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CONTENTS.

MR. J. H. HAMMOND, mining engineer, has gone to California. During the first week of May, his address will be San Francisco.

THE strong evidence brought forward by Mr. A. CHANUTE, of Leadville, through the *Herald* of that city, points to the conclusion that the alleged Mount Pisgah or West Four-Mile gold placers have been salted.

OUR friends of the *Mining Record*, in their intervals of leisure in writing their weekly silver article, devote some attention to giving correspondents good advice on the condition of the properties of different mining companies. Their comments are generally as solemn as the gravity of the situation demands. They are respectably guarded, and weighty, but sometimes cruelly cutting. Imagine the mental condition of the manager of the Evening Star, of Leadville, of whose work it is said in a recent issue: "It is evident a good deal of money has been expended in a *fruitless search for new deposits of ore to replace those already exhausted.*"

SHEFFIELