½ cents for mining.

The dead work proper should not be over 15 cents per ton. I would say for so favorable a location as Broad Top region 7½ cents per ton abundant; this would give us 39 cents per ton of coal, and add 10 cents per ton for royalty and we have only 49 cents per ton as cost, while the Census figures are 72½, a discrepancy of 23½ cents, but which I think can and will probably be accounted for by Mr. Weeks in following items no doubt included in the one item of dead work, to wit:—haulage, bankwork, tools and supplies, timber and general expenditures. I have now before me the cost accounts from two mines for the month of August last, in which these omitted items amount to 29 and 30 cents per ton of coal respectively.

This then, I think, explains the excessive "dead work" item. And I wish to say that 62½ per ton (omitting royalty) is not excessive, but a low cost for mining and delivered on board cars or to the ovens.

It is rather strange that only two items, mining and dead work, are given as representing the cost of coal, but very probably Mr. Weeks has good and sufficient reasons for this.

As to credits for rent and stores, etc., I do not think the cost accounts of either coal or coke are entitled to this credit. Capital invested in mer-

chandise and dwellings is an entirely separate affair from coal getting, and stands on its own bottom. Yours truly,
E. O. NATHURST.
TRACY CITY, Tenn., Oct. 4, 1892.

[Mr. Nathurst's assumptions might reasonably account for a cost of 72½ cents a ton in some small vein mines, but there is nothing in the Pocahontas 11-foot vein to justify them. We have what we consider excellent authority for our statement that the Census report of the cost of producing Pocahontas coal (72½ cents a ton) is very far from being correct—in fact, is about 38 per cent. too great, the actual total cost being but 50 to 52 cents a ton. As Mr. Weeks must certainly be somewhat familiar with the cost of coal mining, he could, without any official returns, have "estimated" the cost at Pocahontas closer than the figures he has published.

Whether 62½ cents a ton as a cost of coal (omitting royalty) is a reasonable one or not depends on the character of the bed; we know mines where this cost is not 40 cents a ton. So also there are comparatively few mines where the appearance of the item 29 or 30 cents a ton for "haulage, bankwork, tools and supplies, timber, and general expenses," would not be followed by a very searching inquiry by the manager into the cause of this high cost. There are of course conditions which would justify both these figures. The important question in this matter is not so much the actual cost of producing coal at Pocahontas as it is the value of our Census reports if their figures are 35 to 40% out of true.—Ed. E. & M. J.]

The Tariff on Silver Lead Ore."

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have read your able article on this subject in your issue of September 17th with much care.

I think one or two of your statements are somewhat misleading. You give the impression that the government taxes the lead contained in Mexican ore at the request of "certain lead ore miners in Colorado." You say the result of taxing the lead in Mexican ore "has been to increase the smelting charge on dry silver ore about an average of \$2 per ton." You further state that the smelters in this country are "all in want of lead ore."

Regarding the first proposition, several western States joined in the request to the Government that a tax should be put on lead coming into this country, whereas you convey the impression that the Government truckled to certain men in Colorado.

Regarding the second proposition, the charging of \$2 per ton more for smelting dry silver ores is not entirely due to the tax on Mexican ore. The uncertainty and instability of the price of silver has much more to do with this extra charge than may be supposed. Starting in with the first of the year with silver at 94½ to 94¼ cents per ounce, the smelters have been purchasing and paying cash for silver on a declining market. The loss sustained by them is in part made up by this extra smelting charge. The gradual decline in silver to 83 cents per ounce has entailed a loss on their silver purchases of several hundred thousand dollars, which must be made up to them in some form.

Regarding the last proposition that all the smelters are in need of lead ore; it is true they may like to get more carbonate lead ores than they are getting, but there is no lack of lead ores containing sulphur. These latter, on account of requiring to be roasted, are not so much liked. Still there is a great abundance of this class of ore, and the smelters are able to supply all their wants without any trouble, and are able to charge a good price for smelting.

The West is entitled to protection just as much as the East, but having no manufacturing industries to protect, asks for protection on its lead and silver. When absolute free trade takes the place of protection in the East then the West will be content to see lead ores admitted free and the purchase of silver by the Government cease.
A. H. WETHEY.

BUTTE, Mont., Sept. 30, 1892.

[It is notorious that the chief beneficiaries of the tariff on lead ores were certain Colorado carbonate mine owners; and as the action of "several western States" requesting the imposition of the tax was chiefly due and easily traced to these individual interests, and that the passage of the law and the rulings of the Treasury are also easily connected with the interests that profited by them, we still think our statement does not misrepresent the facts.

The instability of silver values, no doubt, justified some advance in smelting charges, but the advance was made even before there was much of a decline in silver, and is stated by most, if not all, of the smelters, to be due to the necessity for running on low lead charges with consequent higher silver losses; we know also that all, or nearly all, the smelters are now wanting high grade lead ores. The possibility of using sulphide ores that have to be roasted, and are consequently more expensive than the Mexican ores, is unquestionably one of the reasons why smelting charges on "dry" silver ores have advanced so much.

There is undoubtedly much force in Mr. Wethey's proposition that because the East exacts high protective duties on its manufactures the West must have it on its raw products, but we wholly dissent from the policy of a division of one industry or a few individuals in it enriching themselves at the expense of the rest of the industry or of the whole people by the imposition of an unnecessary tax, simply because some other individuals are able to have an unnecessary tax imposed on something else for their especial benefit.

THE ENGINEERING AND MINING JOURNAL, has always held that it is to the interest of this country to have free raw materials, and in opposing, some two or three years ago, the exclusion of foreign lead ores we pointed out that the effects would be precisely what everyone now knows they have been, namely, the building up of a rival metallurgical industry in Mexico, which adds to the production and, consequently, lessens the market value of silver and lead, while at the same time the exclusion of these ores has added to our cost of production and has been a heavy drawback to our silver miners.

It is not a satisfactory argument that a prominent Colorado inspirer of public opinion used to us when he said in regard to this very lead tariff: "You are quite right, but when there is boodle going we want our share of it." This in fact seems to be the foundation argument for a good many. The strange matter in connection with it is not that men should advocate what they think will enrich them, no matter at what cost to others, but that the miners and other workmen who pay the "boodle" like it and ask that this privilege be continued.—Ed. E. & M. J.]

THE BARRIER RANGE SILVER FIELD, AUSTRALIA.

Written for the Engineering and Mining Journal by G. E. Boxall.

At the present time the principal mining centre in Australia is Broken Hill. For many years the belief obtained that Central Australia consisted for the most part of a vast sandy desert. In dry seasons it was as inhospitable looking a country as could well be imagined. It was in 1882 that a shepherd who had been stationed far back near a low ridge of hills, known as the Barrier Ranges, from their situation near the boundary of New South Wales and South Australia, picked up some ore and carried the specimens with him.

In the following year, some of these specimens having been assayed, several mineral leases were taken up and a township formed. The place was named Silverton. The attention of mining men having been attracted to the district by the stories of the extraordinary richness and the great extent of the mineral deposits, a number of people visited Silverton, and in 1884 it was announced that Broken Hill, a rugged ridge, which rises to a height of some 400 to 500 ft. above the level of the plain was a mass of silver lead ore. Then a rush set in, and in a few weeks what had once been considered a corner of the desert had a population of some 20,000 people scattered about it, prospecting in all directions.

The Broken Hill Proprietary Mine.—In 1884 a syndicate was formed, and almost the whole of the ridge known as Broken Hill, Parish of Willyama, was pegged out in 40-acre mineral claims. The company set about developing what was considered the richest portion of this estate without delay, and in the first half-yearly report, issued in November, 1885, it was shown that 48 tons of ore had been treated for 35,605 oz. of silver, valued at £7,442 12s 11d., while the expenses had been £4,644 15s 4d. Since then the output has increased every year by enormous percentages. The quantity of ore treated in 1891 was 286,118 tons, which produced 9,947,038 oz. of silver and 41,688 tons 6 cwt. 2 qrs. 18 lbs. of lead, valued at £2,301,453 2s 5d., the expenditures having been £1,076,859 5s 2d., while the dividends and bonuses amounted to £1,152,000. The total quantity of ore raised and treated during the six and a half years ended November 30th, 1891, was 803,497 tons 9 cwt. 2 qrs. 14 lbs. The silver produced totaled 30,557,505 oz., and the lead 125,102 tons 5 cwt. 3 lbs. The net amount received was £7,059,175 13s. 5d., or, in round numbers, \$35,000,000. The total dividends paid to date amount to £3,304,000, and the cash bonuses to £592,000, making a grand total of profits of £3,896,000, or \$18,000,000. The cost of concentrators, smelters, and other machinery to date, has been £428,148 8s., of which £204,538 9s. 9d. have been written off for depreciation. The total working expenses have been £3,360,962 2s. 11d., or, rather less than half the net receipts. To carry out the work of this mine timber is ordered from America by shiploads. A large proportion of the machinery has been obtained from the United States.

Among the 4,000 miners and others employed in various capacities in this mine there are many that hail from the United States of America, though the majority of the miners are from the gold fields of Ballarat and Bendigo. The pay roll every week amounts to £15,000, or about \$70,000.

The present condition of the property was described in the annual report of the company in the *ENGINEERING AND MINING JOURNAL*, September 10th, 1892.

The whole of the trade is through Adelaide (South Australia). New South Wales, therefore, derives but little benefit from the mine. The only moneys paid to the Government of the colony in which the mine is situated are those for the rent of the blocks of land, and this amounts to only a few pounds per annum. It is little wonder, therefore, that complaints were made by the Australian coal mine owners and coke manufacturers that the Broken Hill Company obtained all the coke used for smelting from England. These complaints were considered by the directors of the company, and on June 20th a report was issued to the effect that the Australian coke carries 6% more ash than the English coke and is of a very friable nature, so that fully 9% is lost by abrasion in transit from Newcastle (N. S. W.) to Broken Hill. The quantity of coke used is about 1,000 tons per week. The use of Australian coke would mean 80 tons more per week, and would reduce the capacity of the furnaces by 70 tons ore per week, while 70 tons more of flux (lime and iron) would be required. This would mulct the company in about £645 per week. The coke might, however, be much improved if more care was taken in its manufacture.

Other Barrier Mines.—Near the Proprietary are a cluster of mines, many of them consisting of one or more of the 40-acre blocks originally taken up by the Proprietary Company, but subsequently sold to other parties. There are three companies now in existence—namely: The British Broken Hill (consisting of blocks 15 and 16) and Block 14 and Block 10 companies. The nominal price paid by the British Company to the Proprietary Company to date is £576,000 cash and 80,000 shares valued at £5. The mine has been well opened and a fine chute of carbonate ore exposed at the 50 ft. level south. This ore carries 9 oz. silver per ton and 40% lead. At the 100-ft level is a similar chute, carrying 9 oz. silver and 60% lead. In the north, a block of 140 ft. long by 30 ft. high and 60 ft. wide is ready for stopping. This is reckoned at 20,000 tons carbonate ore carrying from 12 to 20 oz. silver per ton. The western side is opened out in a similar way, with equally good promise. A large quantity of the best ore has been exported, and with the proceeds of this an immense amount of work has been done at the mine, and a complete smelting plant erected at Port Pirie in South Australia. From this ore some 25,000 tons have been stacked pending the completion of the local smelting works. The manager is Colonel Morgan, an American expert. In addition to the carbonate ore, it is estimated that over a million tons of sulphide ore, averaging 24% lead and 3% zinc and 12 oz. silver per ton, is in sight, but nothing can be done with this at present. The company has paid two dividends of 2s. (50 cents) per share.

Block 14 Company is, as its name implies, simply block 14 of the Proprietary Company worked as a separate mine. For this block the Proprietary Company received 96,000 shares of a total value of £432,000. The ore in this mine is precisely similar to that in the big mine, and has yielded similar results. For some time the smelting was done at the Proprietary mine, but recently a complete plant has been erected on the ground, and it is now hoped that the dividends will be paid as regularly as they have been in the larger mine. Mr. Lane, the manager, is an American expert.

Block 10 Company (Limited) is similar in character to Block 14. The value of the 96,000 shares allotted to the Proprietary Company as the price of the block is £912,000. This mine has been a source of constant surprise, and consequently more speculation has taken place in the shares of Block 10 than in any other mine in the field. Assays have run as high as 5,000 oz. silver per ton. A great portion of this rich kaolin ore has been worked out, and high dividends were paid while it lasted. Some two or three feet of the sulphide ore in immediate contact with the kaolin yielded from 160 oz to 200 oz. silver per ton. One shaft is down 617 ft. and another 650 ft. The reserve fund amounts to £148,000. At the present time 33,000 tons sulphide ore are lying on the surface and for this the sum of 30s. per ton has been offered. The directors, however, refused to sell for less than £2. The assays show 34 oz. silver, 22% lead and 2% zinc, the whole being estimated to yield 1,250,000 oz. silver.

Broken Hill South has also been well developed and some valuable discoveries have recently been made. At the 400-ft. level about 200 ft. of very rich carbonate ore has just been explored. A winze has been sunk from this level to a depth of 38 ft. through massive carbonates mixed with copper ores. Some thousands of tons of silicious gangue and other ores more or less rich have scarcely been touched, while huge deposits of sulphides await exploration. A new 80-ton smelter is now being added to the plant.

The Central Broken Hill has been working some dry silicious ores (that is, ores containing no lead or so little as to be insignificant), but several rich deposits of carbonates have been found. Mr. Randolph Thomas, the manager, reports that there are 175,000 tons oxidized ores in sight. Some of the dry ore yielded 25 oz. silver per ton in bulk, but the major part went some ounces less than this. Some extensive explorations have been made in the sulphides in this mine, and the cross-cut at the 400-ft. level is calculated to have opened up 800,000 tons of this ore. Over 200 samples bulked assayed 18 oz. silver and 24% lead, while the center width of 100 ft. shows 22 oz. silver and 22% lead.

The Broken Hill Junction has a shaft down 715 ft., the bottom being micaceous schist. In the earlier stages rich pockets of carbonaceous ores were discovered. During the half year ended March 31st last 4,927 tons of ore were sent to the smelting works at Dry Creek, Port Adelaide, the yield being 109,715 oz. silver and 531 tons lead, valued at £24,745. The cost of carriage, smelting, etc., was £19,485, and this left only £4,568 to pay for mining. There are huge deposits of sulphide ore in this mine, but the cost of extraction is too high to enable this to be profitably worked at present.

The New Junction north shaft is down 548 ft., and the character of the work done is similar to that in the adjoining mine. The New North Broken Hill, under the management of Mr. A. Wilson, has a shaft down 725 ft., with similar large deposits of ore as in the other mines described. Besides these, there are the Broken Hill Extended, Central Blocks, North Central, Australian, Consols, Brisbane Blocks, Underlay, and many others more or less developed.

Silverton.—About 14 miles from Broken Hill is the Umerberherka mine, now the chief support of the municipality of Silverton. A number of other properties are being held here, but the greater attractions at Broken Hill have reduced the population of this town to about 1,000, while that of Broken Hill is 26,000. To the north of Broken Hill there are several other mining centres, where ore of more or less value is being worked. The principal mine outside Broken Hill is perhaps the Mount Gipps, but there are several others that will, no doubt, come to the front in time.

An important problem is the labor question. In Ballarat, Bendigo and other gold fields the standard wages are £2 5s. per week for miners. At Broken Hill the standard rate is £3 (\$15). The mines are worked from 12 midnight on Sunday to 12 midnight on Saturday. During the 24 hours of Sunday only pumping is done. The other 24 hour days are divided into 3 shifts of 8 hours each. Out of these 8 hours half an hour is allowed for "crib," "grub," or "tucker" (as it is variously called), so that the actual working time for a miner is 7½ hours per day, or 45 hours per week. The rate of pay, therefore, is 16 pence, or 32 cents an hour. But on the gold fields mentioned above and on the coal fields at Newcastle, Wollongong and elsewhere in New South Wales the work is chiefly done by contract, the rate per ton being fixed according to the width of seam, etc., so that a man may earn about the standard pay. Recently the mine owners of Broken Hill gave a month's notice that on the 1st of July last all stoping would be done on this system.

The Amalgamated Miners' Association decided to resist this change, and consequently nearly the whole of the mines in the district are now idle. Upward of 6,000 men are on strike, and 4,000 other men have consequently been thrown out of work. The mines are practically in a state of siege. A notice appeared on the door of the office of the Miners' Association to the effect that if Messrs. John Howell (manager of the Proprietary), and Mr. Z. Lane (manager of Block 14) did not clear out within 24 hours, they would be dynamited off the place. It is said that the reason why the men went out so promptly was owing to a rumor that there was a "creep" in the timbers of the Proprietary mine, and that therefore the directors dared not risk the chance of the mine falling in. The timbering is almost entirely composed of specially imported Oregon pine, which is said to be better suited for the work than the Australian hard woods. The other mines are timbered with the ordinary Eucalyptus (red gum principally) specially carried from the forests of South Australia, there being no timber suitable at the Barrier. The miners thought that the mine owner's difficulty was their opportunity, but Mr. Howell reports that the mine is perfectly safe.

The pickets of the miners attempted to stop provisions from being taken to the managers, watchmen and others who are living on the mines, and some difficulty was feared, but a strong force of police has been sent from Sydney to preserve order, and public opinion here is so strongly opposed to violence that it is not thought that the miners will dare to create a disturbance. The cause of the dispute is so inadequate—as there was no intention to reduce wages or lengthen hours—that very little outside support will be accorded to the men on strike, and it is expected that the strike will collapse in a short time. For six months the people were dependent for drinking water on the quantity carried by tank trains from South Australia, and the drought only broke up on the 27th of May last. It seems too bad that, after so severe a trial, another blow at the prosperity of the town should be struck by the miners, without sufficient excuse.

THE SEVEN STARS MINE, ARIZONA.

The accompanying illustration gives a good idea of the country immediately surrounding this property, some 50 miles west of Prescott, Yavapai County, Ariz., and which was described in our issue of Oct. 1. The view is taken looking north; over the heads of the two men in the foreground is seen the mouth of the tunnel level. The mill is in operation, as may be seen by the steam arising. The other buildings are the company's office, store and boarding houses. Boulder Creek is shown at the extreme left.

Coal Trade of India in 1890-91.—According to the London *Mining Journal* the total yield of Indian coal has, during the past few years, increased as follows: 1886, 1,389,000 tons; 1888, 1,708,000 tons; 1889, 2,045,000 tons; 1890, 2,168,000 tons. During the same period the importations of coal by sea decreased from 849,000 tons in 1886 to 605,000 tons in the year 1889, but rose in 1890, under the stimulus of a high rate of exchange between silver and gold, to 784,000 tons; of this the bulk came from England, while 12,014 tons came from Japan and 10,017 from Australia. The Burdwan coal mines in Bengal did not maintain the large output of the preceding year, but their industrial importance is great and they employ over 12,000 workmen. The exportations of Bengal and Assam coal by sea from Calcutta to foreign countries and coast ports were 132,000 tons, while of 289,000 tons of coal placed on steamers in Calcutta during the year for bunker use, 286,000 tons were Indian coal. Burmah in 1887-88 took 70 tons of Bengal coal, but in 1890-91 took 64,244 tons, while Madras in the latter year took 20,214 tons. Up to the end of 1890 no appreciable output had been obtained by concessionaires in the upper Burmah coal fields, but work there had begun.

THE CYANIDE PROCESS IN SOUTH AFRICA.

Written for the Engineering and Mining Journal by Chas. Butters, Ph. B., and John Edward Clennell, B. Sc.

It has long been known that the extraction of gold from its ores by amalgamation is imperfect. The only method which has hitherto proved successful in working the tailings from that process on the South African gold fields is that known as the cyanide process. The adoption of this process has been rapid and the success attending its operation most striking. It is all so beautifully simple on paper that we might well suppose the "Ultima Thule" of metallurgical research has been reached.

But the working metallurgist who attempts to carry out this process on a large scale soon finds himself confronted with difficulties, and is forced to the conclusion that even the cyanide process is open to improvement. These difficulties arise from the nature of the material under treatment, and from the manipulations necessary in applying the process to large bulks of material. Neither the solution of the gold in the ore under treatment, nor the precipitation of this gold, nor the conversion of this precipitate into a marketable commodity is perfect from a theoretical or practical point of view. Losses occur in each of these operations. Moreover the consumption, both of cyanide and of zinc, is enormously in excess of that which is indicated by the various chemical reactions involved.

We propose in this paper to shortly describe the process as it is carried on at the present day in South Africa, indicating the various improvements which have been introduced for the purpose of overcoming the drawbacks pointed out above, with special reference to the methods in use at the large works belonging to the Robinson Gold Mining Company.

In subsequent papers the details of the process from a metallurgical



THE SEVEN STARS MINE, YAVAPAI COUNTY, ARIZONA.

Wages of Rolling Mill Workers.—Owing to the recent strike at the Homestead Steel Works the high wages paid this class of workmen has attracted the attention of the entire country. Messrs. A. R. Whitney & Co., whose rolling mills are situated at Altoona, Pa., stated in a letter to the editor of the *New York Evening Post* that the average daily wages paid to rollers and heaters at their mills from July 1, 1891, to July 1, 1892, was as follows:

8-inch Guide Mill.	
Paid net to roller, 290 days.....	\$13.97
Paid net to heaters, 290 days	7.20
15-inch Bar Mill.	
Paid net to roll r, 288 days.....	7.22
Paid net to heaters, 288 days.....	5.85
7-inch Hoop Mill.	
Paid net to roller on cotton ties, 107 days.....	15.10
Paid net to roller on guide iron, 27 days.....	14.04
Paid net to heaters on cotton ties, 242 days.....	8.15
Paid net to heaters on guide iron, 27 days.....	7.04
10-inch Hoop Mill.	
Paid net to roller on cotton ties and steel hoop, 270 days.....	29.85
Paid net to heaters on cotton ties and steel hoop, 270 days....	9.18

It will be noted that the roller in the 7-in. mill only made 134 days. This was due to the fact that the 10-in. hoop mill roller handled the product of the two furnaces on the 10-in. mill for six months in the year. In its communication the firm said: "The reason why the rollers on cotton-ties made more money than in the other finishing-mills is because they have a higher rate of wages per ton, and are able to turn out a much larger tonnage, on account of the product being rolled out of steel. This also applies to steel hoop as rolled on the 10-in. mill, with this exception, that about 50% more tonnage in the same time is produced on steel hoop over and above cotton-ties, which makes the roller's wages on that mill average \$29.85 per day for the whole year. Messrs. Whitney & Co. have since given up the manufacture of cotton-ties, as there was no profit in it they claim, with such high wages.

and from a commercial point of view will be more fully dealt with. It will be sufficient to state at the outset that hitherto the process has only been successfully applied to those ores or tailings usually described as "free-milling," i. e., such as are capable of yielding the greater part of their gold in the ordinary amalgamation process. Although it is quite possible to extract a high percentage of gold from pyritic and other refractory ores by means of potassium cyanide, it remains to be seen whether this operation may be profitably conducted on a commercial scale.

The promoters of the McArthur-Forrest process have been singularly fortunate in the nature of the material they have had to deal with on these fields. The ores forming the upper portion of the main reef series, extending to a depth of 10 to 150 or 200 ft. (as on the Robinson property) consist almost exclusively of silica and oxide of iron. They contain practically no substances except gold and silver which the cyanide is capable of attacking. The serious difficulties of the process begin when we come to deal with ores or products containing sulphides of iron, especially when these are partially oxidized to sulphates and those containing compounds of the base metals, lead, zinc, etc.

The cyanide process, as applied to free milling ores or tailings, comprises three distinct operations: (1) Solution of the gold in potassium cyanide. (2) Precipitation of the dissolved gold by some suitable reagent. (3) Conversion of the precipitated gold into bullion.

We shall consider each of these operations separately, noting the various methods in use, the difficulties to be overcome and the plans which have been tried or suggested for surmounting them.

Solution of the Gold.—When the cyanide process was first introduced about two years ago, it was thought necessary to agitate the material under treatment with the cyanide solution in order to obtain a satisfactory extraction of the gold. It was soon found, however, that the power required for the agitation and the rapid decomposition of the solution, were sources of expense which more than compensated for the greater

percentage of precious metal extracted in comparison with the method of simple lixiviation. At the present day the "percolation" system is almost invariably adopted. The operation is carried out by the African Gold Recovery Co., who represented the patentees in South Africa, as follows: The damp tailings, taken from the tailings pits, are charged into wooden vats of a capacity of 35 to 50 tons; these vats are usually square. The best works are now building circular tanks.

The round vats in use at the Robinson Works have a capacity of 75 tons; those now in use at the Langlaagte Estate have a capacity of 400 tons and still larger vats are being constructed for the cyanide works at the New Primrose mine. The vats are filled to within a few inches of the top and the surface of the tailings leveled. Cyanide solution of '6 to '8% strength is then allowed to flow into the tank until it is completely filled. The ore settles from 3 ins. to a foot below the rim of the tank (the amount of shrinkage depending on the depth of the vat). This solution is allowed to remain undisturbed, in contact with the ore, for 12 hours. Each vat is provided with a false bottom—usually a wooden framework covered with cocoanut matting. Below this is a layer of coarse sand and pebbles through which the solution percolates. An iron pipe communicates with the vat below the false bottom, and conveys the filtered solution to the "zinc-boxes," where precipitation takes place. After 12 hours' contact with the ore, the solution is allowed to drain out of the tank by opening a cock.

It may be interesting to remark here that the dilute cyanide solution does not attack a wooden vat, nor does it corrode the iron piping to any appreciable extent. As to wear and tear of apparatus the use of cyanide offers decided advantage over chlorine or chlorine water, which otherwise might be applied quite as cheaply to the treatment of these oxidized surface ores. Brass plungers and valves, such as are in use in ordinary pumps are attacked, but not very rapidly. The pumps at the Robinson Works were in use for four months with comparatively little wear, but iron is, of course, preferable for all pump fittings where cyanide solution is used. As the liquor is drawn off during the leaching process it is replaced by fresh solution. This operation is continued for a longer or shorter period, depending on the value of the tailings (about 6 to 12 hours).

At the end of this period, which is known as the "strong solution leaching," a weaker solution (containing '2 to '4% of cyanide), is turned on, and allowed to filter through the ore for about 8 to 10 hours. This "weak solution" is then drawn off through another zinc box (known as the "weak zinc box"). Finally a quantity of water is run into the tank, more or less equivalent to the amount of moisture which the ore contained when the tank was filled. This last water-washing displaces the weak cyanide solution, so that the volume of cyanide solution in use remains unchanged. The "weak solution" is, in fact, the liquor which has previously passed through the zinc boxes into the receiving tanks or "sumps," and has been pumped again to the leaching tanks. The cyanide is usually supplied in cases, containing 190-195 lbs. of crude cyanide, contaminated with carbonaceous matter and iron, but containing 72-78% of pure potassium cyanide.

This cyanide is usually dissolved in a small volume of water, to form a highly concentrated solution, a special small tank being employed for this purpose. The solution of required strength is obtained by adding this concentrated cyanide to the dilute liquor in the sumps. By this means a dilute solution of given strength is more accurately arrived at than would be the case if the cakes of cyanide were dissolved directly in the required volume of water, since the percentage of cyanide can be more accurately determined in a strong solution than in a weak one. The actual amount of cyanide used in this method of working is about half a ton of strong ('6 to '8%) solution and half a ton of weak ('2 to '4%) solution for every ton of ore treated. As the amount of cyanide actually entering into combination with gold and silver is almost infinitesimal in comparison with the quantity consumed in the different stages of the process, it will be obvious that there is still considerable scope for inventive genius in determining the conditions of economical working. When the final water-wash has been added, and has displaced the weak solution, the "exhausted tailings" or "residues" are discharged, usually by the somewhat tedious process of shoveling out over the side. A truck-line runs across the top, or by the side of the tank to receive the discharged tailings, which are then removed and dumped outside the works. The tank is then ready for a fresh charge.

The "percolation system" which we have just described has been modified in various ways.

One of the first difficulties in the application of this process arose when tailings were treated containing a small percentage of pyrites, which by exposure to the air had become partially converted into sulphate of iron and free sulphuric acid. These substances gave rise, as will be explained in a later paper, to a considerable decomposition of the cyanide solutions, a decomposition which could only be prevented by special treatment, adding greatly to the cost of the operation. The trouble could be minimized by treating tailings direct from the battery, in which there had been no time for the oxidation of the pyrites, but where old tailings which had been exposed for many months to the action of the atmosphere were to be extracted it was found necessary to give a preliminary washing, first with water and then with some alkaline solution, such as lime or caustic soda. At the Robinson works lime was found to be in every way preferable to the stronger alkali, as it is less active in inducing the decomposition of the cyanide solution in the tanks, and in attacking the zinc used in the subsequent precipitation. Endless complicated reactions occur when substances are present in the ore capable of decomposing the cyanide solution, and in some cases the gold already dissolved may be re-precipitated and deposited in the gelatinous mass formed on the surface of the tank, especially when the "circulation" method is employed.

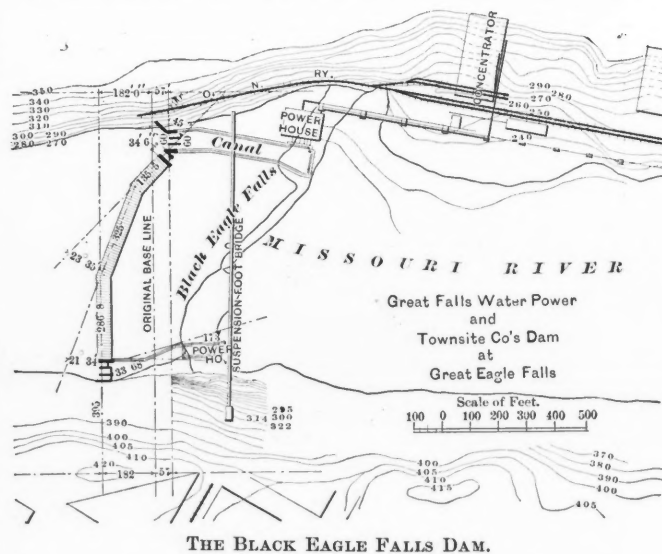
It has been stated that in the usual method of working about a ton of solution is employed in the treatment of a ton of ore. Since, with free-milling ore, a much smaller quantity is sufficient to dissolve the same percentage of gold, it was suggested that the solution from one tank might be transferred to a second, and be made to dissolve an additional quantity of gold before being passed through the zinc box. For example, at the Robinson works it was found that 20 tons of solution were amply sufficient to extract 40 ounces of gold from 75 tons of tailings in one tank. It was found that 20 tons of solution sufficed to fill a tank holding the usual charge of 75 tons of tailings, covering the charge to a depth of three or

four inches. Instead of replacing this 20 tons of solution by fresh cyanide, the solution filtering through was continually pumped back again into the same tank for about 36 hours, and then passed through the zinc box. The extraction of gold by this circulation system was equal to that obtained by the ordinary method, and the consumption of cyanide was much less, since a much smaller quantity of solution was exposed to the action of the zinc. A further modification suggested itself, namely, the transference of the solution charged with gold, from one tank to a second and third, in order that it might take up an additional quantity of gold from fresh tailings, before passing into the zinc boxes. The advantages of this method are that the solutions from which the precipitate is obtained are much richer in gold, giving a cleaner deposit on the zinc, with much less consumption of cyanide.

The usual practice, as we have pointed out, is to dissolve the cyanide in a special tank set apart for that purpose. At the Robinson works a different procedure is adopted. The strength of the cyanide solution is kept up by adding cyanide in lumps, dissolving it under the steam from the pump. By this method a cyanide solution of required strength is formed in the leaching tank itself, and not in the pump. This simplifies the operation and diminishes the number of tanks required in the treatment. It also gives us an easy means of getting rid of the insoluble impurities of the cyanide (the so-called carbide of iron), which would otherwise accumulate as a black slimy deposit in the concentrated solution tank. This insoluble residue is of course discharged with the tailings when the tanks are emptied.

Another difficulty frequently encountered in the application of the cyanide process is the treatment of "battery slimes," i. e., the very finely divided material produced during the crushing, and which has a tendency to accumulate in pasty masses. These either resist the penetrating action of the cyanide or retain the dissolved gold during the leaching operation. No satisfactory method of breaking such material has yet been devised—the evil may be lessened by mixing the slimy tailings with clean coarse sand.

A trial is now being made by the African Gold Recovery Company on the direct treatment of ore from the battery. Ore from the May Consolidated mine (averaging about 2 oz. to the ton) is being crushed with cyanide solution, instead of water, and is then led into the tanks without



passing over amalgamated plates. The operations so far do not appear to have been very successful. Coarse gold, which is easily caught on the plates, is very slowly dissolved by cyanide, and this is probably a very serious source of loss in all such attempts at direct treatment. Experiments are also on foot at the Langlaagte Estate and many other places on the treatment of pyritic concentrates, with or without agitation, by the cyanide process. Although an extraction of over 90% has been obtained, it appears that the consumption of cyanide is enormous. The results obtained by the agitation method in the treatment of concentrates have been so unsatisfactory that it is now abandoned by its originators. The results of both experiments will be awaited with great interest, as they have an important bearing on the future of the gold-mining industry, and will give us some indication as to whether the cyanide process can successfully compete with amalgamation and chlorination.*

Various improvements have been introduced in the mechanical details of construction. The large leaching vats of the Robinson Company are rapidly and conveniently discharged by means of a trap door placed in the centre of the tank-bottom, and which may be hermetically closed by a patent screw fastening. The enormous underground vats of the Langlaagte Estate Company are discharged by means of a dredge, which appears to give perfect satisfaction.

(To be continued.)

Sulphureted Hydrogen Free from Arsenic.—To procure sulphureted hydrogen free from arsenic Habermann mixes one part by weight of calcium sulphide and two parts of crystallized magnesium chloride with as much water as is required to make a thin paste. This mixture is first heated gently and finally more strongly. He also proposes to free the gas from arsenic by passing it over iodine and then through water. He has proposed a somewhat similar treatment to free hydrogen from hydrogen arsenide, phosphide and sulphide.

* The direct treatment of ore by the cyanide solution in the battery has been attempted in this country by Almarin H. Paul at the Calumet Mill, Shasta county, California, but with what results we have not learned.—Ed. E. & M. J.

THE BLACK EAGLE FALLS DAM AT GREAT FALLS, MONTANA.*

By Maurice S. Parker, M. Am. Soc. C. E.

In the year 1887 the Great Northern Railway was built through the town of Great Falls, on the Missouri River, in Cascade County, Montana, and when this source of life woke them up, the authorities in the town became aware of the fact that there was a remarkably valuable water power in the neighborhood. Throughout the course of the Missouri River, from 10 miles above to the fall which gives its name to the town, there is a fall of over 410 ft., and the Great Falls themselves are 75 ft. high. Until the railway was completed to the town no one had ever thought of utilizing the vast power in the water. However, in that year, Mr. Fanning, M. Am. Soc. C. E., prepared plans for a dam at the Black Eagle Falls, whereby a head of 40 ft. above the tail race was to be obtained, with a calculated flow varying from 3,360 cu. ft. per second in winter, to 12,100 cu. ft. per second in the spring. The length of the dam was to be 920 ft.; its average height above the rock, 14 ft.; its breadth, 56 ft. 9 in. at bottom, and 28 ft. 6 in. at top.

Nothing, however, was done in the way of carrying out these plans until the year 1890, when bids were asked for among engineers' contractors. The bids received were, however, so very unsatisfactory, as they betrayed a total ignorance of the necessities required in building a dam in the face of a swift running stream, that they were all rejected. These bids for labor of construction only were based on the following estimate, and for curiosity's sake the range of bids in each case is also given:

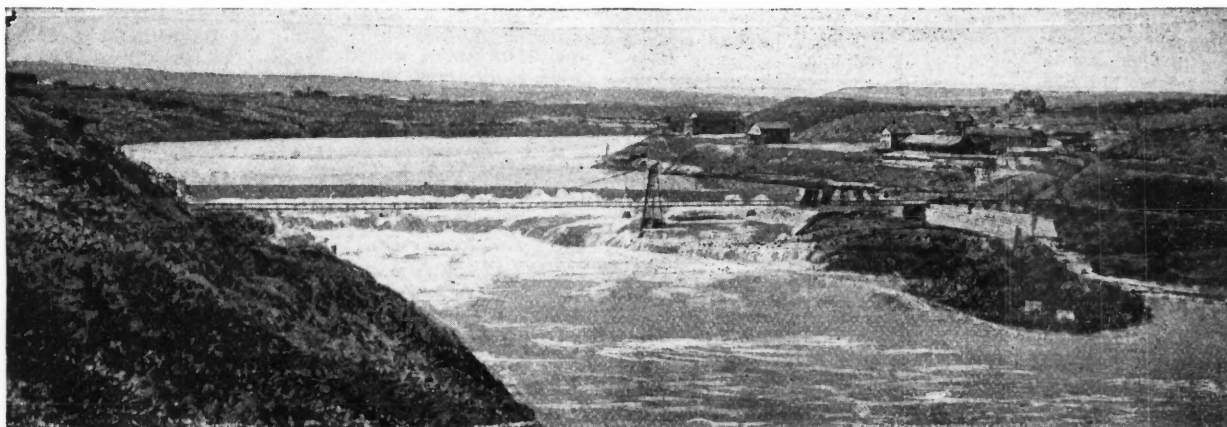
	Range of bids.		Range of bids.
Excavation, solid rock, 9,000 cu. yds.	\$1.18 to \$4.20	Rip rap, 150 cu. yds.	\$1.10 to \$5.00
Excavation, loose rock, 2,000 cu. yds.	49c. to \$1.00	Backfilling earth, 500 cu. yds.	25c. to 90c.
Masonry in gate chambers, 3,194 cu. yds.	\$5.85 to \$20.00	Placing timber in dam 1,800 M. ft. B. M.	\$6.00 to \$13.50
Masonry in crib of dam, 3,600 cu. yds.	\$1.85 to \$6.50	Framing gates, 86 M. ft. B. M.	\$14.00 to \$40.00
Stone filling in crib, dry, 5,300 cu. yds.	\$1.45 to \$6.00	Placing gate gearing, 40 tons.	\$14.00 to \$30.00

The highest bid was a perfect absurdity, and does not appear in

8 ft. apart. Over this crib the solid stone masonry of the dam was built.

The quick flow of the river at this point was a great difficulty to be overcome, for in the neighborhood of the dam the river flowed over rapids falling 2 ft. per hundred. On the north side of the river a simple horse dam was thrown out to sheer the water from that part of the river bed where work was to begin. The horses were placed in position about 8 ft. apart, with stringers of 4-in. plank; and beginning at the outer edge of this line of horses the facing of 2-in. tongued and grooved planking was placed in position. A row of sandbags was laid on the toe of the sheer dam to stop the leakage. Behind this dam 150 ft. of crib work and masonry were put in position. On the south side the river was deeper, and so it was necessary to sink small cribs filled with stone to support the wooden horses for the sheer dam. The horses were then placed in position, one horse to every crib, in this way it was possible to construct the gate chamber masonry, and 100 ft. of the dam.

After the two ends of the dam had been completed the work of closing the gap was commenced from the north side. A curved foot bridge, convex to the stream, was built between the two ends, and horse bents were placed 8 ft. apart, with a foot-walk of 4-in. plank laid on top. Upon the caps of these bents, which extended beyond the walk, heavy timbers were placed, to keep the bents in position. From this bridge wooden horses were placed, one in front of each bent of the foot bridge; and stones were piled behind each bent to prevent the structure from sliding. These horses were connected by 4-in. plank stringers, and the same were used in facing the dam. Leakage through the dam was controlled by small sheer dams, and by sand bags. The sections of the crib were 8 ft. apart. At intervals of about six sections, the masonry and fillings were left out of two sections and openings 14 ft. wide were thus left. The bottoms of these openings were covered with rubble masonry, laid in hydraulic cement up to the top of the bed timbers, and the side walls between the timbers were also laid up solid in the same material. The plank for the face of these openings was fitted to the ledge to be used when ready to close the openings. As the sections were completed, the cofferdams were removed, to allow free passage of water through the openings left, and before the final closing of the gap in the dam the gates and chambers



BLACK EAGLE FALLS DAM.

this table. Otherwise, the range of the bids varied from \$163,000 to \$305,000. This was for labor only, as the material was to be furnished by the water power company. It was evident that, though the tenders were given by companies who were either engineers, or had engineers in their employ, the science and practice of constructing dams in quick running rivers was not understood properly in Montana.

Mr. Fanning then engaged the writer on behalf of the water power company to take charge of the construction of the dam, and to undertake the work by day labor. The work of construction was accordingly begun on the 15th day of April, 1890, and completed on the 15th of March, 1891. At present there are two stations for utilizing this water power. The one on the north side of the river supplies power to the smelting works of the Boston & Montana Consolidated Silver and Copper Mining Company. It develops 2,600 H.P., and consists of seven Victor turbines, viz., two with 44-in., two with 22½-in., two 20-in., and one 40-in. wheels. The other on the south side of the river develops 1,030 H.P., and supplies the street railway and lighting plants with the electric current. The total minimum power of the river is 16,583 H.P. at 40-ft. head, and a flow of 3,360 cu. ft. per second, and assuming that 80% of this can be utilized on the turbine shaft, the available horse power of the fall is 12,287. There is plenty of accommodation provided for further installations of water power plant.

The accompanying illustrations give a plan of the location of the dam, and a view of the Black Eagle Falls, with the dam.

The foundation on which the dam is constructed consists of a hard red sand rock, strongly impregnated with iron. It lies in vertical strata, the outcrop of which runs at an angle of 45° to the direction of the current. The thickness of this bed of sand varies from 1 ft. to 4 ft. Below it is a layer of clay about 6 in. in thickness, and then below that there is another layer of sand rock, which is not so hard as the surface layer. The sandstone bottom was first made approximately level, and the bottom timbers of the crib were placed in position on the ledge, and imbedded in mortar, and drift bolted to the stone. The timbers were then built up so as to form a blunt triangular ridge, and at each addition of timber the space inclosed was filled up by layers of stone and mortar alternately. The longitudinal timbers were laid

at the north end were finished, and the eight gates opened. Afterward, all the gaps and openings were closed successively. When the plank in the face of these openings had been driven in place these compartments were freed from water, and the masonry and stone filling were placed in position. During this time the flow of the river was carried through eight gates, and turned out through an opening left in the canal wall for this purpose by a high sheer dam, built across the canal.

The stone in the bed of the river was of little use in building the dam; but in the crest of the falls a hard stone was found which proved an excellent material for the dam. The masonry was laid mostly in American hydraulic cement of Milwaukee and Buffalo brands. While the weather was cold English Portland cement of the Hilton brand was used. The cost of materials and labor was \$98,530, and the total cost of the dam, from its inception to November 30th, 1891, was \$175,000.

An Active Volcano in the Behring Sea.—News has been received a Seattle, Wash., from Alaska, of a volcanic eruption in an Aleutian island, believed to be Black Peak, between Chignik Canneries and Ounangas-hik. On the morning of August 28th a beautiful blue cloud was seen from Chignik Bay to ascend behind the mountains. About 11 o'clock came an earthquake, accompanied by thunder and lightning. In the afternoon the cloud turned black. The next morning the air was full of sulphurous smoke. The deck of the schooner "Clara," lying in Chignik Bay, was covered two inches deep with black sand. Everything on land and sea was black. Burning rocks thrown in the air were seen from Vossnessenski. That afternoon a shower of dust like burned paper fell at Chignik Bay, and next day there was another light shower. Dust showers were seen far at sea, and the schooner "Dennis" brought in a bag of dust. The water in all streams and bays was muddy. Advice received at San Francisco, Cal., on the 29th ult., from Unalaska, state that the supply steamer "St. Paul" reached there on September 2d from San Francisco, and reported that on August 28th it steamed for four hours through a cloud so black and dense that lamps had to be lighted. When the steamer emerged from the cloud the decks were covered to a depth of several inches with volcanic dust. The nearest active crater to the steamer's position is Pabloff Mountain, 265 miles away. It is thought at Unalaska that there has been an upheaval on the shore, or that a new island has emerged from the sea, as did Bogasluf Island six years ago.

* Abstract of a paper read before the American Society of Civil Engineers.

MINING IN THE DONETZ COALFIELD, RUSSIA.

Although coal was discovered in the Donetz district as early as 1784, it was not until a comparatively recent period that the mines assumed much importance.

M. A. Brull, a French engineer, has made an extended study of the region, an account of which was published by him in the "Memoires de la Societe des Ingenieurs Civils" in May; since then his report has been issued in pamphlet form. To it we are indebted for the account here given:

The Donetz coalfield lies upon the right bank of the Donetz River and extends westerly a distance of 270 kilometres, and southerly nearly to the Azov Sea, giving it a breadth north and south of 70 to 110 kilometres, making an area of 24,000 square kilometres. On the east anthracite is found, while on the west the coal is bituminous. According to Mr. Brull, the crystalline rocks, gneiss, syenite, granite and mica schist, which form the Southern boundary of the coal basin, have exercised a great influence upon the elevation of the carboniferous beds, which properly speaking are underlain by limestone. On the northwest the coal strata are covered by horizontal deposits of Permian rocks. On the west, north and east, the carboniferous strata disappear under cretaceous rocks, reappearing in the west and north in isolated spots. The author says that according to Mr. Grand'Eury, the Donetz coal field belongs to the middle zone of the second period of the Permian-Carboniferous period, or to the same age assigned to the deposits of Le Department du Nord of Pas-de-Calais and Hainault. The Moscow Coal basin is only about 800 kilometers north of the Donetz basin and some geologists have assigned the same age to both, but the consensus of opinion seems to be against this view. The anthracite is quite black with a metallic lustre, hard and of a high specific gravity, more than 1.44 even when very pure. It contains 90 to 95% of fixed carbon, 2 to 5% ash and 1 to 3% sulphur. It lights with difficulty. It is used for smelting iron, for steam boilers and domestic heating. The poor or non-bituminous coal has dull streaks, but is often quite hard and splits in the fire; it contains from 82 to 88% fixed carbon, 1½ to 5% ash, and 0.3 to 1.1% sulphur. It has nearly the same calorific value as the anthracite. The semi-bituminous coal yields 74 to 82% of compact coke, containing 2 to 6% ash and 0.0 to 3% sulphur. The bituminous coal used in finished iron works and capable of yielding 69 to 71% of blast furnace coke, is black, brilliant, scaly and friable, with 1.5 to 4% ash and 5.1 to 6% sulphur.

The long flame bituminous coal, used to make gas, is hard and gives but little slack; it yields from 60 to 68% coke, containing 3 to 4% ash and 0.5 to 3% sulphur. The kinds of coal here given are in accordance with the classification of Gruner and are taken from the published researches of M. A. Tchirikov made in the laboratory of the University of Kharkov.

The nature of the coal varies considerably in the same seam.

The anthracite veins are much broken and are generally less than 39 in. thick. The bituminous veins vary from 14 in. to 5 ft. in thickness. The seams are generally regular, and but little inclined; but, on account of the upthrows, which have formed local basins, certain portions are, on the contrary, much inclined, some seams as much as 8 to 12 degrees. The seams are thin, thicknesses so slight as 70 cm. (2 ft. 4 in.) being worked, while those under that thickness are not worked. There is very little sandstone in the formation, so that working is difficult, the shales splitting and swelling with the water, which greatly strains the timbering, while the floor rises; but the shales are often sandy and hold firm. Some seams have a sandstone sole, while another has a roof of hard sandstone 15m. thick. The sinking of the shafts is not difficult, on account of the absence of water-bearing strata and shaly rocks. The section of the shafts is generally small (being often square or rectangular, and only circular or elliptic in the large collieries), and of depth slight; but a shaft can only serve for working one seam or sometimes two near together.

Some colliery proprietors have put down inclined shafts with rails for extraction at the foot of the shaft; or, at one end or other of a short cross-cut, two forward headways are driven. In the slightly inclined seams the pillar-and-stall system is adopted. At right angles to the roley-way and 15 m. apart, are shoots rising in the seam, the banks thus formed being divided by four forward stalls 15 m. apart. A certain number of nearly square pillars, with a side of 12 to 13 m., are thus cut out of the seam, the stalls and roley-ways being timbered. The pillars are taken out, beginning with the farthest and highest; and the spaces are not gobbled.

When the seams are much inclined they are generally worked by reverse steps, in which method, immediately above the level of the main headway and at its beginning, a first stall is begun and continued for about 10 m. in the direction of the seam; and then a second step above the first is pushed forward in the same direction. Similar stalls are pushed forward successively while rising with the seam, and taking care that the advance of each faces remains at least 4 or 5 metres behind that immediately below.

The coal is brought to the main gangway where it is loaded through shoots into wagons which hold about half a ton. The track usually has a .45 metre gauge, and the rails weigh 7.7 kilos per metre, this being equivalent to 17.6 in. gauge and rails of 15 lbs. per yard. The wagons are constructed of either wood or steel and have a capacity varying from 650 to 1,200 lbs. The haulage is generally done by horses, though in some mines it is performed by men. In small workings the winding is done by jack rolls, but in the more important it is done by geared winches driven by steam engines at the mouth of the pit. At some of the largest collieries powerful winding engines are used, the largest one being 150 H. P. The ropes are generally round, of iron or steel, but for the largest winding engines flat manilla ropes are used. In the guided shafts, single decked cages are almost universally used, and but few are provided with safety appliances. A notable exception, however, is the Korsonn Colliery, which uses double decked cages with Libotte safety catches.

As the coal measures are often covered with a thick stratum of clayey alluvium there is generally but little water, but where the coal is mined

under ravines, or near the limestone, and where subsidence has taken place, there is often a considerable amount of water, and it sometimes happens that the small collieries where the water is taken out in tubs are drowned out in the spring. In some of the mines the cages have a water chamber attached below, which is filled from the sump while the cage is being loaded. Upon reaching the surface the water chamber is automatically emptied. In other pits where there is not a large quantity of water, pulsometers are used, while the largest mines are provided with pumps of the Cameron type. These pumps are worked by engines of from 35 to 40 H. P., but there is one pump which is worked by a compound engine of 240 H. P., this being the largest in the district.

In the Kalmious mines open lamps were formerly used, but in 1890 an explosion occurred which cost the lives of over 100 miners, since which time safety lamps only have been used. The Donetz mines are generally ventilated by natural draught, by means of a rise in the seam and an air-shaft put down to the rise of the winding shaft. Korting ejectors and Guibal fans of considerable diameter are used in some collieries.

The working by pillar-and-stall yields a product mixed with shale, containing a large proportion of ash; and, as it is not possible to supply railways or important consumers with coal containing more than 8% of ash and 1¼% of sulphur, it is often necessary to pick out the shale and pyrites at the pit mouth on endless bands made of worn-out ropes. Where coke is made, the coal is separated on inclined-bars or perforated plate-iron screens. Only one colliery has put up a washing floor.

The coking of such friable coal as that of the Kalmious colliery presents great interest, as the coke is used for iron making, the demands of which are constantly increasing. Many owners make large quantities of blast furnace coke in open ovens on the Schauenburg system; there are also other ovens like those of Coppee, coking in forty-eight hours and yielding 70%. The adherence of the coke to the sides of the oven renders mechanical drawing impossible; but this difficulty is got over by a judicious mixture of coal.

The working population of the Donetz amounts to 20,000, and wages are higher than in the neighboring regions. In March, 1891, the miners received 90c. per day of ten hours, haulers 75c., and pickers 18c., engine tenders received \$1, and stokers 25c.

Most mine work is let by contract to artelles, or gangs of men; and there are two shifts of ten hours each. In 1891 the sinking of a shaft 7 ft. by 59 ft., without pumping, cost \$7.50 per ft.; and one 77 ft. by 7 ft. for the first 140 ft., \$10.70 per ft., with timbering. Rolley-ways cost \$1.07 per ft. with timbering; and preparatory drifts in coal 7 ft. wide, \$2.70 per 49 sq. ft., including props in the middle of the width. Taking out pillars costs \$2.25 per 49 sq. ft. in seams of 70 cm. (2 ft. 4 in.), and \$3.00 in those of 1 m. (3 ft. 3 in.), including timbering and delivering coal to cage.

M. Vincens estimates as follows the daily production per man in the Routhenko collieries:—Holer, 2½ tons; underground hand, 819 kilog. (16 cwt.); and mean production of underground and surface hands, 688 kilog. (13 cwt.). The working is generally let by contract based on the pood (36 lbs.) of coal put out at the pit mouth. In the Kalmious region the contractor has 2 cents per pood of coal put out and stacked at the surface, including tools, timber, explosives, and labor, and covering the expense of preparatory workings in the seam, as well as the maintenance of buildings and engines. Out of this price the contractor saves .2 cents per pood on sub-letting.

Coke-making by contract is paid at the rate of 112 cents per pood of coke, the contractor taking the coal as it comes from the mine, delivering 65 to 70% of its weight in coke, and paying for all stores, labor, and maintenance of ovens and plant.

AUTOGRAPHICALLY RECORDING THE TEMPERATURE OF BLAST FURNACES

For some time Prof. Roberts-Austen, the English metallurgist, has been impressing on iron masters the necessity of ascertaining and recording the temperatures at which the reduction of iron ores is conducted in the blast furnace. He holds that the composition of pig depends to a large extent on the temperature at which it is formed, and when our knowledge on this point is extended it will be possible to regulate the thermal conditions which determine the passage of elements into iron. Sir Lowthian Bell, of Middlesbrough was the first to adopt the suggestion, by placing a platinum-rhodium pyrometer in the hot blast mains in his furnace, and since then several other methods have been employed at many works to attain the same object. It is not until lately, however, that any attempt has been made to automatically record the temperature of the hot blast. A few months ago Mr. Martin, of the Dowlais Works in South Wales, requested Prof. Roberts-Austen to devise some method of doing this. Mr. Martin has already introduced a method of automatically recording the times at which the valves were reversed. Accordingly, the professor has recently arranged a set of instruments. There are six new blast furnaces at Dowlais. In the hot blast main of each a pyrometer has been placed, consisting of a thermo-junction of platinum and platinum-rhodium. The wires from these six thermo-junctions are brought to a switch in the laboratory, where they can be connected one after another with a D'Arsonval galvanometer. The spot of light is thrown upon a cylinder, which is covered with sensitive photographic paper and which revolves once in twenty-four hours. A datum line representing the required temperature is first drawn so that the distance of the line traced by the spot of light from this datum line represents the variation of temperature of the blast. By this arrangement it will be seen that the heat of only one blast can be recorded at a time, and that the full record of variation in temperature cannot be obtained. The reason for this is apparently that the apparatus is only experimental, and that if it is found to be perfectly reliable a more complete set of instruments will be employed. In reading an article before the Iron & Steel Institute on the 20th September the professor stated, with Mr. Martin's corroboration, that excellent results had already been obtained, and that they could recommend the general adoption of the apparatus. In reply to questions he said that these thermo-junctions gave constant and reliable readings and did not deteriorate with usage.

THE PRENTISS ENGINE LATHE.

Our engravings show a large size standard engine lathe which embodies several new and important features. The lathe is manufactured by the Prentiss Tool and Supply Company, of New York, and is designed for use in extra heavy work. The lathe is made of unusual weight and stiffness, and is equipped with a driving gear which enables it to take the largest cuts. Together with strength and capacity for large work, the tool is claimed to be perfectly accurate, and it is thus capable of doing work of the finest description. One of the principal features of the tool is the method of imparting the feed motion to the carriage. As is shown in the cut, this is accomplished in two ways. When the tool is being run for heavy work the feed is made by means of the gearing, and when used for light work the ordinary belt feed is used.

The lathe is 6 ft. 2 in., between centers; it has a swing of 30½ in.; the bed is 12 ft. long. The front bearing for the spindle is 7½ in., and the diameter of spindle is 5 in. The back bearing is 5½ in. in length and 4 in. in diameter. The tailstock spindle is 3½ in. in diameter. The great strength of the tool will be appreciated from these measurements.

A five-step cone drives the spindle; the cone steps are 4½ in. wide, and vary in diameter from 8 in. to 19½ in. Uniform speeds are attained from the slowest to the fastest by means of the heavy back gearing, and the arrangements are such that a change of gearing will fit the tool for thread cutting from 2 to 20. A compound tool slide is arranged on the carriage, which is 36 in. over all.

The tail stock is arranged with a crank as shown, which allows it to be moved back and forth very readily. This feature will be appreciated by all those having to work a heavy tailstock back and forth. The latter is provided with a taper attachment arranged to slide in a T-slot along the back of the bed. A good feature in this respect is embraced by the fact that by simply loosening two bolts the taper attachment may be used at any point between centers, and thus work of this description is not limited to any circumscribed point or part of the bed.

The bearings are all phosphor-bronze, and are particularly arranged for

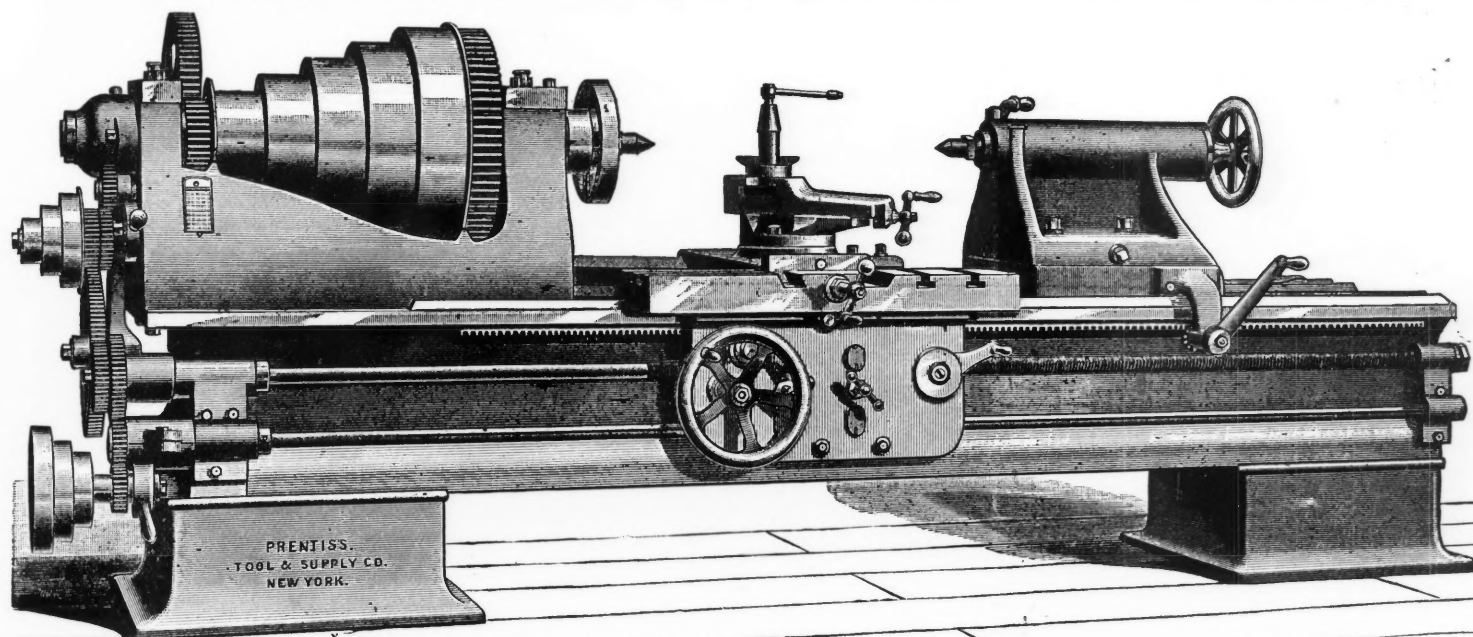
MECHANICAL NOTES.

Written for the Engineering and Mining Journal by Albert D. Pentz.

It is he who recognizes elements and combines them into a new art that is a public benefactor rather than he who invents one of these elements. It would be impossible to enumerate here all the discoveries in electricity and magnetism that were made before Morse, but in these subtle agents that had been found by inventors to possess certain qualities he recognized the only means to construct a practical commercial telegraph. It was he who took what before were considered interesting toys and made them servants to all mankind. He found electricity an idler and set it to work. He invented but a few very simple things, but he recognized and selected from prior inventions the only agents that could make a telegraph possible. So in all arts, one law of nature is found here, another is found there. One fact is four thousand years old, another was born to-day. The master mind recognizes the laws and the facts that make a new art possible, selects them and compiles a creation.

No machine need wear out if repairs are done on it in season. Often a machine is abused so far before it is attended to that it cannot profitably be rebuilt, but oftener in this age where the heel of one improvement feels the toe of that next behind it the machine becomes of an obsolete style before it is half worn out. Most shop tools may be replaced to advantage every ten years whatever their condition may be, and many tools advance so fast in improvement that after five years they may be replaced with profit even if the old ones are made into scrap.

Many buyers of tools by not making an investigation of the market either delude themselves or are deluded by selling agents in one way or another, generally because they deal with one or two agents and



THE PRENTISS ENGINE LATHE.

lubrication. The actuating screws are all made of special steel; the spindles are made of special hammer drawn steel, and are thereby free from seams. The feed arrangement is such that an almost instantaneous change may be made from the gear to belt. The intermediate gear is carried on an arm, which in turn is held in place by a binding screw. The mere raising of the arm of intermediate gear and lowering the one on the cone changes the feed from gear to belt, and vice versa. The lower arm also serves as a tension lever for the belts, a feature of considerable importance. The entire arrangement is such that the lathe may be readily used for small and delicate work while being specially adapted for large pieces.

The Manufacture of Soluble Hydrate of Aluminum.—It is said that a process for preparing a water-soluble hydrate of aluminum direct from clay has been invented. The process is based on the hitherto unknown fact that superheated steam has a decomposing effect on silicates of aluminum. Other metals which may be present in the silicates are also thrown down as soluble hydrates, and the hydrate of aluminum is afterward separated from the others by precipitation.

Steel Wire Ordnance.—Dr. Anderson, the director of the ordnance factories of the British Government, expresses the opinion that a large gun made of steel wire must necessarily be more reliable than a gun built up of forgings. The reason for this is that we know nothing of the internal molecular conditions of large masses of iron, whereas we know the exact state of structure built up of separate wires. Then, also, the tensile strength of steel wire is more than twice as great as that of a mass of steel. Dr. Anderson states that they are conducting experiments with wire guns at Woolwich arsenal, and that in all probability he will be able to give the results shortly.

not with the whole American trade. If a man wants only a \$300 engine lathe he is entitled to get the best lathe which that amount of money will buy. Now many buyers live in localities where they can see but few tools so as to judge of their actual merits. They cannot afford to journey far to examine them in warehouses or in large factories. Traveling men representing builders will not go a hundred or more miles out of their way to see if the owner of one small shop may possibly want some small tool; so such a man generally is left to the local dealer. This dealer will endeavor to sell that which nets him greater profit; a second hand tool in preference, for the country is full of good second hand back numbers which have been sold by wise manufacturers to make place for more improved tools. The thing for a buyer to do whether he needs \$100 worth of tools, or \$100,000 worth, is to write and tell those papers in which he sees tools advertised precisely what he wants. These papers will print his wants gladly and during the next month every maker in America will be made aware of what is wanted, who wants it and where. Every one of them who are interested will try for the sale. Thus the buyer will discover all the merits of a machine from its representative, and all its faults from others. He will get the best prices in competition if he is not too anxious to buy. If he does not get the best at the cheapest prices it will be his fault.

Workmen should be selected for the duties they will be required to perform, and they should be retained for their shop value alone. A fine watch toolmaker would be as much out of place in repairing mining machinery as a cowboy would be in the opposite direction. First, he would not do the work, and secondly he could not do it as

well nor as quickly as the man who is bred to it. The kind of man to select for any repair shop is a good workman taken from the shop where the most of the machines to be repaired were made. A machine runner will have about as much repair value as a good carpenter would have, because a man operating a lathe or a planer generally has no very clear idea of the offices performed by the different pieces he works upon. An inspector of such machines as are to be repaired, if he be a machinist, is the best man to place in charge of a repair shop, and men who have erected, or assembled, such machines make the best workmen because they know how they go together and their offices when together. They also know all the tricks of adjustment and that is precisely the point where the ordinary machinist would waste time in blindly groping, and get inferior results in the end.

THE RECOVERY OF AMMONIA FROM BLAST FURNACE GASES.

In the early days of gaslighting the ammoniacal liquor and the tarry matters were allowed to escape into the sewers and many years passed away before this unintentional waste was arrested by the discoveries that ammoniacal liquor could be used in the manufacture of sulphate of ammonia and that almost every organic substance could be prepared from the tar. In Great Britain, at the present day, at least seven million tons of coal are used in the manufacture of illuminating gas every year and a little over 100,000 tons a year of sulphate of ammonia is recovered, representing £1,000,000 sterling. But there they are wasting all the hydrocarbons and ammonia from the coking of about 15,000,000 tons of coal for use in ironworks.

A great deal of ammonia is wasted in the manufacture of pig iron in blast furnaces where raw bituminous coal is used instead of coke, but in Great Britain during the last few years a great deal has been done toward its recovery. About 1,000,000 tons of pig iron are annually produced there with the aid of 2,000,000 tons of raw coal, and from 25,000 to 30,000 tons of sulphate of ammonia should be recoverable. As yet very little has been done in England to stop this waste, but in Scotland 57 out of the 77 blast furnaces are provided with scrubbers for recovering the tar and ammonia. The capital expended on chemical plant is slightly higher than that invested in the iron works, and the chemical products give a better margin of profits than the iron. It is hard to decide, therefore, whether the chemicals are the by-products in iron manufacture or *vice-versa*. The first firm to engage in the new branch of industry was Baird & Co., the makers of the Gartsherrie brand of pig iron. The most recent plant put down is that of Merry & Cuninghame's, the makers of the Carnbroe brand. The latter is such a highly efficient and successful plant that we shall quote the description of it given by Sir Lowthian Bell in a paper read on the 20th September before the Iron and Steel Institute.

Sir Lowthian states that the lowest consumption of coal to a ton of iron that he knows of was 3,472 lbs., though it often exceeds 4,480 lbs. At the lowest figure the analysis of the blast furnace gases was by weight: Carbonic acid, 13.08%; carbonic oxide, 27.12%; CH₄, 2.41%; hydrogen, 0.38%; ammonia, 0.08%; nitrogen, 51.59%, and water, 5.34%. Thus it will be seen that under these circumstances there is only one part by weight of ammonia in 1,250 parts by weight of blast furnace gases. It follows, therefore, that the apparatus used for recovering such a small proportion must be somewhat extensive, and the process a particularly difficult one.

The plant at the Carnbroe works was designed and built by R. & J. Dempster, the chemical engineers, and consists of dust boxes, condensers, exhausters, washers, scrubbers and separators, together with the plants for treating the recovered tar and ammoniacal liquors. The gas is led from the close-topped furnace through a large main to the dust boxes. Here the dust which is carried in suspension is deposited along with about 80% of the tarry matter. The whole of the dust and part of the tar is intercepted in the first of the dust boxes, and the rest of the 80% of the tar in succeeding boxes. The dust and tar from the first box are allowed to run into a settling tank, from whence the clear tar runs into the general receiver for the tarry matters. After having passed through the dust boxes the gases enter the condensers, which like the remainder of the plant are arranged in two independent sets, so that in case one set gets out of order the continuity of the process shall not be broken. Each set of condensers consist of 144 wrought iron tubes 55 ft. high and 20 in. in diameter. These tubes are mounted on and communicate with cast iron boxes, inside of which there are partitions for directing the gases out of one tube into another. The total length of the tubes is exactly five miles and the internal area is 58,000 sq. ft. The tubes are cooled externally by means of water sprays at their upper extremities. A further amount of tar and a good deal of ammoniacal liquors are intercepted in the condensers, and after being extracted through traps the two are separated in a centrifugal machine and passed to their respective storage tanks.

On leaving the condensers the gases are drawn through the exhausters. The gas connections of the exhausters are all outside the exhauster house and thus all dangers from explosions and leaky connections are avoided. Afterward the gases are forced into the washers, which consist of four cast iron boxes sealed with ammoniacal liquor. The gases enter in the center of the bottom of each washer and meet a spray of water which falls through perforated plates and finally pass out at each side of the box. The precipitated water containing ammonia liquor acts as a seal for the chambers and it is mixed here with the liquors obtained in the next section of the apparatus, viz., the scrubbers. The overflow from the seals is carried into another centrifugal machine, which separates the tar from the ammoniacal liquor. The gas after leaving the washers enters the scrubbers, each of which consists of three towers each 120 ft. x 18 ft. in diameter. These towers are filled with thin boards set parallel on edge in tiers, the boards in each tier being at right angles to those in the next. The ammonia liquor from the general collecting tank is brought in at the top of the first two towers and allowed to fall down over the structure of boards, while the gas goes up from the bottom to the top. The large scrubbing surface thus presented to the gas helps to absorb all the remaining ammonia.

In the third tower pure water trickles down over the boards, and removes every possible trace of ammonia that might have escaped the other processes. The gases then pass to the hot air stoves and boilers to be burnt as gaseous fuel. In the process for working up the ammoniacal

liquor into sulphate of ammonia the liquor is first distilled with steam in continuous ammonia stills which are heated by purified blast furnace gases. The ammoniacal gas from the stills is passed into saturators, containing sulphuric acid, and the sulphate thus formed is lifted out on to drawing tables, and then sent to the stores. The tar is treated in eight vertical stills, each of which has a capacity of 7,000 gallons. The oil and pitch which are thus obtained are taken away to separate stores. Owing to the fact that the tar obtained from the blast furnace is formed at a much lower temperature than that in a carbonizing or gas works, its constitution is very different, and at present it contains very little benzene, phenol or anthracene, so that it is not very valuable as raw material in a chemical works. It is said, however, that, if it is passed over red hot coke, benzene and anthracene are obtained. The temperature of the gases on entering the condensers proper is 130° F., and on leaving them 60° F. This is very low when compared with the gases from a coke furnace, but a large amount of heat is absorbed in gasifying the volatile portions of the coal.

At Carnbroe the yield of raw products has averaged 120 gallons of ammoniacal liquor (2° Twaddell) and 25 gallons of tar to the ton (2,240 lbs.) of coal. During a three weeks' test at the works a total of 5,841 tons of 2,240 lbs. of coal were consumed in the furnaces. Three furnaces were being blown all the time and a fourth during one week only. The following was the production of chemicals from this coal (the ton = 2,240 lbs.):

	Yield.	Price.	Total price.
Sulphate of Ammonia.....	434 tons	£10 10 0 per ton	£508 2 0
Pitch.....	361 0 tons	£1 10 0 per ton	£379 1 0
Oil.....	33,750 gal.	1½d. per gal.	£210 18 9
Total.....			£1,098 19

During these three weeks £379 12s. 3d. was paid for wages, sulphuric acid, management, railway dues and allowance for depreciation of plant, leaving a balance of £718 9s. 8d. for interest on capital and available for dividend. This is the profit for three weeks, so that, roughly speaking, the profit for a year's work might be about £12,000. Sir Lowthian Bell does not state officially in his paper what the cost of the chemical plant was, but it is commonly rumored to have been £70,000. The return on capital is, on such a supposition, highly satisfactory. Since this trial was reported, the price of sulphate of ammonia has dropped slightly, but not sufficient to affect the pockets of the stockholders to any extent.

DIVIDENDS PAID BY MINING COMPANIES DURING SEPTEMBER AND FROM JANUARY 1ST, 1892.

NAME OF COMPANY.	Paid in Sept.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in Sept.	Paid since Jan. 1st.
Adams, Colo.....		\$7,500	Helena & Frisco, Mont.....		\$20,000
Alaska, Tr'd w'l, Alaska.....		225,000	Homestake, S. Dak.....	\$12,500	112,500
American Coal, Md.....	\$15,000	90,000	Hope, Colo.....		25,000
American Nettle, Colo.....		30,000	Horn Silver, Utah.....	50,000	150,000
Argyle, Colo.....		20,000	Idaho, Cal.....	7,750	43,400
Aurora, Mich.....	20,000	100,000	Iron Mountain, Mont.....	15,000	120,000
Bald Butte, Mont.....		100,000	Kennedy, Cal.....		60,000
Bannister, Mont.....		20,000	Lake Superior, Mich.....		252,000
Belden Mica, N. H.....	5,000	30,000	Leadville Cons., Colo.....		12,500
Best Friend, Colo.....		20,000	Lexington, Colo.....	3,000	27,000
Brotherton, Mich.....		40,000	Maid of Erin, Colo.....		139,725
Bull-Domingo, Colo.....		4,000	Maryland Coal, Md.....		81,000
Bulwer Con., Cal.....		10,000	Maxfield, Utah.....		18,000
Buxton, S. Dak.....		20,000	Minnesota Iron, Minn.....		630,000
Calumet & Hecla, Mich.....	500,000	1,500,000	Mollie Gibson, Colo.....	150,000	1,250,000
Centennial-Eureka, Utah.....		60,000	Monitor, S. Dak.....		22,500
Champion, Cal.....	3,400	47,000	Morning Star D., Cal.....	7,200	61,200
Colorado Central, Colo.....		41,250	Napa, Cal.....		50,000
Consolidation Coal, Md.....		205,000	New Guston, Colo.....		123,750
Colorado Fuel.....		67,120	Omaha, Cal.....		7,200
Contention, Ariz.....		50,000	Ontario, Utah.....		75,000
Cook's Peak, Colo.....		40,000	Osecola, Mich.....		50,000
Coptis.....		15,000	Pacific Coast Borax.....	15,000	135,000
Cortez, Nev.....		95,000	Pandora, Mont.....		3,000
Daly, Utah.....	37,500	337,500	Parrott, Mont.....	18,000	162,000
Deadwood Terra, S. Dak.....	10,000	90,000	Plumas, Eureka, Cal.....		25,313
De Lamar, Idaho.....		272,000	Poorman, Ltd., Colo.....		36,450
Dexter, Nev.....		80,000	Quincy, Mich.....		200,000
Diamond, Kyune & Castle, Utah.....		7,500	Red Cloud, Idaho.....	10,000	40,000
Elkhorn, Mont.....	100,000	275,000	Rescue, S. N., Mex.....		12,000
Enterprise, Colo.....	50,000	300,000	Rialto, Colo.....		18,000
Eureka Con., Nev.....		12,500	R'ky Fork Coal, Mont.....		100,000
Franklin, Mich.....		16,000	Running Lode, Colo.....		6,000
Golden Reward, S. Dak.....	5,000	40,000	Sierra Butte, Cal.....		14,700
Grant Mountain, Mont.....		500,000	Standard, Cal.....		30,000
Great Western Quick-silver, Cal.....	12,500	100,000	Tamarack, Mich.....		400,000
Hecla Con., Mont.....	15,000	135,000	United Verde, Ariz.....		30,000
			W. Y. O. D., Cal.....	3,000	27,000
			Yosemite No. 2, Utah.....		5,000
			Total.....	1,219,850	10,381,213

Chrome Steel for Springs and Tires.—Chrome steel is used universally for springs and tires on the London & North Western Railway of England, and in the machine shops belonging to the company it is used very largely as tool steel. Mr. Webb, the chief mechanical engineer, states that a chrome steel with only 0.65% of carbon will stand longer when made into tools than any other; that he has tools now which can be used for turning steel axles for two days without being ground.

New Process for the Manufacture of Ultramarine.—A new process for manufacturing ultramarine is announced. The best results are produced by the following proportions of raw materials: 42 lbs. of Na₂S, 20 lbs. sulphur, 110 lbs. of kaolin, 100 lbs. of carbonate of soda or 40 lbs. of caustic soda. The mixture is said to yield 200 lbs. of coloring matter. In carrying out the manufacture the clay and soda are first roasted together at a red heat and then made into a paste with a saturated solution of flowers of sulphur in sulphide of soda. The paste is dried in an oven and then broken into small pieces and charged into a closed earthenware retort. The retort and its contents are heated for an hour at a temperature of 250°-300° C and then for eight hours at a red heat. After cooling the retort is opened and the contents are then exposed to a slow current of air while heated to near dull redness and in a short time the process is finished with the production of 200 lbs. of ultramarine.

ABSTRACTS OF OFFICIAL REPORTS.

The Montana Company, Limited.

The report of this company, working the famous Drumlummon mine in Lewis and Clarke counties, Montana, for the half year ending June 30th, 1892, is disappointing, for the company, in spite of its careful and intelligent management, has failed to earn a profit; indeed, a deficit was made, necessitating the transfer of £5,000 from the reserve fund to the credit of the operations of the six months. The total gross production, including the returns from tailings, amounted to \$294,870, while that for a similar period of 1891, when tailings were not reduced, was \$445,865. The reason for this decreased production and profit, without including such accidents as fire in the mine and the washing away of the railroads by a flood, is apparent in the impoverishment of the lode, the yield of the ore falling from a maximum of \$41.05 per ton in 1886 to \$6.22 in 1892. It may be said that no ore bodies of profitable grade and extent have been found below the 600 ft. level.

The total expenditures, including income tax, £1,675 4s.; London expenses, £1,820 5s. 5d.; Mr. Thomas Richards' report, £635 18s. 2d.; and incidentals amounted to \$6,898 per ton of dry crushed ore. This was divided as follows:

Prospecting.....	\$0.385	Extraneous.....	\$0.350
Sinking.....	0.114	Assay and concentrates, etc.....	0.129
Mining.....	2.519	General charges.....	0.680
Milling.....	1.862		
Working tailings.....	0.412	Total.....	\$6.898
Construction.....	0.426		

The net yield amounted to \$253,058.53, while the expenses ran up to \$291,000 in round figures. This deficiency was met by the absorption of the balance of profit for 1891, amounting to £3,556 19s. 7d. and by transferring £5,000 from the reserve fund. There remains yet £5,000 in that fund available for future contingencies. Prospecting during the half year was partly suspended. The costs per ton of dry ore crushed being reduced from \$1.056 in a similar period of 1891 to \$0.385. Less shaft sinking was done, the cost for the work being reduced from \$0.355 per ton to \$0.144. Mining on ore was reduced from \$2,736 to \$2,519 a ton. Milling fell from \$2,371 to \$1,862, partly on account of the suspension of work in the small but costly 10-stamp mill.

It would be interesting to know what the extraneous expense of \$14,725.74 amounted to, but no solution is given in the report; 7,625

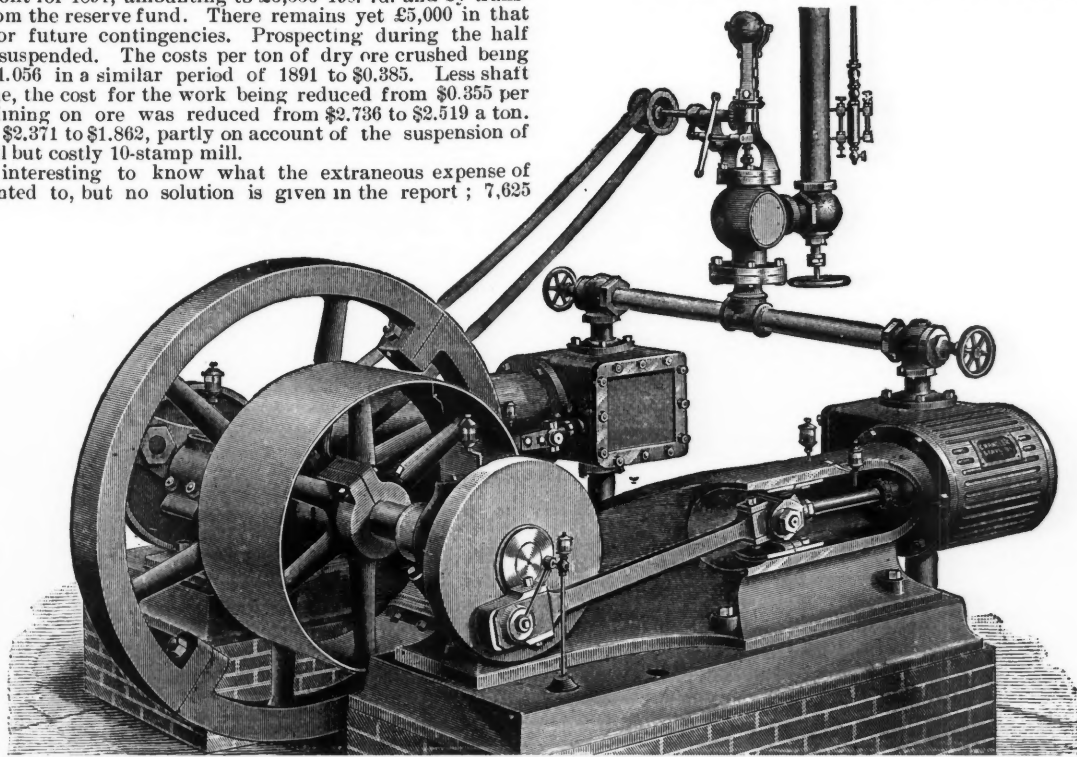
THE NEW CHANDLER & TAYLOR TWIN ENGINE

This engine has been lately put on the market by the Chandler & Taylor Co., of Indianapolis, Ind. The engraving is of an engine built for L. A. Thompson, and is to be used on the Switch-back Railroad to be operated in Jackson Park, Chicago, during the continuance of the World's Fair. The arrangement consists of two engines, right and left hand, coupled quartering, with crank disks on the ends of shafts, dispensing with outboard pillow blocks. As is well known, only a moderate sized fly wheel is required for this type of engine, and for many uses, as where great regularity is not required, this may be dispensed with, the turning still being uniform. The working strains are also more equally distributed than with a single cylinder engine. This engine, it is claimed, is so constructed as to admit of high rotative speed when desired, as in electric light plants, and for other purposes. To render unnecessary the removal of crank disks (which are both permanently fixed), the band-wheels and eccentrics are made in halves; this saves work and avoids the possibility of throwing out a crank in the operation of removing and replacing a disk. The governor is placed at the center of the connecting pipe, and there are valves for shutting off either engine without effecting the other. When desired, these engines are fitted with link motion.

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, SEPTEMBER 27TH, 1892.
483,126. Blasting Powder. Ferdinand Auchman, Graz, Austria-Hungary, Assignor to Anton Moschek and August Brunner, both of same place.



NEW DOUBLE ENGINE.

tons of tailings were treated, yielding \$4.33 a ton, at a cost of \$2.28 per ton of tailings, or \$0.412 per ton of dry crushed ore. This comparatively high cost will be somewhat lessened in the future by the use of a tramway, doing away with the hauling by wagons.

The Injury Caused by Punching Iron and Steel Plates.—According to the results of tests recently communicated to the Engineers' Club of Philadelphia the operation of punching injures steel plates less than iron up to 1/4 in. in thickness. Beyond this limit of thickness the injury to steel increases very rapidly while the injury to iron continues constant.

The Production of Ammonia from Nitride of Titanium.—The copper-colored nitride of titanium heated in hydrogen gas yields ammonia: the nitride is reproduced by heating it in nitrogen, so that by alternately heating this nitride in hydrogen gas and in nitrogen a continuous supply of ammonia can be obtained, says the *Boston Journal of Chemistry*. The nitride of titanium is found as an accidental product in the bottom of blast furnaces using titaniferous ores. [This is interesting, and we would be glad to hear of any investigations made on the subject.—Ed. E. & M. J.]

Hydraulicking Phosphate Rock in Florida.—The Black River Phosphate Company is trying at its hard rock mine the methods employed in pebble phosphate mining. The rock is first cut from its bed by a stream from a hydraulic pump having a pair of 14-in. cylinders. The rock and water are then raised from the bottom of the pit by means of a Heald & Sisco centrifugal pump and forced through 450 ft. of 10-in. pipe and emptied into a wooden sluice-box 600 ft. in length, which conducts it to the creek, where it is loaded into the lighters. The lift is 46.7 ft. where the pebble is deposited in the sluice-box. The rock is then floated down stream four miles to the mill. The system adopted by this company is said to reduce mining expenses 50%. The product of this company is low grade, ranging quite below low grade South Carolina rock, so that to be able to successfully compete, mechanical devices had to be brought into use.

- 483,152. Dump Car. Malvern W. Iles, Denver, Colo.
- 483,156. Mining Machine. Jefferson L. Lechner, Pittsburg, Pa.
- 483,176. Device for Collecting Metallic Fumes. Dennis Sheedy and Malvern W. Iles, Denver, Colo.
- 483,204. Electric Locomotive. Norman C. Bassett, Lynn, Mass., Assignor to the Thomson-Houston Electric Company, of Connecticut.
- 483,290. Process of Making Salicylaldehyde-Alphaphenylmethyl Hydrzone. Israel Ross, Frankfort-on-the-Main, Germany.
- 483,352. Apparatus for Heating Boilers by Gaseous Fuel. James L. Hastings, Philadelphia, Assignor to L. G. McCauley, West Chester, Pa.
- 483,423. Process of Electric Welding. Charles L. Coffin, Detroit, Mich.
- 483,424. Electric Metal Working Device. Charles L. Coffin, Detroit, Mich.
- 483,425. Process of Electric Metal Welding. Charles L. Coffin, Detroit, Mich.
- 483,426. Process of Electric Metal Heating. Charles L. Coffin, Detroit, Mich.
- 483,427. Electric Metal Working. Charles L. Coffin, Detroit, Mich.
- 483,452. Apparatus for Treating Phosphate Rock. Samuel Hughes and William B. Chisolm, Charleston, S. C.

TUESDAY, OCTOBER 4TH, 1892.

- 483,532. Chloridizing Muffle Furnace. Hugh Calhoun, Hot Springs, and Aron M. Beam, Bear, Ark.
- 483,577. 483,578. Furnace for Treating Steel. John Pedder, Pittsburg, Pa.
- 483,639. Process of Treating Copper and Nickel Pyrites. Jules Strap, Paris, France.
- 483,644. Ingot Manipulator. Peter N. Cunningham, New Castle, Assignor of one-half to Robert Gray, Pittsburg, Pa.
- 483,652. Process of Reducing Zinc. Christopher James, Swansea, England.
- 483,752. Method of Working Heat Regenerators. Jacob T. Wainwright, Pittsburg, Pa.
- 483,766. Process of Extracting Gold from Its Ores. Carl Moldenhauer, Frankfort-on-the-Main, Germany.
- 483,842. Operating Mechanism for Mining Drills and Stamps. George M. Gross, Chicago, Ill.
- 483,901. Rock Drilling Machinery. Adam E. Chodzko, San Francisco, Cal.
- 483,908. Mechanism for Drilling. Eckley B. Cox and Samuel Salmon, Drifton, Pa.; said Salmon Assignor to said Cox.
- 483,934. Zinc Furnace. Octavius Lumaghi, St. Louis, Mo.
- 483,936. Furnace Tap. Edward P. Mathewson, Pueblo, Colo.
- 483,962. Process of Smelting Complex Silver Ores. Christopher James, Swansea, England.
- 483,972. Process of Treating Mixtures Containing Sulphides of Precious Metals and Copper. Cabell Whitehead, Washington, D. C.
- 483,986. Metallurgical Furnace. George W. Bierer, Allegheny, Assignor of one-half to George W. Bowers, Pittsburg, Pa.

PERSONALS

Mrs. Sophia Braenlich, the business manager of the Engineering and Mining Journal, who has been very seriously ill for months, has so far recovered her health that she has been able to resume her duties this week.

Mr. Walter H. Weed, of the U. S. Geological Survey, has returned to Washington from a season's field work in the mining regions of Montana.

Mr. Felix G. Cazeneuve, member of the Mexican Geological Survey, delivered a lecture on the "Finding and Founding of a New World" at Hardman Hall, New York, October 7th.

Mr. C. H. Schermerhorn and Dr. E. G. Palen, of Philadelphia, and E. H. Stokes and G. B. Langley, of Millville, N. J., directors of the Niagara Milling and Smelting Company, are in Salt Lake City, Utah.

Mr. John Wilski, a student of Prof. Lunge, of the University of Zurich, left this city October 6th, en route to Zurich, with the intention of resuming his studies. He has spent two months in this country visiting the chemical and metallurgical establishments of Maryland and Pennsylvania.

Prof. H. F. Reid and two assistants, who have been engaged in making a scientific examination of the Muir Glacier in Alaska, were only recently rescued from Glacier Island. The rescue was made by Commander Maynard, of the U. S. Steamship "Pinta," after the regular mail steamer had failed to find the party. They were picked up in Icy Strait in a small boat.

Columbia College began its 139th year on Monday, October 3d. At the meeting of the trustees held that afternoon, President Low submitted his annual report. In speaking of the removal to the new site on Riverside Heights, he says that \$500,000 will be required for even temporary quarters to carry on the work now being performed, and still larger sums will be needed for permanent buildings, etc. Four hundred thousand dollars has already been subscribed and as the college does not take possession until 1895, there is reason to believe that the money will be forthcoming. The internal reorganization of the college is now complete and its four schools have become seven, closely related and having common administration. A School of Pure Science has been provided for which will increase the opportunities for advanced work in mathematics and the natural sciences. In the School of Mines, a four years' course in Mechanical Engineering has been established. During the year lectures will be delivered at Cooper Union, at the Museum of Natural Science and at the Metropolitan Art Museum. With the American Museum an arrangement has been made that will be of benefit to both. By it the museum has placed its collections at the service of the college professors and advanced students for purposes of research, and agree to give them the necessary facilities for the work and Columbia extends a like privilege to the curators of the museum. A small observatory has been erected at Bloomingdale and a series of simultaneous observations are to be undertaken here, in co-operation with the Italian Royal Observatory at Capodimonti, near Naples, for the purpose of determining the variation of terrestrial latitudes. As the two observatories are almost precisely on the same parallel of latitude, and as they are to use identical instruments made for the purpose, the results promise to be of great interest. Among the gifts to the college during the year is a legacy of \$65,000 from the estate of the late President Barnard. According to the terms of the legacy, a gold medal valued at \$200 will be awarded every five years on the recommendation of the National Academy of Science for meritorious service to science. There will also be established a Barnard Fellowship in Science. The accessions to the library numbered 15,408 bound volumes. There was also received as a gift from the Temple Emanu-El a library of 25,000 volumes and 43 old manuscripts on Hebrew literature. The staff now comprises 226, an actual increase of 28 over the preceding year. Among the appointments to the Faculty are Brander Matthews, professor of literature, Wm. Hallock, late of the U. S. Geological Survey, adjunct professor of physics; Dr. T. M. Prudden, professor of pathology, and Robert Peele, Jr., adjunct professor of mining.

OBITUARY.

Mr. James Cartwright, long connected with iron manufacture in the Mahoning Valley, died at Youngstown, O., September 25th, aged 64 years. Mr. Cartwright erected the second rolling mill in Youngstown, engaging in the iron business during the early years of the war, and for years operated the extensive plant of Cartwright, McCurdy & Co.

Announcement is made of the death of Hugo Franz Brachelli, the Austrian statistician, in his 59th year. He was born in Moravia in the town of Brunn, on February 11th, 1834. He studied philosophy, law and political economy in the University of Vienna, and early in life devoted himself especially to statistical and geographical researches. In 1855 he was placed at the head of the official Bureau of Statistics and in 1860 was appointed assistant professor, and three years later regular professor of

statistics and constitutional law, as well as director of the Technical and Superior School in Vienna. When the new military schools were founded he was given the chair of statistics and of Austro-Hungarian public law in the highest grades of artillery and engineering study. In February, 1872, he was made president of the new statistical department. Brachelli's works on statistics and political geography were numerous and of wide scope including and summarizing a mass of valuable information contained in official documents.

SOCIETIES.

The Chemical Section of the Engineers' Society of Western Pennsylvania met September 27th. Twenty-three members were present. Dr. Chas. B. Dudley, Chemist of the Pennsylvania Railroad Company, delivered an address on the subject "Causes of Discrepancy in Chemical Analysis." He thought there were four possible causes. First, non-uniformity of samples. This trouble could be discovered by exchange of samples. Second, impure chemicals. Chemists in cases of dispute should exchange samples and chemicals both. Third, poor manipulation. This can generally be discovered if the two chemists work together. Fourth, faulty or varying methods. The adoption of uniform methods would be very desirable. He quoted from a well known professor who used to say: "No chemist has ever made an accurate analysis. Some chemists can work close enough to accuracy so that their work is valuable."

The regular monthly meeting of the Engineers' Society of Western Pennsylvania, was held on September 20th. Mr. Gustave Kaufman read the paper for the evening on "The Reconstruction of the Ninth Street Bridge, Pittsburg." This bridge, finished in 1840, was originally of the Burr type of combined arches and trusses, of one span of 190 ft. and four spans of 200 ft. in the clear of masonry. The piers were 9 ft. wide on top and 35 ft. long, having semicircular ends, thus making the total length of the piers 44 ft. The foundations of all masonry in the river were timber platforms. The price paid for the masonry was about \$7 per cubic yard. The substructure cost about \$37,000 and the superstructure about \$33,000—with approaches the bridge cost about \$80,000. The bridge was covered on all sides and top, and offered great resistance to the wind. In 1889 this bridge, which was still in safe condition for slow traffic, fell into the control of the Pleasant Valley Electric Street Railway Company, who at once began to replace the old structure with one that would be adapted to rapid transit traffic purposes. The requirements of the company were: First, the new structure to be wide enough for four lines, two for quick rapid transit and two for slow transit; and two for sidewalks of 10 ft. each. Second, the old masonry to be used. Third, the old structure to be removed and traffic maintained during the erection of the new bridge. Fourth, the structure to be designed on strictly economical principles, no ornaments to be used, the substructure to consist of five spans of plain Pratt trusses. The load on the floor to accept twelve tons on two pairs of wheels 10 ft. apart, or a uniform load of 100 lbs per sq. ft. The trusses to be figured to carry a moving load of 4,000 lbs. per lineal foot. The work necessitated the building of a new abutment on the Pittsburg side; the rebuilding to the tops of all the piers, a new pier on the Allegheny side, and an entirely new superstructure, the trusses of which are of steel, and the entire floor and lateral system of iron. The paper describes in detail the work as performed, including the strengthening of the masonry on the old piers by the inflow of hydraulic cement. The cutting down and rebuilding the tops of the piers, the removing of the skew backs and the building up of the piers to a uniform section between the new trusses, the raising of the bridge spans to meet the requirements of the U. S. Government engineers. The work was completed in the fall of 1890 without injury to any person and practically without cessation of traffic.

INDUSTRIAL NOTES.

The strike at the Catasauquus (Pa.) rolling mill of the Catasauqua Manufacturing Company begun July 1, 1891, has been declared "off" by the Amalgamated Association. All the mills in that section are again in full operation.

The Chicago Ironworks, Clybourn Avenue, Chicago, have been appointed sole Eastern agents for J. H. Bryan's patent roller quartz mill. This firm also manufacture and are the Eastern agents for Hendy's improved Triumph Concentrator.

A consolidation of the large brass manufacturing concerns in the Connecticut Valley is being urged, with a view of reducing expenses. The capitalization, it is said, will be from \$12,000,000 to \$15,000,000, and all the stock will be allotted to the manufacturers in direct ratio to the actual value of their plants.

It is reported that the Ohio Iron Company will start its rolling mill at Zanesville, O., after a year's idleness. The managers of the mill offer to pay the wages of the association, but refuse to sign

the scale. The company will offer its old hands the first chance, and if they do not accept, men will be brought in from other places.

An 8-in. guide mill of the Alabama Rolling Mill Company made on September 15th 50,560 lbs. of $\frac{3}{4}$ in. rod iron with only one heating furnace. It is said that the same train of rolls has been averaging for the last six months over 40,000 lbs. a turn of all sizes from $\frac{1}{2}$ in. to 1 in. round or square. The company has just added 2 new gas furnaces.

The directors of the Berlin Exposition granted an award to the following fire-proof process: For light tissues a composition consisting of 16 lbs. ammonium sulphate, 5 lbs. ammonium carbonate, 4 lbs. borax, 6 lbs. boric acid, 4 lbs. starch or 1 lb. of dextrine or 1 lb. of gelatine dissolved in 25 gallons of water and heated to 86° Fahr. For heavier material 30 lbs. of ammonium chloride are mixed with so much floated chalk as to give consistency to the mass, and the material treated with it by means of a brush.

The Carter Ore Separator and Mining Company, of Brooklyn, N. Y., are placing on the market a magnetic separator in which the separating power is supplied by permanent magnets arranged in a series of rows one above the other. It is intended chiefly for cleansing crushed kaolin from stray iron particles and other operations where there is very little iron to be separated. It can also be used for separating iron filings from brass turnings or for recovering iron filings and turnings from the floor accumulations in a machine shop.

At San Francisco on September 30th a decision was handed down by the District Court which may have an important bearing on the Pacific coast coal trade. Judge Ross decided that the McKinley act did not repeal the act of 1883, granting the right of a drawback of 75 cents per ton on imported bituminous coal, and afterward used for fuel on American steam vessels engaged in the coasting trade. The decision will result in the payment of \$200,000 to coal dealers of San Francisco who, since the passage of the act have been deprived of a drawback on all coal sold to American steamships.

In the case of the Brush Electric Company vs. Electrical Accumulator Company, the United States Circuit Court of Appeals handed down a decision, October 4th, in favor of the Brush company. This decision ends five years' of litigation over the invention of the storage battery and gives to the Brush company and the Consolidated Electric Storage Company, practical monopoly of the business of manufacturing storage batteries. Camille A. Faure is popularly supposed to be the inventor of the secondary battery, but by this decision priority is given to Mr. Brush.

The case of the Edison Electric Light Company vs. the United States Electric Lighting Company, appellants, was decided in favor of the Edison company by the United States Circuit Court of Appeals on October 4th, Judges Lacombe and Shipman concurring in the decision. The issue was the appeal made against the decree of the Circuit Court granting an injunction with accounting for profits and damages. By this decision, from which there is no further appeal, all the claims made by Edison in his patent of 1880 are sustained and held valid. These claims, four in number, were essentially to the effect that the illuminating vehicle should be a carbon filament of high resistance, and that it should be enclosed in a vacuum protected by a transparent globe through which the electric current was conducted by means of platinum terminals. The claim was made by the United States Company that as the use of platinum wire for obtaining light was known before Edison's patent, that the change of material did not constitute an invention because the substitution would be obvious to any one skilled in the art. To this the judges dissented on the ground that Sawyer and Man had learned how to procure the vacuum yet turned aside from it to use nitrogen, a non-acting gas. This decision in favor of the Edison company will have a far reaching effect. At present incandescent lamps are manufactured by 12 or 15 different companies, the Edison company manufacturing 40% of all. As it stands now the Edison company will manufacture all the lamps made and at the same time can recover damages from the other companies for all the lamps made since 1880.

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 address at 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 of goods of any kind.

Goods Wanted at Home.

- 2,796. Machinery for an ice factory and laundry, including boiler, engine, etc. Virginia.
 2,797. Machines to bore pump logs or wooden water pipe; also machinery to make several sizes of bowls or trays from the same block. Virginia.
 2,798. Estimates on a creosoting plant of ordinary capacity for piling and bridge timber of ordinary sizes. Texas.
 2,799. Machinery for a lumber and veneering company. Florida.
 2,800. Barb wire machinery. West Virginia.
 2,801. Engine and boiler combined for hoisting coal and supplies from barge in river. West Virginia.
 2,802. Small railroad iron. West Virginia.
 2,803. Coal cars. West Virginia.
 2,804. A small roller flour mill. Virginia.
 2,806. Stave and hoop making machinery. Virginia.
 2,807. A small planer and matcher suitable for light custom work; also a saw gunner. Virginia.
 2,808. Filter press and steam pumps for oil refining. North Carolina.
 2,809. 500 ft. 25 or 30 lbs. second-hand T rails. Virginia.

Goods Wanted Abroad.

- 2,781. Catalogues of mining machinery, more especially relating to electric coal cutting machines; diamond drills for deep boring, say 2,000 ft., and the best kind of water motors. New Zealand.
 2,805. Catalogues, price lists, etc., of diamond drills for mine prospecting. Mexico.

GENERAL MINING NEWS.

CALIFORNIA.

Mono County.

Bulwer Consolidated Mining Company.—The official letter for the week ended September 25th says: "A north drift has been started from the flat upraise and driven in vein matter along the footwall a distance of 12 ft. Have also started on an upraise from the old stopes south of No. 5 upraise, near the footwall, and it is now up 13 ft.; the face is in vein matter of a favorable nature. We are rebuilding the main ore chute from the Bulwer tunnel level up."

San Bernardino County.

(From our Special Correspondent.)

The high fence around the works of the Carnegie Steel Company, Homestead, Pa., is being torn down. The officers say that, as far as they are concerned, the strike is practically over, and they desire operations to continue just as they did in May. The locked-out men consider it another invitation to return to work.

San Jacinto Estate, Ltd., Temescal.—Since the Sheriff of the county served attachments to secure the payment of over \$6,000, no new developments have taken place. All is at a standstill at the mines, there being no signs of life about the place save the few watchmen. Orders are being awaited from London, but ignorance is professed here as to the reason for closing down and the possibility of an early resumption of work.

COLORADO.

According to the figures based upon smelter returns and presented by the Board of Labor Statistics of the State of Colorado, the lead production of this State for 1891 was 63,128 short tons, with a total valuation of \$5,050,230, says the Denver "Republican." Leadville was a heavy producer of this output. The value of lead output exceeded that of gold production for the same year. The growth of the lead production in Colorado can readily be observed when the output of 1891, valued at \$5,050,230, is compared to that of 1872, which was only \$5,000. The lead production of the entire United States in 1891 was 205,488 tons. Colorado produced 63,128 tons of this amount. According to the most conservative estimates Colorado produced \$75,000,000 worth of lead from 1859 to 1891 inclusive. The following are the official returns from smelters on Colorado lead ores handled during 1891: Omaha and Grant, Denver, 6,489 tons; Globe, Denver, 3,672½ tons; Pueblo, Pueblo, 10,538½ tons; Philadelphia, Pueblo, 11,000 tons; Colorado, Pueblo, 5,955½ tons; San Juan, Durango, 2,517 tons; American, Leadville, 9,107 tons; Harrison, Leadville, 3,878 tons; Elgin, Leadville, 2,087 tons; Arkansas Valley, Leadville, 7,679½ tons; Kansas City, Kansas City, 108 tons; Eastern smelters, 97 tons; total in short tons, 63,128.

Clear Creek County.

Edgar Union Mining Company.—The management is crosscutting to the main vein, which it is expected will be struck in about 18 ft. more. In drifting east the big cross lode was struck and levels are being driven north and south in order to cut the other veins owned by the company, that are running parallel with the Edgar.

General Thomas.—This property is shipping 4 carloads of milling and smelting ore daily. There are about 60 tons of milling ore on the dumps awaiting shipment. The usual development work is going on.

El Paso County.

Following are the latest items of Cripple Creek news, from our exchanges:

It is reported that two sales for Bull Mountain

properties are now pending, the prospective purchasers being New York capitalists and the amount involved \$100,000. The properties adjoin some of the best-known mines in the camp, and it is thought the deals will be closed on Monday.

Sweet Mining and Milling Company.—George Darrow, one of the stockholders of this company, has closed a deal by which the controlling interest in the Comstock, El Reno and World's Fair lodes at Cripple Creek changes hands. The main portion of the stock was owned before by S. H. Hard, J. E. Downie and B. Sweet of Pueblo. The purchasers are W. H. Malone, Will Evans, Dr. Steele, W. A. Cooper and other Denver parties. The purchase price was \$50,000. The best of the ore in the three claims assays \$213, and there is a 2-ft. streak of this. Heavy machinery and proper appliances for working the mines to the utmost will be put in at once.

Lake County.

Fanny Rawlins.—The upraise in the mine has opened up a fine body of iron carbonates.

Antoinette.—A strike is reported at this mine. Vigorous work has been carried on in this property which has resulted in opening up a good body of ore, running from 3½ to 7 oz. in gold. Arrangements to ship are about completed.

Ouray County.

The following are the latest items of Ouray mining news, culled from our exchanges: A strike has been made on the Grand View mine. The ore body that was broken into runs 6 oz. gold per ton, and there seems to be plenty of it. Manager Ed. Ingram reports that the Little Mollie is now making a better showing than ever before. Shipments are about to commence again, and there is good gray copper and silver ore in the shaft, the stopes and both of the levels. A great deal of systematic development work has been done this year. The Jay-Eye-See has struck another body of bismuth ore. The Guadalupe is driving a crosscut to cut the vein and is now within 20 ft. of the pay streak. The Indiana mine has uncovered a body of ore which is identical with that in the Silver Belle. The Guston shipped out 18 cars of its high-grade ore on the 27th ult., 148 cars were shipped last month, and 250 cars will be the record for September. A few cars of very rich ore are sent out every day from the eleventh level of the Yankee Girl. The National Belle has struck a large body of gray copper and silver in the lower level. The entire breast of the tunnel is solid ore. The Rochester Consolidated Mining Company continues to send out two cars of ore per week from the United States Depository.

Saguache County.

According to the returns published in the Denver "Republican," ore shipments from Creede for September were 272 cars of 3,729 tons, divided as follows: Amethyst, 144 cars; Ethel, 10 cars; Last Chance, 115 cars; Sulphurettes, 10 cars; Yellow Jacket, 1 car; Bondholder, 1 car; World, 1 car. The last three are new shippers, which began steady output during the last week. They are at Sunnyside, Spring Creek and Spar, respectively. The shipment made on the 30th ult. was 18 cars, and the same number went out on the 1st inst. In the last 10 days of September the result of the recent option given on the Amethyst properties affected perceptibly the output. The purchasers have the privilege to take out all ore possible up to the last day of the year, and apply the proceeds on the purchase price of \$5,000,000. They are getting out 150 tons a day.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending September 23d: Smuggler-Union, 297; Sheridan Consolidated, 330; Hector Mining Company, 11; Beattie, 11; Montana, 11; Valley View, 11; total, 671. Total since January 1st to September 23d, 24,912 tons.

Shipments of ore and concentrates from Telluride for the week ending September 29th. Tons: Smuggler-Union, 407; Sheridan Consolidated, 429; Hector Mining Company, 11; Beattie, 11; Montana, 11. Total, 869, making from January 1st to September 29th, 25,881 tons.

The Telluride "Republican," in its weekly review of mining affairs in the county, says: In the Mt. Wilson district the concentrating plant on the Silver Pick is practically completed, and will be in operation by October 15th. It will turn out from two to three cars of concentrates weekly, and will enable the property to more than double its output. The San Bernardo mine and mill at Trout Lake are in steady operation, and new ground is being opened in the mine. The Caribou, at Ophir, is furnishing employment to more than 60 men on lease of mine and dumps. The new 20-stamp mill for the Suffolk will be completed and in operation by November 1st. The Gold King (40-stamps) and Turkey Creek (25 stamps) mills, are running night and day, and sending down reborts with a regularity that indicates a handsome profit. Bridal Veil basin is receiving greater attention than in any previous year, and several promising locations are being opened. Marshall Basin still leads all our mining districts in the value and amount of its production in both gold and silver. With but few slight and temporary stoppages, the Belmont mill has been in steady and profitable operation. The Sheridan-Mendota, while steadily increasing their output, are extending their levels and opening new ground preparatory to further increase. Our information is to the effect

that the output of these mines will be more than double, within 90 days. The Smuggler-Union, in addition to a steady output of 25 to 30 or more cars per week, is sinking two shafts, running a tunnel that when completed will be 4,700 ft. in length, and has just about completed a Bleichert tramway 5,000 ft. long. The tunnel is now in 1,270 ft., with 1,000 ft., to run to connect with the Union shaft. The 20 stamps of the Hector mill are kept constantly at work on Cimmarron ore, while Beattie's two Huntingtons are crushing 30 tons per day of rock from the Montana and Cimmarron dump.

Summit County.

Extension.—The mill at this mine has been placed in good condition and the returns from clean-ups made show a decided improvement. Two shifts are being worked and good ore is being encountered everywhere in the mine. This property, according to the Breckenridge "Journal," is one of the largest gold mines ever operated in this county.

Jessie.—At this group work is pushed on the cross-cut tunnel which is being driven to cut the Baden Baden vein; it is expected to cut the vein about 70 ft. deep; the tunnel is now in about 1,000 ft. and the crosscut is in about 60 ft. The breast is showing mineralized rock, says the "Summit County Journal."

Silver King Mining Company.—The Silver King concentrating mill at Montezuma, says the Breckenridge "Journal," is now running on ore from the mine; the concentrates made are bright and clean.

FLORIDA.

Marion County.

(From our Special Correspondent.)

Most of the phosphate companies south of Ocala are shutting down on account of the quarantine. It is said that most of the phosphate mined in that region is contracted to be delivered at Hamburg and Stettin, Germany, and the quarantine has made it out of the question to reach those ports during the prevalence of the cholera. The Standard Phosphate, Mining and Chemical Company, whose mines are near Anthony, is adding to its plant machinery for grinding phosphate, consisting of a separate engine and boiler and an improved Alsing mill, and it will be prepared soon to ship ground phosphate. The Deacon Company is preparing samples of acidulated or superphosphate, for use as a wheat fertilizer. The tests will be made in Virginia. This experiment will be an important as well as an interesting one, as it will test the suitability of the material for the manufacture of commercial fertilizers, and also the fertilizing value of the high grade product prepared. The Stranathan Company has suspended mining operations for a short time while a new dryer is being erected. The Maryland Company is at work on its railroad spur in preparation for an early shipment of its large pile of rock. The Anthony Company is putting up its large steam crane, and when this work is completed its plant will be ready to work. The Central Company has now on hand the laying of the railroad track to its works. When this is completed it will be ready to erect the dryer and large steam crane which are expected in a few days. September shipments from Ferdinandina include 1,750 tons of hard rock to England, from the Albion Company, and a cargo to Stettin, Germany, and Landskron, Sweden. Punta Gorda shipments are 2,800 tons of pebble to England, shipped by the Charlotte Harbor Company, and 1,600 tons pebble to Germany, shipped by the Peace River Company.

GEORGIA.

Carter County.

A manganese deposit is reported to have been discovered in the metamorphic rocks of this region. It is stated that the deposit shows at the surface 17 in. between quartz walls. It is high in manganese containing 53%, and low in phosphorus, 0.02%.

IDAHO.

Alturas County.

Red Elephant.—A vein has been discovered carrying 4 ft. of ore of which 18 in. on the foot wall is said to be solid galena. This strike was made at the greatest depth ever attained at the mine.

Boise County.

Boise County Mining Company.—The water is now out of the shaft and sinking is being continued at the rate of 3 to 4 ft. per 24 hours.

Mountain Queen Mining Company.—This company has ordered an engine and boiler for its 20 stamp mill at Grimes Pass. This move was rendered necessary by the lack of water to run the mill.

Negotiations are going on between the owners of mines on Fall and Canyon creeks, near Quartzburg, and Colorado men for the sale of several valuable gold mines. The ledges carry sulphurets in large quantities and expensive machinery must be erected to successfully treat them.

Camas County.

Cariboo District.—A correspondent of the Salt Lake "Tribune" says of this camp: "Among the most promising mines of the district are the Union, which is opened up in several places and shows a vein 20 ft. thick; the Grey Eagle, which has a vein 6 ft. thick. These ledges run from \$10 upward. The next is the Mayflower, in which some rich discoveries have been made during the season. The ledge is nearly 20 ft. thick and all ore. The Wasatch has a vein 5 ft. thick. There is plenty of wood and water near at hand. The placer mine

is looking well. The clean-up for the season, I am told, amounted to \$20,000. The miners who own the mines are generally poor men and need a little help from capital to open up the ledges."

Kootenai County.

The latest discovery in the Priest Lake country is by William Hooston, C. S. Smith and Fred Klockmann. It consists of a galena ledge some 30 ft. wide, from which a large amount of ore carrying 30 oz. of silver and 70% lead could be shipped. Good transportation is lacking, however. This strike is some 18 miles from Kootenai River and some 7 miles south of the international boundary. The owners have been offered \$40,000 on a bond 10% cash. A good wagon road to the prospect will probably be built this winter.

Pend d'Oreille Mining and Milling Company.—Dr. Reddy has disposed of a controlling interest in this company to E. C. Gerlach, of Cleveland. It is reported that a smelter is to be built.

Owyhee County.

It is reported that James Dougherty has discovered a 4-ft. vein of arsenical pyrites on Succor Creek which carries \$70 in gold and 15 oz. of silver.

A correspondent of the Owyhee "Avalanche" says of the South Mountain mines: The Union has been run in an opposite direction from the old workings. At about 45-ft. they struck some rich tellurium ore. The ledge is 2 ft. wide in the face of the drift with a fine-foot and hanging wall, showing every indication to open into a large body of ore. Other mines adjoining the Union are looking fully as well, with a large body of ore.

Trade Dollar Mining Company.—Six men are sacking ore for shipment, 4 carloads have been sent since August 1st netting the company \$28,620 or about \$700 per ton. Most of the work at present is done at No. 3 tunnel. Ore in winze D has a depth of 105 ft. At a depth of 55, a drift is being run north, it is now in nearly 100 ft. Stopping is being done at this point, the face being in good ore. At the bottom of the winze a second drift is being run north; it is in 50 ft. and already in ore. Above winze D the vein is 5 ft. wide and has 18 in. of shipping ore. There is now mined ready for milling about 1,000 tons of 2d class ore. The mill will be ready for work, it is said, by the middle of October.

Shoshone County.

Coeur d'Alene City, Sept. 29.—The trial of the Coeur d'Alene miners at this place on charges of conspiracy, has resulted in the conviction of four of the defendants, 10 being acquitted. Those convicted were George A. Pettibone, John Murphy, M. L. Devine and G. Sinclair. Sentence was passed as follows: Pettibone, two years' imprisonment in the penitentiary; Devine and Sinclair, eighteen months each; Murphy, fifteen months. Pending an appeal the men were released on \$4,000 bonds each.

Coeur d'Alene City.—The prosecution has closed its case in the miners' trials in the United States District Courts. Witnesses for the defendants are now being examined.

Frisco Mining Company.—This mill will be in shape to handle ore in a few days. Sixty men are employed. There is a large body of ore ready to be stopped.

Independence.—A strike of considerable importance has been made in this mine. The vein is reported as 7 ft. wide and carrying 2 to 3 ft. of shipping ore.

Last Chance.—The main drift running west is now over 90 ft. long, in ore that concentrates four to one. The full width of the drift is in ore. The cross-cut going south has not encountered any pay ore yet; it is 245 ft. across the ledge, still in vein matter. Sixty tons is being delivered to the mill daily.

Mineral Point.—The lower tunnel is in 100 ft., with a 50-ft. crosscut, the ledge being struck at a depth of 30 ft. in the crosscut. The ledge is about 2 ft. wide with an 8-in. vein of good ore running high in silver. Seven hundred feet above this tunnel is No. 2 in a depth of 300 ft. with two crosscuts of about 75 ft. Ten carloads of this ore has been shipped to Tacoma, Wash., and Helena, Mont. No. 3 is in a depth of 175 ft. with a 60-ft. shaft at the mouth; 100 ft. higher up is another shaft in a depth of 60 ft. Twenty men are employed.

Mountain Goat.—The ore body was cut after driving the tunnel about 100 ft. The vein is 5 ft. in width, containing 18 in. of galena. At present 6 men are working.

INDIANA.

Jay County.

This county is now passing through a gas boom similar to that of the western counties in former years. Since the gas company formed at Portland, drilled in its oil well near Pennington, in the northern part of the county at the beginning of September, there has been an increasing interest in the new development. Fifteen companies are now at work. In Jay County and in Adams and Wells counties, to the north of it, it is said that 50,000 acres of land are now under lease and there are prospects of 50 new wells going down during October. Something over one-third the area of Jay County is included, according to the map of State Geologist Gorbv, in the area of the gas field having gas in Trenton limestone. The extremely western part of the county is included in the field, hose wells run from 2,000,000 to 5,000,000 cu. ft. a day. Adams County has not been known as a gas county heretofore and only

the southwest corner of Wells County has shown previous indications of gas in the Trenton series.

IOWA.

Carroll County.

In boring a well 181 ft. deep on the place belonging to George Oleson, four miles south and two and one-half miles east of Glidden, gas was struck. The flow is very large, and now there are 16 pipes in.

Cass County.

A 42-in. seam of coal has been discovered in this county. It is said to be of fair quality.

KANSAS.

Cherokee County.

During the week ending October 1st the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds mined, 2,701,740; rough ore, pounds sold, 1,362,860; zinc ore, pounds sold, 1,005,035; lead ore, pounds sold, 300,350. Sales aggregated a total value of \$17,765.

KENTUCKY.

Bell County.

Mingo Mountain Coal and Coke Company.—This company has put in a Stegman disintegrator. It is a 60-in. machine, the largest yet turned out by the builders, and has two 65-H. P. engines connected. The coal passes first through an anthracite crusher a pair of rolls, and then into the disintegrator.

MICHIGAN.

Copper.

Atlantic Mining Company.—This mine produced 165 tons of mineral for September, against 230½ tons for August and 204 tons for September, 1891. The strike and the shutting down of a stamp head caused the small production. For nine months the product foots up 1,883½ tons against 1,915½ tons last year, a decrease of 31¼ tons.

Franklin Mining Company.—This mine produced 10 tons for September, against 191 tons for August and 201 tons for September, 1891. This makes 1,753 tons produced since Jan. 1, against 1,807 tons last year, a decrease of 54 tons.

Huron Mining Company.—The output for September was 50½ tons against 56½ in August.

Quincy Mining Company.—The product of this mine for September was 500½ tons against 500½ tons for August and 570½ tons for September, 1891. This makes 4,504 tons produced since January 1st against 4,748½ tons in 1891, a decrease of 244¼ tons.

Iron—Marquette Range.

Lake Angeline.—About 25 feet of water has been removed from the lake and much of the old bottom is showing. There is a considerable area free of water in the east end and the Cleveland Iron Company will soon begin stripping at that portion of its property. The ore makes near surface at the point of the original shore line, and at this point an open cut will be made, says "Iron Ore."

Pittsburg & Lake Angeline Iron Company.—This company has recently decided to adopt the eight hour shift system, or to at least give it a three months' trial. The mine will be worked continuously during the 24 hours, and if successful the system will be definitely adopted.

MINNESOTA.

Iron-Mesaba Range.

Miners are now wanted for the work of developing the properties of the Barrett, Outcrop, Licking, Hock-Hocking and Itasca companies. The work of disclosing these mines will be pushed forward as rapidly as possible. Negotiations are now pending with the Duluth & Winnipeg road for the construction of a branch line to these properties.

Diamond.—In this mine, on the Western Mesaba, a good body of ore has been found. The mine is now down some 85 ft., and drifts have been driven, and all show a large deposit of hematite. The mine has recently added to its plant a new hoist with a lift capacity of 2½ tons, which will be put in place at an early date.

Ohio Mining Co.—This company, by its lease to Sheridan, Jones & Weimer, will receive 65 cents per ton royalty on the output of the mine, instead of 60 cents, as reported. The minimum amount to be mined annually is 150,000 tons. The lessees have already paid in advance one-fourth of the royalty on this amount for one year. It is stated that the lessees have refused \$100,000 for their lease. They have already made a contract with a Cleveland firm to handle their entire output. This firm has advanced \$25,000 for stripping purposes.

Rouheleau Mining Company.—This company recently leased 200 acres of its lands lying in Section 3, 52-16, to Messrs. Moore, Foley, Curry and others of Michigan.

This mine lies south of the Biwabik and Canton. The Rouheleau Company did some exploring there last spring, but the land is so swampy that the test-piters were always driven out by water after getting down a few feet, and work was discontinued.

Three "forties" have since been leased by Moore & Foley to "Norrie" capitalists, who have put in a diamond drill and will make their explorations with the drill instead of testpitting.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

JOPLIN, Oct. 3.

There were heavy shipments of zinc ore from the

entire district last week, but a great part of it belonged to the sales of the week ending September 24th, so that last week's actual sales of ore were below the average. Several of the ore buyers were entirely out of the market; as a result prices declined to an average of about \$22.50 per ton. Lead ore was in good demand at \$22.50 per thousand. Following are the sales from the different camps:

Joplin mines 1,327,290 lbs. zinc ore and 212,420 lead; value \$20,043. Webb City mines 1,244,200 lbs. zinc ore and 80,310 lead; value \$16,717.40. Cartersville mines, 2,741,260 lbs. zinc ore and 173,230 lead; value \$38,749.50. Zincite mines, 88,010 lbs. zinc ore, and 1,950 lead; value, \$1,056. Lehigh mines, 46,840 lbs. zinc ore; value, \$560. Oronogo mines, 51,740 lbs. lead; value, \$1,160.30. Carthage mines, 103,500 lbs. zinc ore; value, \$1,242. Alba mines, 176,000 lbs. zinc ore; value, \$2,024. Galena, Kan., mines, 1,009,035 lbs. zinc ore and 300,350 lead; value, \$17,765. District's total value, \$99,217.20. Aurora Lawrence County mines, 419,430 lbs. zinc ore, 613,830 lbs. silicate, and 135,000 lead; value, \$12,152. Lead and zinc belts, total value, \$11,369.20.

The decline in the zinc ore market is again filling the ore bins, and large operators seem inclined to hold their produce for something near \$25 per ton. D. A. Gault, of Joplin, and a syndicate from Toledo, O., have secured a lease on the old Duff mines just northeast of Joplin, and commenced work this morning. This land in the early days of mining was noted for a large deposit of silicate almost on the surface of the ground, and but little development has been done except on the surface. The indications are favorable for finding a good run of zinc ore with a high grade.

Macon County.

A dispatch from Macon says: "The miners in the Kansas and Texas, the Loomis and the Watson mines have struck for a 25 cent per day increase in wages. They now receive \$1.75 per day. The operators have as yet taken no action."

MONTANA.

Cascade County.

United Smelting and Refining Company.—This company started up one furnace at Great Falls on September 28th, according to the Anaconda "Standard." The smelter was closed January 9th to make necessary repairs. It was the intention to start some months ago, but washouts on the Montana Central and Belt Mountain branch occurred and ore could not be obtained. It is said that the company has secured good rates from the railroads and will be able to run at full force in a short time.

Deer Lodge County.

Anaconda.—A division in the case of appeal in E. O. Ferrel *et al.* vs W. L. Hoze *et al.* has been handed down from the General Land Office. This decision is important as defining the quality of mineral discovery. The case and points of issue involved are as follows: The Horseshoe quarry placer was located April 9th, 1890, by William L. Hoge, Marcus Daly and six others, and the mineral entry for the claim was made January 6th, 1890. On February 10, 1891, a protest against issuance of patent for the claim was filed by E. O. Ferrel *et al.* The protest alleged, in effect, that the claim contained no deposit of precious metals, but was only valuable, in a small portion of it, as a stone quarry, and that it was sought for speculative purposes, the land being chiefly valuable for business purposes, lying contiguous to the town of Anaconda. On the other side witnesses testified that the claim was valuable, as a whole, for deposits of limestone and sandstone, bearing small quantities of iron. The Helena Land Office decided that the only discovery of mineral was in one excavation, and laid down the proposition that the mineral claimant must show a valuable deposit of mineral upon every 10-acre tract; in consequence of which they should be allowed to take a tract of 10 acres surrounding the excavation mentioned, and that the entry should be canceled except as to that 10-acre tract. From this decision an appeal was taken to the General Land Office.

Acting Commissioner Stone holds that the proposition that mineral must be shown on every 10-acre tract is inapplicable to this case, because the claim being situated upon unsurveyed land and being entered as one lot contains no 10-acre tract. It was located and entered as an entirety. It having been established that the lot as an entirety contains a valuable deposit of limestone, the acting commissioner holds that it follows that the entry of the whole tract must stand.

Elizabeth.—A new road is being built from the hoist to Granite, and preparations have been completed for active work at this mine.

Meda.—According to the Phillipsburg "Mail" the operators of this mine have made a small strike. By drifting on the vein about 50 ft. from the incline shaft galena was found, the vein being about 6 ft. wide. The water in the shaft is somewhat troublesome at present, but this will soon be remedied.

Lewis and Clarke Co.

Penobscot.—A fire was discovered in the blacksmith shop on September 17th, which finally destroyed much of the material for the new mill.

Whitlatch Union & McIntyre Gold Mining Co.—After standing idle nearly twenty years, the mill of this company started up during the last week in September.

Silver Bow Company.

Butte & Boston Mining Company.—According to the Boston "Herald" a letter from the mine says that matters at the mill and smelting works are going along all right. The shafting and machinery for the mill have been received and are being put into place. There is a good showing at the mines. Silver Bow No. 1, 700 ft. level, is looking fine, both east and west. At the Gray Rock mine, north end, very good ore is coming in, both east and west. On the 700 ft. level, east and west, the same vein shows good ore; in fact, a great improvement has taken place in this mine. The appearances indicate a large body of ore in this vein. The matte is running high in silver, about 39 51-100 oz. to the ton. This same 700 ft. level is running much higher in silver than it did in the upper levels.

Boston & Montana Consolidated Copper and Silver Mining Company.—The manager of the Boston News Bureau, who was recently in Montana, says of this company: The Great Falls smelter is worth to-day all that it has cost; that it will cost some more and be worth a great deal more, and that the San Coulee coal is rich in gas, and will smelt copper at a minimum of cost. The Boston & Montana had a million dollar bond issue before any works at Great Falls were thought of. It has to-day outstanding \$1,600,000 bonds, has \$1,600,000 in cash planted in the Great Falls smelting works, and should, when making the product at Great Falls, which is now made at Butte, have altogether at least \$2,000,000 in its smelting and electrolytic plants. The company took a wilderness, and approximately a gift of water power of 10,000 horse capacity, 400 acres of land, now taxed for more than four times its cost, exceptionally favorable railroad contracts for switching charges and on transportation from the mines and for the furnishing of coal at less than one-fifth of the price paid at Butte, and then began the erection of reduction works to do more in capacity and economy of operation than could be done at Butte, and a concentrator has been built with a capacity to handle 50% more rock than is now treated at Butte, and this again can be increased another 50% without further building, but with only additional machinery, and the concentrator capacity can be again doubled to treat if necessary 1,800 tons in 24 hours, while at present only 400 tons are treated at the company's "upper" and "lower" works in Butte. The smelter has been constructed with a capacity to roast 250 tons of concentrates per day, but the capacity can be extended, as the O'Hara furnaces, which have been adopted by the Butte & Boston Company, are improved and adapted to economical automatic work. At present Bruckner furnaces are in use. Eight hydraulic tilting furnaces, capable of smelting by gas 480 tons of calcined ore per day, are in place. This capacity is equal to a concentrator capacity of 1,200 tons of crude ore per day. The hydraulic tilting arrangement works perfectly, and is a great labor saver, but the gas flues are found not to be adapted to the San Coulee coal, which, although rich in gas, is high in ash, and these have yet to be widened out and changed and some changes made in the coal grates of the gas producers. The San Coulee coal is not what its name suggests. It is used all over the Great Northern Railroad system, and recent tests at Anaconda, made by the railroad company, have shown that it compared favorably with Rock Spring coal in the production of gas for copper smelting. With this coal the eight furnaces will in time be producing matte in larger quantity than is now produced at Butte. Moreover, a traveling electric plane picks up the hot liquid copper matte and pours it into a tilting converter, similar to a Bessemer steel converter, where for about an hour a charge of cold air is blown through it at a pressure of 16 lbs. to the square inch, the oxygen, uniting with the sulphur and iron, makes a still hotter fire than that of the furnaces, and smelts the matte down to pig copper 97 to 98% fine. The electrolytic works will eventually add another process, and make electrolytic copper, which is worth 2c. per lb. more than copper in the matte, and do it at practically no cost, because the silver, 30 to 35 oz. to the ton, which the electrolytic process saves from the copper, will more than pay the cost of the electrolytic treatment. It seems pertinent to summarize all these details by saying that the future of the company is in its mines and the market for copper, and not in the Great Falls smelter, which promises from its present work to do all that was claimed for it when it was planned—save at least more than 1 cent per pound in an output of 30,000,000 pounds copper per annum.

NEVADA.

Elko County.

Belle Isle Mining Company.—At the annual meeting of this company 55,997 shares were represented and the following officers elected: E. Scott, president; F. A. Berlin, vice-president, and M. A. Jackson, T. J. Shackelford and J. W. Pew, directors. J. W. Pew was re-elected secretary, and his financial statement showed an overdraft of \$8,741.59. During the year 149 tons of ore have been sent to the mill, of an average assay value of \$204.83.

Commowwealth Mining Company.—Second level, east drift from No. 3 chute advanced 23 ft., total 93 ft., in low grade vein matter. Third level, south drift from No. 1 chute in 72 ft., giving low assays. West drift from same point is in 42 ft., also in low grade ore. Hoisted three tons first class ore, assay \$230 per ton, and 40 cars second class, car sample \$26 per ton.

Following are the latest official weekly letters from the superintendents of the various Tuscarora mines:

Belle Isle Mining Company.—North drift, 250-ft. level, extended 5 ft., the face is still looking very well. Stopes near the upraise, same level, are now breaking into the ore.

Nevada Queen Mining Company.—Second level, east line stope, advanced 14 ft., total 156 ft. in vein formation giving low assays. North intermediate drift from No. 6 chute extended 22 ft., total 138 ft., exposing seam of good ore. Stopes east of No. 3, east crosscut, have seams of good ore. Produced 4 tons first-class ore, assaying \$260 per ton, and 48 tons of second class, assay \$26 per ton.

North Belle Isle Mining Company.—North drift, south 300-ft. level, extended 5 ft., the ore continues high grade. Have started a stope from No. 1 raise on the south 400 No. 3, which is showing some fine ore.

Esmeralda County.

Mount Diablo Mining Company.—A shipment of 5,716 oz. of fine hullion has been received at the company's office in San Francisco.

Lyon County.

Carson River Placer Mining and Dredging Company.—Mr. J. H. Rae, Jr., superintendent of this company, says the Dayton "Times," has received advices from the East to make preparations for building a new boat for dredging purposes, and he will probably leave in a short time to procure material in Sacramento or San Francisco for this work. It is understood that the company will put on a large clam shell dredge this time, capable of 1,200 tons of material a day. The amalgamator now on hand will be used in connection with revolving screens and concentrators, and nearly an entirely new plant will be put in.

Storey County.—Comstock Lode.

Belcher Mining Company.—The latest official weekly letter says: "The raise from the north drift on the 400-ft. level has been advanced on the slope to and connected with the 300-ft. level south stope. From this inclined raise at a point about 50 ft. below the 300-ft. level, a vertical raise has been started, and is now about 21 ft. It has cut a width of 3 ft. of white quartz pitching about 45° west, which yields assays of from \$5 to \$25 per ton. The top of the raise has reached a smooth clay, with a slight pitch to the northwest, which it is believed is the same clay which formed the footwall of the pay exposed higher up. Repairs on the 200 and 300 ft. levels are still under way."

Overman Mining Company.—The latest official weekly letter says: "On the 1,300 level the lateral drift to northward, from a point 600 ft. in on north-west drift, has been extended 22 ft.; total length, 68 ft.; formation, porphyry, clay and quartz. The quartz assays \$6 to \$8.50 per ton. The 600 west crosscut No. 1 has been extended 17 ft."

Savage Mining Company.—The latest official weekly letter says: The usual prospecting and repair work is being carried on throughout the mine. The joint north drift with the Gould & Curry Company on the Suro tunnel level has been advanced 28 ft. since last report.

Following is the official report of the pumping operations in the Crown Point incline for the week ended September 24th: The 1,700-station pumps have been working continuously during the week, and the quantity of water handled daily is the same as at last report. During the past week we have been cleaning out and timbering the drain tunnel. The tunnel is still extremely hot, but we think that better ventilation will be received in a few days.

Hale & Norcross Mining Company.—The two west crosscuts started on the 1,800 level of this company's mine are respectively 50 and 140 ft. north of the incline station. It will be several days before they are in far enough to cut the vein. In both crosscuts, however, favorable material is being encountered.

(From our Special Correspondent.)

The following is the weekly statement of ore hoisted from Comstock mines and milled, with the car and battery assays, the hullion shipments, etc.:

Mine.	Tons hoisted.	Car sample assay.	Tons milled.	Average battery assay.	Hullion product, week.	Hullion shipped.
Con., Cal. & Va.	992 26.78	980 24.01	.....	.....	133,419.89	.....
Occidental	170	170 18.00	.....	.....	.....	.....
Potosi	464 23.67	465 20.03	.....	.....	420% B	.....
Silver Hill	2364 24.56	202 23.08	.....	.....	.....	.....
Savage	3559 26.24	525 20.76	.....	.....	7,592.55	443B

¹ Making to date on September account \$46,522.20.
² Cars.

Consolidated California & Virginia Mining Company.—Work of a most interesting character is about to be commenced in the mine belonging to this company. It is reported, on creditable authority, that all the preparatory arrangements have been made to take out ore from the west ledge in West Consolidated Virginia through the 1,700-ft. level. It will be remembered that a year ago considerable ore was taken out from West Consolidated Virginia ground, and the latter company tried to enjoin the Consolidated California & Virginia Company from pursuing this scheme. In order that the matter might be

definitely settled an application was made to the courts in Nevada to grant a survey of the Consolidated California & Virginia and West Consolidated Virginia ground. Judge Rising, before whom the application was made, held that he had no jurisdiction until a suit was instituted. It was not really expected that the Judge would grant the prayer of the applicant company if he could find a loop hole whereby, through a legal technicality, he might evade complying with a request. For years he has been practically on the pay roll of Messrs. Jones, Hayward & Co. The statute especially provides that in the event of any dispute arising between owners of adjoining properties either party may, by depositing the cost of survey, make application to the court, and have such application granted. The law last year was deliberately put aside by Judge Rising. Now, however, so soon as the Consolidated California & Virginia Company commences to extract ore through the 1,700 level from the west ledge, the West Consolidated Virginia Company propose to at once seek relief by applying to the Superior Court of California. In such event it is almost certain that the application for survey would be granted and the Consolidated California & Virginia Company enjoined from taking any more out pending the survey.

Hale & Norcross Mining Company.—Next week a decision will be rendered by Judge Hebard on the motion for a new trial by the defendants in the suit of M. W. Fox vs. the Hale & Norcross Company. When the motion is dismissed, and it is reasonably certain that it will be, five days are allowed by law to the defendants to file their bond pending an appeal to the Supreme Court of the State. The four chief conspirators will be required to file bonds of over \$2,000,000 each. Although the men concerned are wealthy, as they certainly should be, it will be a tax on their resources to get bondsmen in these large sums. The practical locking up of large capital pending an appeal—which cannot be heard for probably two years—is a serious matter to a money maker. And then it is to be remembered that the judgment carries interest from the day the decision was rendered, or, roughly speaking, about \$5,000 per month. Already \$24,000 has accumulated in this way.

When the motion for a new trial is dismissed, and the defendants have filed bonds, the parties in interest will apply to the court that a competent expert be appointed to proceed to the Comstock to exhaustively examine the mine and report upon its actual worth. If such an expert is appointed his report will be of great interest, for as things are at present Comstock shareholders know absolutely nothing regarding the outlook in the several ore producing mines on the lode.

Silver Hill Mining Company.—The ore being taken out is mainly from the 200 and 300 levels. There has been stored, in all, about 2,000 tons of ore, the battery assays of which show a heavy percentage of gold, viz., \$15.31 gold, \$7.71 silver. With the ore saved and that in sight the company ought to net not far from \$80,000. How much of this will reach the stockholders, seeing that the mine is controlled by the Jones combination? Between the 200 and 400 levels there is a good vein of ore, the character of which indicates that it is an extension of the old Woodville vein. The title to the Woodville was bought out by the Justice company.

Sierra Nevada Mining Company.—The work of enlarging the Cedar Hill drift has been continued up to the vein, and some pay ore has been taken out. The face of the drift shows from 3 to 4 ft. of quartz, assaying from \$18 to \$22 per ton. An intermediate tunnel midway between the Kenosha tunnel and the Cedar Hill drift has been commenced.

NEW MEXICO.

Grant County.

A mill run of 80 tons of ore belonging to the Patterson estate has been finished at Gold Hill. According to the Silver City correspondent of the New York "Sun," the ore yielded 59.7 oz. of gold and about 7 tons of concentrates. The run was satisfactory, and it is believed that work will be resumed in the mine. The standard company which owns nine claims in the camp has done considerable development work on two of its claims and is keeping a five-stamp mill running on good ore. The company's Reservation mine has been a producer for about a year and a half, and enough work has been done on the Standard mine to show that it can be operated at a profit. A body of ore has been exposed in this mine which samples \$60 per ton.

Two hars of hullion were shipped from the Bremen mill at Silver City last week, and the mill is doing good work, says the New York "Sun." It is the only mill now running there, and there is little prospect that any of the others will be started up again this year. Shipments of hullion from the gold camps have been increasing for the past two or three months, but they are much smaller than they were at this time last year. Last year Pinos Altos was the largest gold-producing camp in the territory, but the production of the mines there this year will not be more than one-third as large as it was last year. The mines at Silver Creek have been closed down a considerable portion of the year, but some of the larger ones are now in operation. The ores mined in this district contain both gold and silver, and the low price of silver has reduced the margin of profit so that there is no profit in operating except on a large scale. The only gold camps in southern New Mexico which are producing more hullion this

year than they did last year are Gold Hill and Hillsborough. Both camps were small producers last year, but Hillsborough is now producing about as much gold as Pinos Altos. The Gold Hill mines are steadily increasing in production, and the camp promises to become one of the most important gold camps in New Mexico.

Mimbres Consolidated Mining Company.—This company has just made a shipment of 1,015 lbs. of silver bullion to New York. This is the last shipment which will be made by the company until the price of silver improves. According to the Silver City "Sentinel," the mill on the Mimbres River has been closed down, and will not be started up again until the conditions are such that it can be operated at a profit. Before this shipment of bullion was made the expenses of the company were about \$56,000 more than the receipts for the past two years. This shipment will reduce the amount to about \$40,000, which is the net loss to the company in operating the property in the last two years. The company has reduced the force of miners employed at the mines to 17 men.

Manhattan Gold Mining & Milling Company.—According to the Silver City correspondent of the New York "Sun," the Montana tunnel, which is being driven by this company at Pinos Altos to the main vein on its property, is now in over 450 ft., and is being driven at the rate of a little over a foot a day. The tunnel had been driven about 400 ft. by the Aztec Gold Mining Company before the reorganization was effected by which the name of the company was changed and the stock made assessable. Three assessments of half a cent a share have been levied, and several more will have to be made before the tunnel can be completed. The company owns ten quartz mines and one placer mine in the Pinos Altos district, and the best veins in the camp run through these mines.

NORTH CAROLINA.

Mecklenburg County.

Chinquelin Gold Mining Company.—It is reported that this company will add stamps and a chlorination works to its plant.

PENNSYLVANIA.

COAL.

It is reported that the Central Railroad of New Jersey has contracted with the Pennsylvania Railroad Company to deliver 1,000,000 tons of coal per annum to the latter's road at Phillipsburg. It is also rumored that the Pennsylvania Railroad will make strenuous efforts to increase its output of anthracite. Plans are being carried out which will push work at all the collieries along the line of this system, and result in a heavy increase in the output, which in 1893 is expected to be double that of the present year. Pennsylvania Railway officials say there are just now 150 cars of coal a day passing through Pottsville from Philadelphia, all of which come from upper Lehigh and Wilkes Barre region on the joint Pennsylvania-Lehigh line, which is billed through from the collieries, and not subject to transfer conditions. The Pennsylvania owns the sidings into mines making such shipments.

Bolivar Coal and Coke Company.—This company, whose plant of 53 ovens is located at Lockport, Pa., recently reorganized, and the management was transferred to the Western stockholders. Major C. H. Tebbetts, of Pittsburg, was elected president; Howard Tebbetts, secretary and treasurer, and Nathaniel Miles, late of the Charlotte Furnace Company, general manager. The company owns about 600 acres of land underlain with a 6 ft. vein of coal, under which is another vein of 5 ft.

Delaware & Hudson Canal Company.—This company is making the necessary preparations for sinking a shaft between Broadway and Ridge Row in Plymouth township, says the Scranton "Tribune." Everything is staked out, and the machinery is put on the ground as fast as possible. The shaft will be large enough for four hoisting shafts, pump shaft and air shaft, and will be sunk to the big vein. This shaft, when completed, will do away with No. 5 altogether.

Lehigh & Wilkesbarre Coal Company.—This company's collieries at Honey Brook, Audenreid, Trescow, Beaver Meadow, and many of them in and about Wilkesbarre, are working on full time.

Lehigh & Wilkes Barre Coal Company.—A bill in equity has been filed against this company by Judge Garrick M. Harding, Charles P. Bennett, Fred Bennett and Helen B. Millard, heirs of Ahle Bennett, deceased. The bill is to prevent the company from using the surface land at the South Wilkes Barre shaft for mining other coal than that under the 168 acres leased from the complainants by the company.

Philadelphia & Reading Coal and Iron Company.—The following statement in the Shenandoah "Herald" shows the collieries in the Schuylkill region drawn to return prices of coal sold in September, 1892, to determine the rate of wages to be paid: Ashland colliery, \$2.47; Merriam, \$2.667; North Mahoney, \$2.718; Preston No. 3, \$2.806; Oak Hill, \$2.767. The average of these rates being \$2.6856, and the rate of wages to be paid for work for last two weeks of September and the first two weeks of October, 1892, is above the \$2.50 basis.

The Schuylkill Coal Exchange has issued a report dated Pottsville, September 30th, which shows the following collieries drawn to return the prices of coal sold in September, 1892, to determine the rate

of wages to be paid, make the following returns: P. & R. C. & I. Company North Ashland Colliery, \$2.47; Merriam Colliery, \$2.66; North Mahoney Colliery, \$2.71; Preston No. 3 Colliery, \$2.80; Leisenring & Co. Oak Hill Colliery, \$2.76. The average of these prices is \$2.68, and the rate of wages to be paid for last two weeks of September, and the first two weeks of October, 1892, is 6% above the \$2.50 basis.

SOUTH DAKOTA.

Lawrence County.

Beaver.—Thomas H. White, on behalf of the English syndicate, of which he is general manager, has taken up the bond on the Beaver fraction, paying therefor \$5,000, says the Deadwood Daily Pioneer. The syndicate has still a large number of claims bonded, and is taking them up as rapidly as the options mature. It has already expended over \$300,000 in the purchase of ground. The hoist recently erected on the Homestake group, belonging to this company, will start up inside of a week.

Caledonia Mining Company.—For the fiscal year ended April 30, 1892, this company mined 98,940 tons of ore, yielding a net sum of \$193,441.28 or \$1.97 per ton. Recently, however, at a depth of 500 ft. a shoot of ore has been found yielding \$5.50 per ton. It is estimated two years' workings of ore in sight. At the opening of the last fiscal year the cash balance on hand was \$38,559.73—at the opening of the new year the amount was reduced to \$7,034.91, made up apparently, however, of supplies on hand mainly, valued at \$7,011.32.

Minerva.—The owners are still pumping water from the lower levels. A large quantity broken and ready to be sent to the mill is yet covered by the water.

Pennington County.

Welcome Chlorination Works.—This plant has been closed down for about ten days, in order to give an opportunity to reline the present roasters with firebrick, and to put in position the machinery for the two new roasters which are expected daily. When the plant starts up again it will have a largely increased capacity and will give employment to an increased force of men.

TENNESSEE.

Southern Iron Company.—This company has guaranteed to build two new blast furnaces if the Nashville, Chattanooga & St. Louis Railroad Company will purchase and run the Centreville Railroad running from Dickson to Lewis. This the directors have agreed to do.

Pickett County.

Cumberland Oil Company.—This company, while drilling recently on Franklin Creek, near Byrdstown, struck natural gas with an estimated capacity of 1,000,000 cu. ft. per day. The company also struck a small quantity of oil with the gas.

UTAH.

Juab County.

It is reported that the Mammoth Mining Company is associated with Hyde & Beck in the purchase of Rockland Springs, and that one-half the water will be used at Mammoth to operate a cyanide plant. The remaining water is to be used at the Bullion-Beck mine for a similar purpose.

Salt Lake County.

Bingham.—Shipments from the mines of this district are being made with considerable regularity. The Rough and Ready mine recently shipped 3 carloads of concentrates. The Lucky Boy and Hoogly also made shipments during the last week. At the Monitor mine a large amount of ore is being taken out and placed on the dump. It is reported that the owners will put up a plant on the McArthur-Forrest process. The new tunnel on the Lakeview property is progressing rapidly; it is now in 60 ft.

Leona.—The tunnel being driven on this lode, in Dixon Gulch, is in 150 ft. and is being pushed vigorously. The operators expect to tap the ore chute exposed in the shaft by driving 25 ft. further, when they will begin taking out ore for shipment.

Sampson Mining Company.—Martin K. Harkness and W. M. Nesbit, arbitrators in the case of the Sampson Mining Company vs. the Yosemite Mining Company (No. 2), have filed their finding in the Third District Court. They find that the Yosemite No. 2 vein crosses and departs from the easterly side line of the said Yosemite No. 2 mining claim at a point on said easterly side line from which the post at the northeasterly (variation 17 degrees east) corner of said Yosemite claim bears north 7 degrees, east 245 1/2 ft. distant as officially surveyed for United States patent. This point is indicated and marked by a pine post about 4 x 4 in. and about 4 ft. long, and set firmly in the ground with the names of M. K. Harkness and W. M. Nesbit, arbitrators, and Richard H. Brown, surveyor, written thereon in pencil, with a statement thereon that said vein crosses and departs from said side line at that point.

Summit County.

Montreal.—It is reported that work on this mine will be resumed shortly.

Northland.—Connection has been made with the upraise by the winze sunk from the porphyry dike. It is the intention to continue the upraise to the surface.

Yankee Girl.—A whim has been put up and the shaft will be continued 200 ft. more.

Utah County.

Saltana Smelter.—This smelter was burned to the ground on Sept. 24th. It was owned by the Miller Mining Company, and was said to have cost \$80,000.

VIRGINIA.

Powhatan County.

James River Coal Company.—This company has been organized and the following officers elected: President, Wm. O. Neil, Pittston, Pa.; vice president, John Haston, Pittston; treasurer, S. P. Clay, Richmond; secretary, L. A. Gahanyi. This company is working the coal fields in Powhatan County, which some time ago were leased by Mr. Gabanyi and comprise 2,700 acres. So far 3 seams of coal, 12, 8, and 4 ft thick, respectively, have been found. The company is sinking now a new shaft, which will be finished within 6 weeks, and will then be ready to ship 100 tons per day. The machinery at the mines has a capacity for an output of 250 tons per day.

Roanoke County.

Salem Iron Company.—One thousand tons of iron have recently been shipped north from the Salem furnace. It is thought the furnace will soon have to shut down for repairs, as it has been in continuous blast for a year. The directors of the furnace have concluded to abandon the working of the Bott mines, as the ore from there only runs from 32 to 38%. In future they will purchase all their ore, and have been offered some rich ore from off the Lynchburg & Durham road for \$3 per ton delivered. As to the vein on Twelve o'clock Knob, recently opened by Dr. Pitzer, it was found that the ore was in pockets, and not in sufficient quantities to work properly.

WASHINGTON.

Mineral County.

Davis & Elkins Coal Company.—This company is now operating its Big Vein mines on the West Virginia Central Railroad, seven miles from Piedmont, nearly full time, employing 80 or 90 men. The opening into the old pillars of the old Virginia mine has been finished, and all the coal is now coming from the new openings farther around the mountain. Another opening into the coal is being made about 150 yards further out. The hull wheel of the rope haulage plant will be extended to it. When this opening is made more room will be made as fast as possible for their men.

Okanogan County.

Ruby.—This mine, located on Ruby Hill, made a fortunate strike showing native silver while working their tunnel, and the body of ore has the appearance of being quite extensive. While working at a depth of some 60 ft. and some 200 ft. from the mouth of the tunnel, a vein of ore some 12 ft. thick was struck—some 8 ft. of it is average ore and the balance is mixed with high grade sulphides and native silver. The owners, Jonathan Bourne, Jr., Thomas Donan and William Mellican, are very jubilant over their rich find.

(From our Special Correspondent.)

Washington Reduction Company.—Conconully.—This company has just completed and started up their new mill, which has a capacity of 60 tons per day. This company is composed mostly of San Francisco and Portland capitalists. The officers are: President, D. P. Thompson; Vice-President, Mr. Holman; Secretary, Jonathan Bourne, and the directors and principal stockholders are B. J. and J. Jefferies, Preston Smith, W. K. Smith, Woodward & Son, C. P. Knowles and I. Wagoner. Mr. Wagoner is in charge of the company's works. They have a paid up capital of \$100,000. A contract has been made with the Arlington mine to furnish them with ten tons of ore per day for three years, and the First Thought mine has a contract to furnish 20 tons per day for the same length of time. They expect to buy one of the neighboring mines and fill up the capacity of the mill. The ore is mostly free milling. The concentrator, however, will run about ten tons per day. Late developments of some of the mines show that all of their gold ores are not free milling.

Stevens County.

(From our Special Correspondent.)

Bonanza.—Work has been suspended for the balance of the season on the Bonanza, and will probably be commenced again next spring.

Dead Medicine.—The buildings are nearly completed for the reception of the 25-ton concentrator now on the way to this mine from Chicago. They have already sufficient ore on the dump to keep their concentrator busy all winter. Development work, however, will be continued during the winter.

WEST VIRGINIA.

Barbour County.

Belington Coal and Coke Company.—This company has sunk a slope to the coal seam; 20 new coke ovens have been completed and will be fired in a short time.

Marion County.

Considerable activity prevails in the coal fields near Farmington. A local firm has recently purchased about 1,000 acres, and is shaping up a field which will embrace about 3,000 acres. The coal at this point has been tested by the Pittsburg Gas Coal and Coke Company, and is found at a depth of 240 ft. from the railroad. The product is said to be first class in every respect. The vein is 10 ft. thick, with good covering. The superiority of the vein for cooking and fuel, and the practicability of opening it at that depth on a railroad already constructed, makes this a very desirable field.

WYOMING.

Natrona County.

From an Occasional Correspondent.

Eadsville. — Casper Mountain asbestos producing ground, on Casper Mountain, covers an area of three miles long and two and one-half miles wide. The greater portion of this has been more or less prospected and found to contain a good quality of asbestos. While the fiber is not as fine as the Canadian, yet it is much stronger and of greater length. The veins of asbestos occur in serpentine dikes. The veins are from six inches to six feet in width. Eight claims have been sold to a Pittsburg firm. Prices range from \$500 to \$4,000 apiece. This camp is only twelve miles from the railroad, with which it is connected by good wagon roads. It also has plenty of timber and water. There are also good copper and galena ores found in the limestone and sandstone range close by. This limestone and sandstone formation is some 25 miles long and from 10 to 12 miles wide, with belts of granite and quartzite running through it. Some very fine prospects of grey copper and black oxide of copper have been found, also a good quality of galena assaying from 10 to 55 oz. in silver and from 25% to 73% lead.

FOREIGN MINING NEWS.

GREAT BRITAIN.

A company has been started to work the deposits of Fuller's earth in Bedfordshire. This deposit is very extensive and easily mined, and, as it contains no grits or sand particles, no washing or refining is required. Besides the use of Fuller's earth in cleansing textile fabrics, there is a large demand for it in the United States and elsewhere for use in the refining of fats and oils.

INDIA.

The Indian Government has decided to grant a five years' concession to the syndicate formed by Captain Monsell, of Penang, and the Chinese capitalist Ah Kur, for the exploitation of the Mergin tin deposits. They will be allowed to work over 1,400 square miles, and will pay a royalty of 5 per cent of all the metallic tin produced.

MEXICO.

Batopilas Mining Co. — This company reports for the period, November 1st, 1891, to July 1st, 1892, a product of 331,191 pounds first class; 1,761,875 pounds second class, and 1,617,243 pounds third class ore, yielding total product, \$337,636. Expenditures — Mine expense, \$58,035; reduction works, \$59,198; store room, fuel, etc., \$12,732; construction, \$171,331 — \$301,516; balance, \$86,120. The openings made in the period were 6,486 ft. The tunnel is now in 2,500 ft., leaving 115 ft. to be completed, beside 54 ft. in the air shaft, before a junction can be made. This should be made in November or December. The tunnel has cut several ore veins, but none have been worked. It is hoped that the San Antonio aqueduct may be finished in 1892. In conclusion, General Manager Alexander R. Shepherd says:

"During the past eight months the debt of the company has been reduced about \$100,000, and the assets largely increased. The exorbitant rate of interest paid for money used in improvements here, 12, 15 and 18% per annum, and the fearful rate of exchange from 30 to 48%, have been a heavy burden, and few properties could have borne it. The total amount of silver produced since commencing here has approximated over \$7,000,000 while the working capital did not exceed \$375,000, and bonds sold aggregate but \$450,000, most of which was applied to old debts. The lack of means for improvements has doubled the cost of them. But without them the property would have no future, and therefore they have been made. As it is, with the hoists completed for deep workings and the aqueduct completed for power, I think our yield even next year should be increased very largely. Should silver have fair treatment and not be made a commodity, we may hope for a growing improvement, and ere long a prosperous condition of affairs for this business."

Durango.

Candelaria Mining Company. — A bullion shipment valued at \$52,415.28 has been received at San Francisco from this company's mines.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 358 and 360.]

NEW YORK, Friday Evening, Oct. 7.

The momentary burst of activity in the mining market with which we were surprised a fortnight ago has subsided and the trading during the past week has been as featureless as the old time dullness. The San Francisco market, from all reports, is still fairly active and the Comstocks hold their price somewhat better than many anticipated.

During the week there were sales of 4,000 Comstock Tunnel bonds at 18 and 19; the common stock was in fair demand, sales of 3,700 shares being reported at 13@15c. The third annual report of the Comstock Tunnel Company for the fiscal year end-

ing August 31st last, has just been issued. An extended notice of it will appear in our next week's issue. Of Consolidated California & Virginia 200 shares changed hands at \$4.10@4.35. An equal number of shares of Hale & Norcross were sold; the price of this stock declined from \$3.15 to \$2.30. Other sales of Comstock shares were as follows: 100 Savage at \$2; 100 Sierra Nevada at \$2.40; 300 Yellow Jacket at \$1.20@1.25; 200 Bullion at 85c. and 200 Exchequer at 55c.

No sales of Tuscarora stocks are reported this week.

Of the California stocks we note sales of 500 shares of Bodie Consolidated at 35 to 55c., the lower quotation occurring at the close. There was a sale of 100 shares of Standard Consolidated at \$1.30; the shipments from this mine for September amounted to \$20,300; the expenses for the same period were \$13,000, leaving a clear profit for the month of \$7,300. No dividend will be paid by the company for this quarter, the directors having decided upon this step in view of the great outlay necessitated by the installation of an electric plant at the property. The mine is looking well.

Brunswick Consolidated was in good demand during the past week, 5,600 shares being sold at 7@9c. The superintendent of this company's property, writing under date of the 28th ult. says: "Since my last report the mine has improved both in the quality of ore and in the quantity coming in. The average width of the ledge in the drifts is 1 1/2 ft. that assays from \$10 to \$50. The ore in the bottom of the shaft shows good assays. I have stopped sinking for the present to put in a tank for holding all the coming water down to the 600 ft. level. I will also push both drifts 100-ft. each. The faces of both at the present time are in good milling ore. The total depth of the shaft is now 625 ft. Total length of East drift 58 1/2 ft; west drift 68 ft."

Of the Colorado stocks Leadville was the most active, although at the close the stock was rather quiet. Reported sales amounted to 2,800 shares, and the price declined from 18c. to 16c. Last week's "boom" having been cut off in its very incipency it is probable that Leadville will suffer, in common with the other stocks. Of Robinson Consolidated 300 shares changed hands at 30c. Sales of Chrysolite aggregated 500 shares at 17c. to 20c.

Of the Black Hills shares Caledonia shows sales of 200 shares at 98c.; and Deadwood Terra of 350 shares at \$2@2.15.

There was a solitary sale of 100 shares Alice at 60c.

Horn Silver was quiet during the week; a single transaction of 100 shares at \$3.40 is reported. The annual meeting of the Horn Silver Mining Company was held in Frisco, Utah, on the 4th inst. The old Board of Directors was re-elected. The production of the mine remains about the same and better prices have been obtained for the ore. Of Phoenix of Arizona, 500 shares were sold at 50c.

BOSTON.

Oct. 6.

(From our Special Correspondent.)

The advance in ingot copper has developed quite an active demand for copper stocks the past few days and prices show a handsome advance throughout the whole list. The Montana stocks, as usual, have led in the advance and it is current gossip that there is a large short interest in them, especially in Boston & Montana, which is in demand for delivery. There was quite a lively rush to cover yesterday and to-day, carrying the price up from \$30 3/4 to 34; at this figure a good deal of stock was encountered and a decline naturally followed. The transactions in this stock the past week aggregate over 9,000 shares.

In Butte & Boston there has been but little doing and the advance from \$8 3/4 to \$9 1/2 was due to buying on orders for investment. The good reports from Centennial have caused quite an active demand for this stock, and its friends are confidently predicting much higher prices for it on its merits. The stock closed last week at \$6 1/2 to \$7. Orders to purchase could not be filled at those figures and the price rapidly advanced, touching \$11 to-day, the highest price since June last. Subsequently a reaction set in which carried it back to \$9 1/2, leaving a net gain of \$2 1/2 over the closing of last week. Osceola also advanced from \$30 to \$34 on the improved prospects of the mine, and its friends claim that with the advance in ingot copper to 12 cts., it can pay dividends of \$4 and upward per annum, and ought to sell at \$40 per share. The stock held quite firm, only going off 50 cts. per share on the reaction. There was only one reported sale of Calumet & Hecla for the week and that was to-day at \$285 for 48 shares, a gain of \$8.

Tamarack shared in the general improvement and sold at \$159 against \$150 last week.

Tamarack, Jr., also found purchasers at \$24, a gain of \$6 for the week.

Franklin was in demand to-day and advanced from \$12 to \$13 1/2 on limited transactions.

Kearsarge, in a quiet way, sold up to \$12 1/4, a gain of \$1 1/2.

Atlantic also gained from \$9 1/4 to \$11 on sale of 100 shares only.

Arnold sold at \$1 1/2, and Allouez at 90 cts., a slight advance over previous sales.

At the National mine a large mass of copper has recently been encountered and it looks as if it might again become a producer. The stock is strongly held, being very seldom offered on the market. One dollar was bid for it to-day and \$2 asked.

Wolverine sold at \$2 and \$2 1/4, and Santa Fe at 10 and 11 cts.

3 P. M. — After the noon hour prices were a little inclined to a lower level, but without any material decline except in Centennial, which was unduly inflated and the desire to realize brought out more stock than the market was prepared to take, resulting in a decline from \$11 to \$9 1/2, the lowest point for the day.

San Francisco.

Sept. 30.

The inflated value of stocks, which continued to be fairly well sustained during the early portion of the current week, has gradually given way to steadier prices and a less active market. The causes for this appear, however, only to be of a temporary nature and there is every indication of another rally in mining stocks in the near future. Belcher, that led in the recent advance, is just at present in an uncertain condition. If the ore body as it is advanced upon is found compact, then a bound forward in the price of the stock will follow. Private advices are to the effect, however, that the vein has split; hence the heavy drop in the value of the stock from \$6.75 to \$3.90 on Thursday morning. In addition, it is reported that some difficulty is being experienced in handling the water. Still another and perhaps a more potent reason for the heavy decline in this and other stocks is found in the fact that so far in the present "deal" the stock has not been passing into the hands of people pleasing to the manipulators. The "chippers," "mud hens" and "gutter snipes" have been content to snatch a small profit and not await prices to touch fancy figures; the insiders were not willing to take the stocks back at the enhanced values, consequently the bottom dropped out of the little boom for the present. But only for a time. Assessments have to be levied and it is essential that the stocks should be unloaded upon substantial men: men who will pay up and look pleasant, and furthermore it is very necessary for the insiders to have a fund on hand just now in readiness for the (Nevada) elections in November. For these two important reasons it is certain that the mining stock market will not cease moving for a little time yet.

This morning Consolidated California & Virginia opened at \$4.40, advanced 10 cents, and during the afternoon declined to \$4, closing steady at that figure. Mexican opened at \$2.40 and closed at \$2.20; Ophir ruled at \$3.20, Sierra Nevada at \$2.40, Utah at 45 cents and Union Consolidated at \$1.65.

It is extremely probable that certain of the middle groups of Comstocks will be the bait held out for the Pine Street gurglers to snap at a week or so hence. In Hale & Norcross and Savage the public have been taken into the confidence of the managements, so far as known, work of interest and importance is being carried on. When the time is ripe it is within the power of the insiders to advance prices to a sufficiently high figure to carry the entire lode several notches in advance of present rulings. To-day Hale & Norcross sold for \$3.30 on early call, and in the afternoon session it advanced to \$3.75 under the sale of nearly 4,000 shares. Savage advanced 30c. during the day, selling to \$2.65 with fair sales. Best & Belcher ruled at \$3; Chollar at \$1.50; Potosi at \$1.25, and Gould & Curry at \$2. The entire line of middle stocks were stronger in the afternoon, shading off somewhat at the close.

The South End and Gold Hill Stocks have not been largely dealt in this week, and, in common with the other Comstocks, have weakened considerably. Belcher, of course, continued to be an exception. It opened at \$3.85, a decline of \$1.90 on the week's trading, and sold to \$3.90 in the Pacific Board during the afternoon, closing at \$3.40. In the several sessions 5,000 shares changed hands. Alpha sold for 35c.; Alta, 45c.; Bullion, 75c.; Challenge, \$1.00; Con. New York, 35c.; Confidence, \$2.20; Crown Point, \$1.40; Exchequer, 30c.; Justice, 30c.; Lady Washington, 15c.; Occidental, 45c.; Overman, \$1.10; Lady Belcher, 75c.; Silver Hill, 20c., and Yellow Jacket, \$1.25.

The outside stocks have remained much the same as during the past few weeks. In the Bodie groups Bulwer Consolidated has sold for 35c., Mono for 20c. The only Tuscarora stocks quoted to-day were Belle Isle at 15c. and Nevada Queen at 15c. North Belle Isle and North Commonwealth were held for 10c., no buyers, and Navajo for 15c.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'Inq't in office.	Day of sale.	Amt per share.
Alpha, Con., Nev...	9	Sept. 2	Oct. 6	Oct. 27	.10
Belle Isle, Nev....	15	Aug. 22	Sept. 26	Oct. 20	.10
Best & Belcher, Nev.	62	Aug. 17	Sept. 22	Oct. 13	.25
Brunswick Con., Cal	4	Sept. 29	Oct. 31	Nov. 17	.02
Challenge Con., Nev.	12	Aug. 24	Sept. 27	Oct. 18	.10
C'm'n'we'lth Con., Nev.....	9	Sept. 7	Oct. 13	Nov. 9	.10
Crocker, Nev.....	12	.....	Sept. 2	Oct. 18	.05
Crown Point, Nev...	58	Sept. 15	Oct. 20	Nov. 10	.25
Derbec BlueGravel, Cal.....	10	Sept. 14	Oct. 17	Nov. 7	.10
Eureka Con. D., Cal	5	Sept. 19	Oct. 24	Nov. 14	.07
Independence, Nev.	17	Aug. 15	Sept. 29	Oct. 13	.05
Jack Rabbit, Cal....	1	Sept. 17	Oct. 19	Nov. 8	.05
Keystone, Cal.....	3	Aug. 22	Sept. 26	Oct. 18	1.00
Navajo, Nev.....	22	Aug. 17	Sept. 21	Oct. 14	.10
North Belle Isle, Nev	2	Sept. 11	Oct. 6	Nov. 7	.10
Northwestern, B. C.	5	Aug. 27	Oct. 24	Nov. 19	.20
Silver King, Ariz...	8	Aug. 6	Oct. 7	Nov. 4	.25
South Eureka, Cal.	1	Sept. 10	Oct. 12	Nov. 1	.01
Yellow Jacket, Nev.	52	Sept. 6	Oct. 7	Nov. 10	.25

MEETINGS.

Eureka Consolidated Mining Company, at the office of the Company, room 10, No. 216 Bush street, San Francisco, Cal., Oct. 17th, at 11 a. m.
Idlewild Gold Mining Co., at the office of the Company, room 4, No. 306 Pine street, San Francisco, Cal., Oct. 12th, at 4 p. m.

METAL MARKET.

NEW YORK, Friday Evening, Oct. 7, 1892.
Prices of Silver Per Ounce Troy.

Oct.	Sterling Exch. & c.	London, Pence.	N. Y. Cents.	Value of sil. in \$1.	Oct.	Sterling Exch. & c.	London, Pence.	N. Y. Cents.	Value of sil. in \$1.
1	4'86½	38½	83	643	5	4'86½	38½	83½	646
3	4'86½	38½	83	643	6	4'86½	38½	83½	647
4	4'86½	38½	83½	644	7	4'86½	38½	84	650

Silver has shown a disposition to advance, owing to the rumor that the coming silver conference will make some suggestions calculated to improve the commercial standing of silver, as, for instance, the curtailment of the sales of India Council bills. Shipments from New York to London have been light.

The United States Assay Office at New York reports the total receipts of silver for the week to be 151,000 ounces.

The International Silver Conference is to meet in Brussels on the 22d of November.

There were sold during the week ending Friday, October 8th, 668,000 ounces in silver bullion certificates, at from 85 to 83½ cents per ounce.

Gold and Silver Exports and Imports at New York for Week Ending October 1st, 1892, and for Years from January 1st, 1892, 1891.

Week...	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1892.....	\$28,940	\$7,233	\$307,750	\$125,776	\$2,368,1
1891.....	58,727,589	6,551,514	16,637,391	1,987,745	66,825,674
1890.....	70,218,910	10,815,408	13,555,639	1,572,498	76,386,803

During the week ending October 8th the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$36,000; silver, \$172,250. Imports, gold, \$459,545; silver, \$147,359. The gold exported went to Venezuela, the silver to London.

NOTES OF THE WEEK.

A peculiar feature of our importations of the precious metals at present is that most of the silver imported consists of foreign coin. Out of the \$125,776 imported during the week ending October 1st, but \$90 was American silver. During the present week the importations of foreign silver coin have been \$125,242.

It is gratifying to be able to announce that the importation of gold has recommenced. During the present week \$453,545 in gold have been imported. This amount came entirely from South America and the West Indies, and consequently is not so indicative as if it came from Europe. The ruling rates of exchange are unfavorable to further exportations. The gold in the Treasury has increased to \$133,000,000, which is very satisfactory. The meeting of the Silver conference is to take place at Brussels on 22d November.

The governments which have accepted the invitation of the United States to send delegates to the conference are: Austria-Hungary, Belgium, Denmark, France, Germany, Great Britain, Greece, Italy, Netherlands, Portugal Roumania, Russia, Servia, Spain, Sweden and Switzerland. It is reported that Mr. Terrell, United States Minister to Belgium, will be appointed a delegate.

The English press continues its open expressions of hostility to the conference, but it is noteworthy that Sir William Houldsworth, one of the English delegates to the conference, is holding public meetings, at which he advocates the establishment of bimetalism. It should be remembered, however, that Sir William Houldsworth is a cotton merchant of Lancashire, and that the continued prosperity of that trade depends to a considerable degree upon the stability in value of the rupee.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars.....	\$.66	\$.67
Peruvian soles and Chilean pesos.....	.61	.63
Victoria sovereigns.....	4.85	4.90
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.70	4.81

The coinage executed at the United States mints during the month of September, 1892, was as follows: Gold pieces—143,211, value—\$2,452,122.50; silver pieces—3,350,400, value—\$1,245,185; minor coinage pieces—4,496,200, value—\$67,686; total coinage pieces—7,989,811, value—\$3,764,913.50.

The Director of the Mint has estimated and the Secretary of the Treasury has proclaimed the value of foreign coins to be used in estimating the value of all foreign merchandise imported into the United States on and after Oct. 1, 1892.

In the case of Austria-Hungary the Director of the Mint has changed the standard from silver to gold, in conformity with the new currency law, and valued the new monetary unit, the gold crown, at 20'3c. in place of the florin. The florin (in paper or silver) in

invoice of merchandise will be taken at two crowns, or \$0.96, in conformity with the provisions of the new currency act of Austria-Hungary. The following changes have been made from the circular of July 1, 1892:

Coin.	Value July 1, 1892.	Value Oct. 1, 1892.
Boliviano of Bolivia.....	\$0.649	\$0.616
Peso of Central American States.....	.649	.613
Shanghai teal of China.....	.958	.910
Kaikwan teal of China.....	1.067	1.013
Peso of Colombia.....	.649	.616
Suere of Ecuador.....	.649	.616
Rupee of India.....	.308	.293
Yen of Japan.....	.699	.664
Dollar of Mexico.....	.704	.669
Sol of Peru.....	.649	.616
Rouble of Russia.....	.519	.492
Mahbub of Tripoli.....	.585	.555
Bolivar of Venezuela.....	.130	.123

Copper.—At last the copper market has displayed some life, and prices show quite an advance. Early in the week a few odd lots could still have been picked up at a little above 11c., but with the firmer reports coming from London, manufacturers became anxious to buy, and the market quickly advanced to 11½ without much business being done. As soon as producers realized the improvement in the demand they retired from the market, holding their copper at 11½c. In the course of the week a conference took place between the principal producers of Arizona and Montana copper, the object being to agree upon some basis of price. The results have not yet become known.

For casting copper a much better demand exists, and this description is more firmly held at 10¼@10½c. The London market has taken a rather upward movement, principally on account of heavy speculative purchases in the G. M. B. market, which have put up prices of Chili bars to £45 10s. @ 12s. 6d. for spot and £46 @ £46 5s. for futures, and, as is usual with a rise, there has been quite heavy buying done by manufacturers. It is reported that the demand from India continues to be good, but at prices somewhat below the market, and not much business has resulted. Consumption for wire purposes is very large, and consequently the demand for fine copper is very satisfactory. We quote refined and manufactured:

English tough, £47 @ £47 10s.; best selected, £48 10s. @ £49; strong sheets, £55 10s. @ £56; India sheets, £52 10s. @ £53; yellow metal sheets, 5d. Copper statistics show a decrease of 1,800 tons during the second half of September. Sales of Lake are just now reported at 11½c. and the market closes strong, though quiet.

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

To Liverpool—	Copper Matte.	Lbs.	
S. S. Tauric.....	1,817 bags	199,112	\$10,000
To London—	Copper Matte.	Lbs.	
S. S. Mohawk.....	2,144 bags	242,290	\$12,000
To Hamburg—	Copper.	Lbs.	
S. S. Amahl.....	100 bbls	125,000	\$13,750
To Rotterdam—	Copper.	Lbs.	
S. S. Spandam.....	121 bars	20,791	
" ".....	8 casks	10,081	\$16,188
" ".....	10 plates	1,130	
" ".....	59 casks	115,163	

Tin has had its ups and downs, and, early in the week, with the firmer market reported from London, reached 20'55, and as quickly declined 20'30. The close, however, is somewhat better and we quote spot and October at 20'50; November and December at 20'50. In the whole, there was not much tendency to follow the advance observed.

In London a large business was done from day to day and, although the market was somewhat feverish, prices closed considerably higher than a week ago, viz: at £93 10d. @ 12s. 6d. for spot and £94 @ £94 2s. 6d. for three months. Evidently operators are working in view of the prospective duty of 4c. to become operative here next July, but the ground does not seem to be quite prepared, and the experience of a few months ago may again be gone through with the consumers, and public at large, fighting rather shy when prices advance. Besides, shipments from the East continue on a very heavy scale.

Lead is very much depressed and prices continue to sag off. Even at the present low level there is no disposition to lay in supplies shown by the consumers, while the production is, without doubt, rather heavy. We have to quote 3.95 @ 4c. New York. In England, the large advance which we reported last week has also not been fully maintained and we have to lower quotations for Spanish Lead in London to £10 7s. 6d. @ 10s., English lead being there quoted at 2s. 6d. more.

Spelter has again become dull, not so much because values have changed a trifle, as that there is but little interest evinced in regard to it. The transactions have been limited, and the low ruling price does not yet seem to have had the effect of increasing consumption. We quote 4.40 @ 4.5c. New York. Abroad the market has become somewhat more settled, and good ordinaries are quoted in London at £13.15s. and specials at £19 @ £19 5s.

Antimony is very dull, and but few transactions have taken place in Hallett's at 10¼@10½, Cookson's at 11½ and L. X. at 11c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 30, 1892.

Pig Iron Production.—The following table gives the number of furnaces in blast and the estimated production of pig iron in the United States during

the week ending Saturday, October 3d, 1891, and for the corresponding week ending October 1st, 1892. Also the total estimated production from January 1st of last year to these dates. This table has been corrected by the official returns of the American Iron and Steel Association for the first six months of each year. The figures are in gross tons.

Fuel used.	Week ending—				From Jan., '91.	From Jan., '92.
	Oct. 3, '91.		Oct. 1, '92.			
	F'cs.	Tons.	F'cs.	Tons.	Tons.	Tons.
Anthracite..	83	31,700	67	27,777	1,431,860	1,326,796
Coke.....	159	128,000	128	116,905	3,988,000	5,192,700
Charcoal.....	58	12,300	43	9,748	414,327	405,925
Total.....	300	172,000	238	154,130	5,801,127	6,925,421

The firmer feeling in the pig iron market which we noted last week is becoming rather more accentuated. There is evidence on all hands of a slight increase in consumption and buying is rather brisker everywhere. In the immediate district of New York the improvement in trade is not so marked as elsewhere, but in general throughout the East the pig iron trade is in a distinctly firmer state. Some producers have gone so far as to put up their prices 25c. and 50c., but we do not know that any sales have taken place at the higher rate. Although they feel confident that the increased consumption will tend to bring about better prices, they do not incline to stand out firmly for an increase in price. If they could universally ask for an advance the buyers, we believe, would pay it and buy also for future delivery, as there is a general impression abroad among users that the market is ready for a rise. Locally, however, it is impossible to get buyers to believe that higher prices are at hand and consequently trade goes on much in the usual lines. The Southern producers are still maintaining the higher position which they adopted some few weeks ago and it is practically their action which has brought the new strength to the market. If they are determined to hold on to their improved policy the pig iron trade throughout the United States will certainly rehabilitate itself, but Northern producers are naturally doubtful as to how long the Southern producers will be willing or able to hold on in their efforts to secure better prices. The total production is about the same as it has been during the last two or three weeks. The demand for Bessemer pig is increasing, though the price remains low. The prices for pig may still be given as follows: No. 1, \$15; No. 2, \$14, and Gray Forge, \$13 @ \$13.50 at tidewater.

Spiegeleisen and Ferromanganese.—We hear of no transactions in spiegeleisen having occurred during the past week and the trade in it is quite dead at present. In ferromanganese the trade is exhibiting a little revival. During the last few weeks buyers have held aloof and postponed their purchases on account of the dealers having had to raise their prices owing to the scarcity of bars in Europe. The buyers are no longer holding off as they are satisfied that the rise will be permanent. A good many inquiries have been received lately and some transactions are reported with a prospect of more in the near future. The price of 80% quality is \$61 per ton.

Steel Rails.—Nothing in the way of new business is reported this week, and there is very little new in prospect. The steel rail mills are by no means fully employed, but the producers are not at all anxious for they are making billets instead for a fairly good market and structural iron for a very good market. On discussing the question of new business with an authority to-day, we are informed that rail-makers are not troubling themselves about the stagnation for the above reason, and he also saw that in the opinion of producers no new business of any moment would accrue if the price was lowered. They consider that the country has already as many railroads as it requires, and that if rails were reduced in price by 50% it would be no inducement for the railroad companies to open up new tracks to any extent. Anyway the three years' agreement is only half way through and nothing will be considered in the way of modification of the present *modus vivendi* this side of 18 months. Prices are \$30 at mill and \$30.75 at tidewater.

Rail Fastenings.—There is very little new business in rail fastenings and we only hear of a few small orders, presumably for rails which were ordered a week or two ago. It is not probable that any new order of importance will be received in the near future. Prices rule as follows: Fish and angle plates, 1'55 @ 1'65c. at mill; spikes, 1'90 @ 2c.; bolts and square nuts, 2'50 @ 2'70c.; hexagonal nuts, 2'70 @ 2'80c., delivered.

Merchant Iron and Steel.—The market for all sorts of merchant iron and steel is quiet and regular. No orders of any importance have been received lately, and everything is as usual required only in small parcels at a time. There is no variation in prices, which stand as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6½ @ 7½c.; special grades, 13 @ 18c.; crucible machinery steel, 4'75c.; crucible 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.

Structural Iron and Steel.—The market for structural iron and steel continues to be by far the

best in the iron trade at present. A fair amount of new orders are coming in still and the mills are all well filled with work. Most producers are now thinking of winter business and wondering how they can keep their mills in full work until spring. No difference is to be noted in prices of any sorts as the demand is still good and there is plenty of work; but to get large orders for winter delivery it is more than likely that a more favorable price would be accepted than those which rule at present and which may be given as follows: Beams, 2'3" @ 2.5c. except for 20-inch beams, which are 2.8c.; angles, 2'15c.; sheared plates, 2 @ 2'10c.; tees, 2'40 @ 2.60c.; channels, 2'35 @ 2.50c.; universal plates, 2 @ 2'10c.; bridge plates, 2 @ 2'10c., all on dock.

Chicago. Oct. 6.
(From our Special Correspondent.)

The shortage of cars is becoming more pronounced each week. The low price of soft coal, iron and steel have so stimulated the demand, and the consumption is so large that railroads, both east and west, find their rolling stock inadequate to the transportation demanded from them. Aside from this heavy traffic throughout the country, the shipments of grain and fall merchandise has been enormous, the latter larger than usual. This can have but one result, a revival in railroad car building which must obtain in the near future, as it is evident that orders placed for new equipment have not kept pace with those retired from service, or temporarily disabled. Several large important buildings, the structural iron and steel of which was contracted at the low figures current before July, are at a complete standstill, as mills are taking care of the orders placed at more favorable prices. Some contractors are paying half to three-quarters of a cent per pound more for material, and all contract work is now being made at better figures. A peculiar feature of the trade in Southern iron is noted, which may in a measure account for some of the extremely low prices recently made by agents of furnaces in that district. A consignment of pig iron to Pittsburg or northwestern centers is frequently diverted at Ohio river points to Chicago or elsewhere in this district, the Southern roads only receiving their proportion of freight. As a result this iron can be sold at less figures than that which is carried through at the regular tariff. The iron market is in a more encouraging condition, values are firmer, and the prospects fairly satisfactory.

Pig Iron.—Demand is good and the local situation is strengthened by the fact that one of the furnace companies is so well sold up as to be temporarily out of the market. Smelters are asking for quicker deliveries on contracts placed earlier in the season. Business last week was very satisfactory so far as regards sales and there has been a noticeable absence of yielding to the concessions which heretofore have been demanded almost as a matter of right. The policy of dealers and the tone adopted will add to the strength of the market. The outlook for local coke iron is encouraging for two reasons.—Southern iron is bigger and several furnaces near here are filled up to end of year. Carload trade is excellent and country foundries taking in more business. Southern iron is in fair demand but consumers are still a little shy of placing orders at the advanced rates. Lake Superior charcoal is now in fair demand, orders more frequent and prices steady as quoted according to grade. The most encouraging feature is the steadiness of the market and close adherence to quotations.

Quotations per gross ton f. o. b. Chicago, are: Lake Superior charcoal, \$16.55 @ \$17.00; Lake Superior coke, No. 1, \$14.25 @ \$14.75; No. 2, \$13.50 @ \$14; No. 3, \$13.25 @ \$13.75; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15 @ \$15.50; American Scotch, \$16.50 @ \$17.00; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.25; No. 3, \$12.50; Southern coke, soft, No. 1, \$13.25; No. 2, \$12.75; 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 moderate demand at \$24.50 and rods in good inquiry at \$34.50.

Structural Iron and Steel.—There is a large amount of work in sight and the outlook promising for a busy fall. Strenuous efforts are being made by contractors having large buildings on hand to get them inclosed before the advent of bad weather. Regular quotations, car lots f. o. b. Chicago, are as follows: Angles, \$2 @ \$2.10; tees, \$2.30 @ \$2.40; universal plates, \$1.95 @ \$2; sheared plates, \$1.95 @ \$2; beams and channels, \$2.25 @ \$2.50.

Plates.—Some Eastern mills are pressing the market and prices are somewhat uncertain. Tank steel has been offered at less than 2c. Warehouse business is moderately good. 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, 2 1/2 in. and smaller, 60%; 7 in. and upward, 70%.

Merchant Steel.—Demand for this specialty is well in advance of a year ago, orders active and tonnage larger. Immediate carload shipments of tire steels are quite a feature, and a number of large contracts were placed last week. Tool steel shows a fair movement. We quote tool steel, \$6.50 @ \$6.75 and upward; tire steel, \$2.10 @ \$2.20; 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 and Sheet Iron.—Demand continues active and mill shipments slow. Discounts are now very firm at 80 and 10% off on mill lots, and 70% on Juniata and 70 and 5% off on charcoal from warehouses.

Black Sheet Iron.—Deliveries are still slow from mill, demand good, and quotations steady at 2 @ 5c. for No. 27 common; f. o. b. Chicago Steel sheets at 10c. higher. Dealers quote 3'10 @ 3'10c. from stock, same gauge.

Bar Iron.—Demand continues fair from miscellaneous consumers, but the tonnage inquired for is generally lighter, as most of the larger orders have been placed. The lighter freight rate also has something to do with the lessened demand. Quotations, f. o. b., Chicago are 1'60 @ 1'65c., half extras. Youngstown mills asked 1'50c. at mill. Jobbers quote 1'80 @ 1'90c. and business active.

Nails.—Wire nails are unsettled and lower from mill at \$1.65 in carloads; 500 to 1,000 keg lots could be bought at less. Jobbing price, \$1.70. Steel cut nails are firmer and mills now ask \$1.65—30c. average. Jobbers quote \$1.70 from stock.

Steel Rails.—Mills here are not expecting large orders for standard sections just now, but small lots are sufficiently frequent to keep them running. Light rails are in fair demand. Iron or steel splice bars are \$1.70. Spikes, \$2.05 @ \$2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

Scrap.—Inquiry is a little better, but the market is still very dull and quotations nominal. No. 1 railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$9.50; fish plates, \$17; axles, \$19; horseshoes, \$15.50; pipes and flues, \$7; cast borings, \$5.50; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.60; coil steel, \$14; leaf steel, \$15; tires, \$14.50.

Old Material.—Iron rails are quoted by holders at \$18.50 @ \$19. Consumers offer \$17.75 with no sales in this market. Old steel rails are dull, excepting for small quantities, at \$12.50 @ \$15.50, according to length, conditions, etc. Car wheels show no movement, and prices nominal at \$14.50 @ \$14.75.

Louisville. Oct. 1.

(Special Report by Hall Brothers & Co.)

The market remains practically unchanged in so far as prices are concerned, but buying has been on a more liberal scale and the aggregate volume of business is probably considerably ahead of any week for some time. Perhaps in scattered instances small sales may have been made at improved prices, but no advance is quotable.

Hot Blast Foundry Irons.—Southern coke No. 1, \$13 @ \$13.50; Southern coke No. 2, \$12.25 @ \$12.50; Southern coke No. 3, \$11.75 @ \$12; Southern cbarcoal No. 1, \$16 @ \$17; Southern cbarcoal No. 2, \$15.00 @ \$15.50.

Forge Irons.—Neutral coke, \$11.50 @ \$12.00; cold short, \$11.25 @ \$11.50; mottled, \$10.75 @ \$11.

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

Philadelphia. Oct. 6.

(From our Special Correspondent.)

Pig Iron.—If there is any improvement in the market over a week ago, it has not been shown in greater sales nor in higher prices. The substance of the situation is this: There is a heavy consumption, a good demand, and considerable anxiety among consumers as to the future course of the market. The feeling is stronger to-day than a week ago that the market may take a sudden turn and prices move up a little. The fact that two or three companies are now quoting a little higher, and that the heads of some other companies are talking about it, are evidences of the improving tendency. Large consumers of iron, such as mill people, are still able to make large purchases at old quotations, which average \$13 for forge. Stove iron is \$14; foundry, \$15; Bessemer is being negotiated for with the probability of large transactions.

Ferromanganese.—Transactions are likely to be closed before Saturday; but the parties concerned will not speak in advance as to probable prices or quantities.

Steel Billets.—Quotations range from \$25.50 to \$26.50 according to date of delivery. Manufacturers are awaiting developments with confidence that a heavy demand will soon be on.

Muck Bars.—The mill men have done a great deal of business since Monday, and the outlook to-day is for the continuance of the heavy demand. One or two mills are already sold up as far as they care to sell. Large buyers were favored with very low quotations. To-day's figures are \$25.50 to \$26.50.

Merchant Iron.—The talk in and around offices is that there is less business, but the probabilities are that, while this is true, consumption is as heavy as at any time for three months, and that demand will show itself, and that prices will be maintained at 1.70 @ 1.90 for small orders.

Nails.—A steady demand is kept up for cut and wire nails, and factories are rather bare of stocks.

Skelp Iron.—More business is being offered than taken. There is no talk of putting up prices.

Wrought Iron Pipes.—Trade discounts are unchanged. Business is increasing.

Sheet Iron.—The activity in all kinds of sheet iron continues unabated. Small buyers pay card rates without question. There are many unfilled orders in hand for galvanized, which will not be filled before December.

Plate Iron.—Reports on plate of all kinds are necessarily monotonous. What manufacturers are more interested in now than big business is better margins, but the capacity is so great that higher prices will scarcely be asked until a great deal of winter business. Boiler plate has been selling at 2c., tank 1.90.

Structural Material.—A large amount of business is being offered. Prices are firm at 2.30 for tees, beams and channels.

Steel Rails.—An order for 10,000 tons was placed on Monday. Quotations, \$30.

Old Rails.—Market quotations, \$19. Supply liberal.

Pittsburg. Oct. 6.

(From our Special Correspondent.)

Raw Iron and Steel.—Trade since our last has been reasonably active, generally, and for certain descriptions fairly good. The improved outlook in the iron and steel industry continues to be fairly maintained although the change is not so much of a quotable character; consumers of the raw material are making more inquiries and are watching the market closer. For certain brands of mill iron there is an improved demand, holders being disposed to ask an advance. It is predicted by certain parties that the present month will see an advance in prices. At present certain makers are very careful about accepting contracts for future delivery. On the whole producers find much that is encouraging in the present tone of the market, and the general feeling is one of confidence. The action of the leading Southern furnace companies in advancing their quotations 25 cents per ton is looked upon as an evidence of the improved condition of the market, and one likely to be followed by other sections.

Under ordinary circumstances the heavy consumption of pig iron throughout the country, the decrease in the output to a point at least equal, if not below, the amount consumed, the gradual melting away of the unsold stocks on the furnace banks and the fact that the various mills and foundries have only sufficient material on hand to meet their immediate wants, are all factors that would indicate higher prices for crude iron. If the furnaces now in blast were only to be considered, prospects would be brighter, as the consumption appears to be taking care of the output at the present basis and in addition reducing the accumulation somewhat. In the meantime, both producer and consumer are keeping a close watch on the market in order to be prepared to take advantage of any change one way or the other.

An Eastern dealer remarks: "Although the market retains some of the unsatisfactory features recently noted, there is much that is encouraging, and points that denote marked improvement. But the situation is not sufficiently settled to warrant very positive expressions in regard to the matter beyond saying that there are more strong features than there are weak ones. General business among consumers of iron is good, and, so far as can be seen, is likely to remain so for some time to come. Many large concerns have a full two months' work in hand, so that to complete this year's business activity it only requires orders for about four weeks' more work. Hence it may be regarded as settled that prices are absolutely safe for the remainder of 1892."

Bessemer: Demand increasing, sales liberal, former prices maintained. Mill Iron: Steady at quotations. Steel Billets: Prices maintained. Skelp: Both iron and steel, prices maintained. Steel Wire Rods: Market steady. Structural Material very firm; mills running to their full capacity. Scrap Material firm; prices on the up grade. Old Iron Rails scarce, firm, advancing. Muck Bar: Steady.

Steel Billets.—The Bellaire Works have sold all the billets they can make to January 1st, 1893. The Riverside Iron Works are putting all their steel into skelp for use at their own pipe mill and for sale to other pipe mills. Laughlin's and the Junction Steel Company are sold up to December 1st, 1892. Sboenberger & Co. cannot spare any of their stock for love or money during October. Jones & Laughlin are running nine out of 14 of their own mills on steel, and are behind on orders; their main trouble is to deliver enough to parties whose orders they have to keep satisfied. Carnegie & Co. are buyers of steel and not sellers. The Homestead Mill is sold up entirely for October and part of November.

Iron Ore.

8,500 Tons Bessemer at Lake Docks.....	\$4.00 cash.
<i>Coke Smelted Lake and Native Ore.</i>	
4,000 Tons Bessemer Nov., Dec.....	13.70 cash.
3,000 Tons Bessemer Oct., Nov., Dec.....	13.75 cash.
2,000 Tons Bessemer Oct., Nov.....	13.80 cash.
2,000 Tons Mill Iron.....	12.50 cash.
1,500 Tons Mill Iron.....	12.50 cash.
1,500 Tons Mill Iron last three months.....	12.75 cash.
1,000 Tons Mill Iron.....	12.50 cash.
1,000 Tons Bessemer.....	13.80 cash.
1,000 Tons Bessemer, Dec., Jan., 1893.....	13.85 cash.
1,000 Tons Bessemer.....	14.00 cash.
500 Tons Bessemer.....	14.00 cash.
500 Tons No. 1 Foundry.....	14.50 cash.
300 Tons No. 2 Foundry.....	13.50 cash.
150 Tons No. 3 Foundry.....	13.00 cash.
100 Tons No. 2 Silvery.....	15.40 cash.

Charcoal.		
125 Tons No. 2 Foundry		19.00 cash.
100 Tons Cold Blast		26.00 cash.
100 Tons No. 1 Foundry		21.00 cash.
75 Tons Warm Blast		19.00 cash.
50 Tons No. 2 Foundry		18.90 cash.
Steel Billets and Slabs.		
3,000 Tons Billets, Oct., Nov., Dec.		23.00 cash.
2,000 Tons Billets, Oct., Nov.		23.25 cash.
1,000 Tons Billets, prompt		23.25 cash.
1,000 Tons Billets at Mill, Nov., Dec.		23.00 cash.
400 Tons Billets, Oct., Nov.		22.75 cash.
Muck Bar.		
1,000 Tons Neutral, Oct.		25.00 cash.
1,000 Tons Neutral, Oct. Nov.		24.60 cash.
500 Tons Neutral, Oct. Nov.		24.75 cash.
500 Tons Neutral, Oct. Nov.		24.80 cash.
Iron Skelp.		
500 Tons Narrow Grooved	1.62 1/4	4 m.
600 Tons Sheared Iron	1.80	4 m.
300 Tons Wide Grooved	1.63	5 m.
Steel Skelp.		
150 Tons Wide Grooved	1.50	4 m.
Sheet Bars.		
600 Tons Sheet Bars, Nov., Dec.		29.50 cash.
Ferro-Manganese.		
150 Tons, 80 per cent. Foreign delivered		62.00 cash.
Steel Wire Rods, Five Gauge American.		
1,000 Tons five gauge American at Mill		31.00 cash.
800 Tons five gauge American at Mill		30.50 cash.
Old Iron and Steel Rails.		
600 Tons American T's, Valley del.		20.75 cash.
500 Tons American T's		21.00 cash.
500 Tons Old Steel Rails		15.50 cash.
300 Tons American T's, Valley del.		20.80 cash.
300 Tons American T's		20.75 cash.
Spelter.		
200 Tons Spelter, Nov., Dec., Pittsburg	4.25	cash.
100 Tons Spelter, balance this year	4.35	cash.
50 Tons Spelter, prompt	4.27 1/2	cash.
Scrap Material.		
250 Tons Iron Axles, net		23.50 cash.
200 Tons Iron Axles Hammered, net		25.00 case.
200 Tons No. 1 R. R. W. Scrap, net		16.00 cash.
200 Tons Open Hearth Steel, gross		16.00 cash.
200 Tons Cash Scrap, gross		12.00 cash.
100 Tons Cast Borings, gross		7.00 cash.

COAL TRADE REVIEW.

New York, Friday Evening, Oct. 7. Statement of shipments of anthracite coal (approximated) for week ending October 1st, 1892, compared with the corresponding period last year.

Regions.	Oct. 1, 1892.		Oct. 3, 1891.		Difference.
	Tons.	Inc.	Tons.	Inc.	
Wyoming Region	550,774		456,820		93,954 Inc.
Lehigh Region	149,284		132,615		16,669 Inc.
Schuylkill Region	308,186		277,065		32,121 Inc.
Total	1,008,244		866,500		142,744 Inc.
Total for year to date	30,587,010		28,690,583		1,896,427 Inc.

PRODUCTION OF BITUMINOUS COAL FOR WEEK ENDING October 1st, and year from January 1st.

Regions.	1892.		1891.	
	Week.	Year.	Week.	Year.
Phila. & Erie R. R.	1,880	65,232	1,880	132,709
Cumberland, Md.	79,145	2,819,414	79,145	3,120,307
Barclay, Pa.	673	54,539	673	140,370
Broad Top, Pa.	15,318	452,823	15,318	371,952
Clearfield, Pa.	80,026	2,951,774	80,026	2,969,167
Allegheny, Pa.	23,179	951,765	23,179	954,751
Beach Creek, Pa.	32,086	1,784,004	32,086	1,807,425
Pocahontas Flat Top	59,843	1,942,377	59,843	1,724,703
Kanawha, W. Va.	45,784	1,818,031	45,784	2,014,332
Total	337,934	12,840,459	337,934	13,235,716

Regions.	1892.		1891.	
	Week.	Year.	Week.	Year.
Pittsburg, Pa.	20,298	949,408	20,298	937,201
Westmoreland, Pa.	37,284	1,274,598	37,284	1,474,216
Monongahela, Pa.	14,986	486,063	14,986	455,998
Total	72,568	2,710,069	72,568	2,867,415
Grand total	410,502	15,550,528	410,502	16,103,131

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending October 1st, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 119,255 tons; year 4,027,603 tons; to corresponding date in 1891, 3,990,886 tons.

Anthracite.

The anthracite market in New York does not appear to differ from last week's. There is the usual amount of coal moving, but the autumn boom practically does not exist. Consumers are taking only enough for their present use, and are not laying in stocks for winter to any extent. The extra traffic on the Reading and other railroads, due to the encampment of the Grand Army of the Republic at Washington, a fortnight ago, interfered very much with the shipments of coal, and the traffic has not yet recovered its ordinary conditions. The stocks in the storage plants are therefore reduced to some extent. In Philadelphia, especially, the stocks are reported as very low, and Southern customers complain about the delayed shipments. A great deal of coal has been going West lately, as the desire has been urgent among Western dealers to get plenty of supplies before the increase of freight rates goes into effect. At present the congestion of freight traffic on the railroads is excessive, but the companies intend to lay themselves out specially to get things into better shape soon.

As we reported last week, the producers at their meeting last Thursday had decided not to fix any limit to the output for October. The latest advices from the anthracite fields tell us that the Reading Company, who have for months worked their collieries only half time, are now operating many of their Schuylkill mines five full days a week, and it is stated that they have sufficient orders for Western

shipment to keep all their collieries going full time, and that the scarcity of cars and general insufficiency of means of transport are the only hindrances to such a desirable state of affairs. The whole of the Lehigh Valley line, from Easton to Sayre and to Buffalo, is blocked by waiting coal cars. This great Western demand is probably only temporary, and is due to the desire of Western consumers to get coal in before the next rise in freight rates. However, at the present time, it may be said that Western demand is good and Eastern trade slow and featureless.

The miners in the Schuylkill region have had their rate of wages raised again. The committee have officially announced that the rate for the last two weeks in September and the first two in October shall be based on the price \$2.80 per ton as the average selling price at the mines. In August last the rate was raised from the minimum at a selling price of \$2.50 per ton to a rate based on the average selling price of \$2.60 per ton, so that the new advance is a very substantial one, and causes great satisfaction among the miners. The rate is higher than it has been for several years. The rate of wages is not reduced if the selling price goes below \$2.50, and as the price in September, 1891, was \$2.20, and in September, 1890, \$2.24, it is evident that the company are getting their coal at a proportionately cheaper rate now than formerly, as far as the ratio between selling price and miners' wages is concerned, while at the same time the miners are receiving more money for their labors.

Nothing has happened during the week as regards the various legal actions against the Reading deal, and the position of matters stands in exactly the same state as a week ago. While we hear so much of litigation against the Reading and allied companies in the States of New York, New Jersey, Illinois and elsewhere, there is no indication of any action being taken in the real home of the deal, Pennsylvania. No such action in that State appears to be contemplated, and no doubt the authorities there consider that the "deal" is working the State no harm, but is rather doing good.

A report was circulated a few days ago that the Commissioners of the World's Fair at Chicago had protested in a practical manner against the exorbitant prices of anthracite by giving the contractors for the supply of fuel at the fair to hituminous and coke producers. This report is untrue, for the Commissioners are bound by guarantee to use nothing but anthracite at the fair in order that no possible injury shall be done to the many rare and costly articles which will be on exhibition. The contract for the supply of coal amounts to 500 tons of anthracite daily.

We spoke last week of the endeavors to get Colorado coals to market at Chicago and other points in the central states so as to compete with Pennsylvania anthracite. The Denver papers confirm this and give details of preparations for the heaviest fall and winter coal trade ever known in that State. Orders are arriving in such quantities that new mines are being prospected for and old workings are being reopened. The Union Pacific Railroad are contemplating the necessity of laying down new lines to coal districts. It is reported also that coke ovens are being put down to meet the demand of coke from Mexico and elsewhere.

A false report, due to a misapprehension of a State announcement, was circulated during the week that the Reading company had obtained the sanction of the State of New York to establish a gigantic retail establishment in this city for the sale of anthracite. Such a concern formed a part of the scheme of the "deal," but, as Mr. McLeod announced a week or two ago, it is being shelved for the present on account of general complications. As a matter of fact, the State of New York has to give licenses to corporations formed in other States to operate within its boundaries and these licenses have to be renewed yearly. The Reading Company was in this instance only applying for a renewal of its powers to carry on its already established business in New York, and not for a license for any new departure.

Bituminous.

The producers of hituminous complain more bitterly than ever of the difficulty of getting their coal to market, and many are making almost frantic endeavors to supply their customers by trying to horror coal of rival companies. As a rule they find rival companies as hard pressed as themselves and quite incapable of helping them. There is great difficulty in getting rail shipments to Philadelphia, and at Baltimore the supply of vessels is very bad owing to the vessels going elsewhere. There has been a general advance of ocean freights of 15 cents all round, so that the freight rates stand now as follows: From Philadelphia to Boston, Salem and Portland, 70 cents, and to Sound Ports, 65 cents; from Baltimore, Newport News and Norfolk, 75 cents to Boston, Salem and Portland, and 70 cents to Sound ports.

The daily papers contain accounts of the attempt being resuscitated to form a soft coal combine among producers in Indiana, Illinois, Ohio, Pennsylvania and West Virginia. Some people in the East consider that it would be a dodge on the part of Western producers to get a footing in the Eastern markets. There is no doubt, however, that Eastern producers would welcome such a combine if it were possible to form one, as their profits at present are very small, and if things are continued on the present basis some producers will go under during the next five years.

The interests at stake are so varied and scattered that it would be a physical impossibility to consolidate them. It would be impossible also to effect a combine unless the co-operation of the railroads could be obtained. The contracts with the railroads are entered into every March, and last March there was some talk of a combination being made with the roads with the object of raising the selling price of the coal, but at the time the proposition was passed over because too short notice had been given before the contracts had to be renewed. The agitation, which is now beginning again and which is being reflected in the papers shows that its originators intend to be on time this year. We have asked several prominent producers about this report, but they deny that they have heard anything about it, though at the same time they show their pleasure at the bare mention of such a desirable move.

Boston. Oct. 6.

(From our Special Correspondent.)

As the agents did not decide to change the prices of anthracite coal for the month of October, there has been hardly any excitement here in consequence. Buying is but moderate and could not be otherwise, as the yards have no room to store any more coal.

We quote f. o. b. prices at New York: Stove, \$4.75; egg, \$4.50; free broken, \$4.10; chestnut, \$4.65; Lykens Valley (at Philadelphia), broken, \$4.85; egg, 5.45; stove, \$5.90; chestnut, \$5.

In soft coal business is good. A great many want the coal, but find they are obliged to wait for it. There is great delay in getting the coal to shipping ports, so I understand, deliveries being anyway from two to four weeks late. Prices on spot are higher. This is owing mainly to the advance that has taken place in freight rates. George's Creek coal on cars here is worth \$3.45 to \$3.50; Clearfield, \$3.15 to \$3.25.

The great call for vessels at some ports, such as Philadelphia and Baltimore, has been instrumental in putting up rates from 10 to 15 cts. per ton. Present rates are as follows: From New York, 50 to 55 cts.; from Philadelphia, 70 to 75 cts.; to Portland, 70 to 75 cts.; to Bath, 75 to 80 cts.; to Providence, 65 to 70 cts.; from Baltimore, 70 to 75 cts.; from Newport News, 70 to 75 cts.; to Sound points, 65 to 70 cts.

The retailers are all doing a very good business in domestic grades. Stove and furnace coals especially are wanted. Prices in general are firm. Quotations are: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.50; Lehigh egg, \$6.24; Lehigh furnace, \$6.25.

Buffalo. Oct. 6.

(From our Special Correspondent.)

Trade is quiet, but the change in the weather will doubtless cause an increase in demand for house consumption. Bituminous coal is in good demand, and quotations nominally unchanged. The supply is pretty adequate for all the requirements of manufacturers, propellers, tugs, etc. Slack and run of mine are the sizes most in request for immediate delivery.

Lake freights to Chicago and Milwaukee on coal have been advanced 10c. to the forms and 5c. to the latter port in consequence of the demand for vessels exceeding the number offered.

At Bayfield a new coaling station has been established for Lake Superior propellers by a company formed for that purpose.

Complaints are constantly being made of the scarcity of coal cars, notwithstanding the efforts of the railroads to keep up their rolling stocks.

The movement of coal by lake westward, from September 28th to October 4th, both days inclusive, aggregated 125,478 net tons, distributed about as follows: 37,250 to Chicago, 29,825 to Milwaukee, 34,500 to Duluth, 4,495 to Toledo, 10,550 to Superior, 100 to Alnena, 600 to Manitowoc, 500 to Green Bay, 1,400 to Detroit, 2,000 to Washburn, 1,800 to Racine, 423 to Kincaidine, 300 to Sault Ste. Marie, 500 to Chehovgan, 100 to Bay City, 585 to Escanaha and 550 to Houghton.

The rates of freight were 55@65c. to Chicago; 55@60c. to Milwaukee; 25c. to Duluth, Superior, Toledo, Detroit and Washburn; 55c. to Manitowoc; 70c. to Menasha and Racine; 50c. Portage, Escanaha and Houghton; 60c. to Green Bay; 40c. to Alnena, Kincaidine and Gladstone, and 45c. to Ft. William.

The coal charters by canal from Buffalo during the month of September included 1 load to Fulton at 55c., 2 loads to Utica at 60c. and 10 loads to Syracuse at 55c., all gross ton, free on and off.

Statistical.—Railroad receipts and shipments of coal at Buffalo not reported by request: Receipts of coal by lake thus far this season, none; shipments of coal by lake westward for month of September, 387,382 net tons, as compared with 553,670 net tons in 1891, and 326,670 net tons in 1890; for the season to October 1st, 1,797,959 net tons, as compared with 1,687,850 net tons in 1891, and 1,435,860 net tons in 1890. The receipts of coal by canal for the month of September, 14,777 net tons, as compared with none in 1891, and 5,258 net tons in 1890; the total receipts by canal for the season to October 1st, 26,213 net tons, as compared with 625 net tons in 1891 and 21,404 net tons in 1890. The shipments by canal for the month of September, 3,243 net tons, as compared with 4,406 net tons in 1891 and 2,477 net tons in 1890; for the season to Oct. 1st, 22,007 net tons, as compared with 24,327 in 1891, and 8,623 net tons in 1890. The aggregate shipment by lake this year to October 1st, as compared with 1891, show an increase of

110,379 net tons, and an increase of 362,099 net tons in 1890. The rates of freight on coal hence to points named in September were 55c. to Chicago, Milwaukee and Green Bay; 35¢@25¢@40¢@25c. to Duluth and Superior; 65¢@60c. to Racine; 25c. to Toledo and Detroit, 40c. to Saginaw, and 35c. to Bay City and Washburn. A year since the rate to Chicago and Milwaukee was 40c. per net ton.

Chicago. Oct. 7.

(From our Special Correspondent.)

The market remains unchanged. There is only a fair volume of orders coming in, and the unchanged prices relieve the minds of shippers and dealers of the large amount of anxiety they felt as to their ability to satisfactorily fill the orders they had taken for October delivery. We think that "scare" arising from the alleged large deficiency in shipments of coal, the rumor originating in New York, is groundless. It is self-evident that the shippers do not realize how largely Duluth and other Lake Superior points have taken care of trade heretofore directly tributary to Chicago. Of Milwaukee this has also been true this season to a greater extent than ever before. We also know that a very large amount of trade has been taken care of from the docks at Chicago, which heretofore had been supplied with all-rail coal with shippers different from the sellers this year. We know furthermore that it has been practically impossible for the Chicago & Northwestern and Chicago, Milwaukee & St. Paul to begin to fill their requisitions for cars for shipments of anthracite coal from this and the Milwaukee markets. As we said before, we believe that only in a few isolated cases even under the most stringent scarcity of all-rail coal, is there liable to be any serious inconvenience or annoyance. Of course the foregoing is the status now, and with the presumption that lake shipments will come forward as satisfactory as they do at present. The assurances of shipments from mines are much more promising than they were last year, and unless the weather turns very cold and is continuous no trouble is anticipated as to the ability of shippers to grapple with the situation. Retail trade is fair only and by no means as active as it should be at this season. Chestnut continues scarce and there is no cutting the \$7.25 rate.

Bituminous coal is in better demand than supply. Inquiry is very large from all the regions throughout the West and Northwest, which looks to this market for supplies of soft coal. The *bête noir* of coal men, but more particularly the bituminous operators in this section, is the wretchedly poor car service, which is more pronounced this year than ever before, and accounted for as follows: Many of the Western systems are using a high proportion of their flat cars for construction work. They propose to place their roads in as good a condition as possible this fall for the coming winter and spring to have them in readiness for the heavy and continuous passenger World's Fair traffic next year. With this in view is it any wonder that mine operators and agents are "snowed under" with orders, many of which are positively refused. The prospects for any relief inside of sixty days or snow flies are very slim, in good earnest. Many of the railroads East as well as West are already confiscating coal in transit and not a few have notified mining companies from whom they get supplies that if any cars "set in" for railroad coal are diverted to commercial trade, they will shut off car supply entirely and furnish cars only to those who will conform to this rule. Indiana hock and Wilmington are in excellent demand; the same applies to Hocking, Pittsburg and other Eastern varieties, and quotations are very firm.

Coke is in good demand and foundry grade of Connellsville make holds its own against all other kinds. Crushed Connellsville for domestic use is steadily gaining and agents say that demand is now greater than ever before experienced in this section. Quotations are: \$4.65 furnace; \$5.05 foundry; crushed, \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.40; Hocking Valley, \$3.20; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil hock, \$2.50@2.60.

Pittsburg. Oct. 6.

(From our Special Correspondent.)

Coal.—The market is firm with an active demand. Prices are on the up grade, stocks in the lower markets are being rapidly reduced; there was only one shipment from Pittsburg since June and that was a small one. At Cincinnati stocks were large a short time ago, at present they are being steadily reduced by consumers preparing for winter; prices are advancing. At Louisville stocks are low; prices are stiffer with sales reported 8¢@8½¢. At New Orleans an advance of 2 cents per barrel has been established. The Monongahela strike is still on, the river coal operators are determined not to pay over 3 cents per bushel for mining. They say that they cannot afford to do so and compete with other sources of supply in the lower markets. The miners continue to hold out against the reduction, but the probability is that they will accept the situation before long. Over 550,000 bushels of coal were mined and sold by the mines at Long Run, Dillonvale and Laurelton for the year ending July 1st. These mines

were opened less than two years ago. To ship this coal about 3,000 cars were required, 20 tons being shipped in each car. For mining 70 cents per ton was paid, amounting to \$400,000, excluding other wages, such as drivers, tipplesmen, weighmen, blacksmiths, etc.

Connellsville Coke.—The demand is steadily increasing. The market is a strong one. Last week 11,523 ovens were in blast, this has been increased 465, reaching a total of 11,988 ovens out of a total of 17,253. In addition to this the Frick Coke Company have ordered the firing of 610 additional ovens, making a total of 12,598 ovens, leaving only 4,457 out of blast in the region. Fourteen of the Frick plants made six days, 10 plants 5 days each. Seven of the McClure plants made six days and ten plants five days. The other plants averaged from four to six days. As usual, while products increased shipments fell off for the want of cars. Deficiency, 185 cars. Tonnage last week, 127,820 tons; this week, 124,124 tons; deficiency, 3,696 tons. The shipments were distributed as follows: To Pittsburg, 1,695 cars; points east of Pittsburg, 12,201; points west of Pittsburg, 3,310; total, 6,206 cars. Pittsburg shipments increased 78 cars. Western shipments fell off 55 and Eastern shipments 208 cars. Prices are firm, but unchanged; the outlook is favorable.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Oct. 7.

Heavy Chemicals.—There is no marked change to report of the heavy chemical market. The shortness of supplies, which to a certain extent prevailed at the time of our last report, has been relieved by recent arrivals, the vessels having been released from quarantine, and the demand for goods on the spot has not been so active generally. Caustic soda continues unchanged in price and in good request. Alkali was in fair demand and some spot sales are reported. For carbonated soda ash there was some inquiry for future shipments, but no sales of much consequence have taken place. Bleaching powder is easier and lower. For goods on the spot 3¼¢@4c. is asked, and 3c. for future delivery nearby. A very fair demand is still reported. We quote this week: Caustic soda, 60%, 3-17¼¢@3-20c.; 70%, 2-95¢@3-12¼c.; 74%, 2-97¼¢@3-12¼c.; 76%, 3-12¼¢@3-25c.; 77%, 3-12¼¢@3-25c. Carbonated soda ash, 48%, 1-57¼¢@1-60c.; 58%, 1-47¼¢@1-52¼c. Alkali, 48%, 1-60¢@1-65c.; 58%, 1-55¢@1-65c. Sal soda, English, 1-07¼¢@1-15c.; American, 1-05¢@1-10c.

Acids.—A thorough canvass of the trade shows that all manufacturers are very busy. The demand for the various acids generally an sulphuric particularly is very good. Many works are sold up to their full capacity, and some dealers profess even to be short of oil of vitriol. A rumor gained currency during the week that the enlargement of a certain Eastern acid works was in contemplation. The identity of the firm in question could not be established. At the present time the consumption of acids is very nearly equal to the production, and it is due to the fact, as previously stated in this column, that manufacturers are now enjoying a prosperous business. If this equilibrium is disturbed, as it would if the production were to be increased much, we should have a repetition of the dullness and the low price of the past few years, during which time, the manufacturers claim, but little money was made in the acid trade. It seems preposterous that any great increase is really contemplated. Our quotations are: 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", \$1 @ \$1.25; 20", 90c. @ \$1.10; 22", \$1.25 @ \$1.50; 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 \$3.50 @ \$3.75; alum, lump or ground, \$1.70 @ \$2. Glycerine for nitro-glycerine, 11¼¢@12¼c., according to quality and quantity.

Brimstone.—This market continues very quiet. Nothing of importance can be reported. Prices are practically unchanged, closing quotations being: On the spot, best unmixed seconds, \$24.25. October shipments, best unmixed seconds, \$23.50; best unmixed thirds, 75c. less.

Fertilizers.—During the week there has been an improved demand generally for the various fertilizers. Ammoniates are higher, as will be seen from our quotations. There has been a speculative movement in Western ammoniates caused by the buying up of the Winter production of several Western packing houses by Eastern, who evidently are of the belief that, owing to the shortage of fish scrap, higher prices will prevail in the near future. It has been estimated that the fish catch this year has not amounted to much more than one-fifth of the usual catch. We quote this week: Sulphate of ammonia, \$2.87½¢@2.95 for bone goods and \$2.90 @ \$2.95 for gas liquor. Dried blood, \$2.05 @ \$2.07½ per unit for high grade and \$2.05 for low grade; acidulated fish scrap, \$13.50 f. o. b. factory; dried scrap, \$23 @ \$23.50. Azotine, \$2.05. Tankage, \$18 @ \$22, according to grade. Bone tankage, \$22.50 @ \$23.50; hone meal, \$23.50 @ \$25.50.

Double manure salts are unchanged. The price has been fixed by the Syndicate's agents, and has not changed during the year. Quotations are as follows: \$1.13½ cwt., basis 48@53%, in 50-ton lots, on foreign weights and analysis. High grade sulphate, \$2.13 cwt., basis 90% foreign weights and tests. Phosphates. Phosphate rock, Florida, 60¢@62¢, is

quoted from Punta Gorda at \$4.50 per ton of 2,240 lbs. Charleston rock is quoted at \$4.75 @ \$5 f. o. b. Charleston. Mr. Paul C. Trenholm, the well known broker of Charleston, S. C., sends us the following interesting statistics showing the shipments of phosphate rock from that port during the month of August during the past three years:

	1891.		-1892.		
	1890. Crude.	Crude.	Ground.	Crude.	Ground.
Domestic.....	18,473	18,276	50	24,470	215
Foreign.....	6,145	2,000	nil.	nil.	nil.
Total.....	24,618	20,276	50	24,470	215

Kainit.—There is nothing of interest to report of this article. Prices continue as follows: \$8.75 for invoice weight and \$9 for actual weight.

Muriate of Potash.—There is no change to report of this article. Arrivals during the week amounted to 1,200 tons. New sales were 200 tons. Prices are: For 50 tons or over, New York or Boston, \$1.81½; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.86½.

Nitrate of Soda.—Nitrate is firmer this week. A good demand is reported and a very fair business has been done during the week. Quotations are \$2 for spot and \$1.92½ @ \$1.95 for October, November, December, January shipments.

We are in receipt of Messrs. Mortimer & Wisner's interesting monthly statement of nitrate. The accuracy of these figures has never been questioned and this firm deserves commendation for giving to the public regularly such interesting and valuable statistics.

	1892.	1891.	1890.	1889.
	Bags.	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1892, to date...	528,319	524,559	549,721	375,617
Imported into Atlantic ports from Europe.....		18,802		
Stock in store and afloat Oct. 1, 1892, in New York.....	528,319	543,361	549,721	375,617
in Boston.....	47,442	73,070	41,209	44,977
in Philadelphia.....		900		
in Baltimore.....	1,090			
To arrive, actually sailed.....	2,700	3,500	7,500	7,000
Visible supply to Dec. 1, 1892.....	118,000	134,500		
Additional charters ..	169,232	211,970		
Total supply, when shipped.....	93,000	203,000	343,600	289,000
Stock on hand, Jan. 1, 1892.....	264,232	414,970	392,309	340,977
Deliveries past month.....	53,585	36,454	22,009	84,043
Deliveries since Jan. 1 to date.....	46,359	84,640	58,464	45,415
Total yearly deliveries.....	530,672	503,345	522,021	414,683
Prices current Sept. 1, 1892.....	1-95¢	2-05¢	1-77½¢	1-87½¢
	1-97¼¢	2-07¼¢	1-80c.	1-90c.

Liverpool. Sept. 25.

In heavy chemicals business is very quiet all round. Soda ash is in a firm position owing to Le Blanc makes being practically sold out for balance of this year. Quotations are quite nominal in consequence, as follows: Caustic ash, 48%, £5 6s. 3d. per ton and upward; 57½%, £6 7s. 6d. per ton and upward; carb. ash, 48%, £5 9s. 9d. per ton and upward; 58%, £6 12s. 9d. per ton and upward; ammonia ash, 58%, £6 7s. 6d. per ton; net cash.

Soda crystals are easier at £3 5s. to £3 7s. 6d. per ton less 5%.

Caustic soda is very flat, and it is difficult to find any buyers. Quotations are without change, however, 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; net cash. For parcels under 10 tons 5% per ton extra is charged. Shipment to United States and Canada is barred by the Alkali Company.

There are inquiries for 1893 contracts, but we do not hear of much business as buyers prefer to hold off seeing that prices are expected to be considerably reduced for next year.

Bleaching Powder.—There is very little doing in this article at present and quotations are nominal at \$9 @ \$9 5s. per ton, net cash, for hardwood, for prompt and October delivery. Re-sellers are showing more anxiety to clear, but find it very difficult to get any orders, and prices look like drifting back to old level before long.

Chlorate of Potash is scarce, but at the same time the tone is easier, and a little may be picked up from second hands for October at 7½¢ d. to 7½¢ d. per lb. less 5%, and for November and December 7d. @ 7½¢ d. is about range of values.

Bicarb. Soda is firm at £6 15s. per ton less 2½% for 1 cwt. kegs, with usual allowances for larger packages.

Sulphate of Ammonia is rather firmer and values are rather dearer at about £10 2s. 6d. @ £10 5s. per ton for good gray, 24%, and £10 5s. to £10 7s. 6d. per ton for 25%, both in double bags, less 2½% f. o. b. here.

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

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from Oct. 1 to Oct. 7, and Sales.

*Ex-dividend. +Dealt at in New York Stock Ex. Unlisted securities. †Assessment paid. ‡Assessment unpaid. Dividend shares sold, 9,850. Non-dividend shares sold, 10,500. Total shares sold, 20,350.

BOSTON MINING STOCK QUOTATIONS.

Main table of Boston Mining Stock Quotations, including columns for Name of Company, dates from Sept. 30 to Oct. 6, and Sales.

Dividend shares sold, 12,217. Non-dividend shares sold, 7,990. Total shares sold, 20,207.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

Detailed table of mining stock data, split into Dividend-Paying Mines and Non-Dividend Paying Mines, with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date and amount of last payment.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date and amount of last. It lists numerous mining companies and their financial details.

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 of the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42,900,000. ** 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 the reorganization in 1880. ‡‡ 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.

Table with columns for Stock Name, Price, and Date. Includes Aspen section for Oct. 1 and Baltimore, Md. section for Oct. 6.

Table with columns for Company Name, Bid Price, and Asked Price. Includes Baltimore, Md. section for Oct. 6.

Pittsburg, Pa.

Table with columns for Company Name, H. Price, and L. Price. Lists various coal and gas companies.

St. Louis.

Table with columns for Stock Name, Bid Price, and Asked Price. Lists various mining and industrial stocks.

Helena, Mont.

Table with columns for Stock Name, Bid Price, and Asked Price. Lists various mining stocks.

Foreign Quotations.

London. Sept. 24.

Table with columns for Stock Name, Highest Price, and Lowest Price. Lists various international stocks.

Paris. Sept. 22.

Table with columns for Stock Name and Price in Francs. Lists various European stocks.

Sau Francisco, Cal.

Table with columns for Stock Name, Sept. 30, Oct. 1, Oct. 3, Oct. 4, Oct. 5, and Oct. 6. Lists various California stocks.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Lists prices for various commodities like acids, alcohols, and minerals.

Marble Dust, Metallic Paint, Mineral Wool, Naphtha, Nitre Cake, etc. Lists prices for various industrial materials.

THE RARER METALS.

Aluminum, Barium, Bismuth, Cadmium, Calcium, etc. Lists prices for various rare metals.

COAL STOCKS.

Table with columns for Company Name, Oct. 1, Oct. 3, Oct. 4, Oct. 5, Oct. 6, Oct. 7, and Sales. Lists coal stock prices and sales data.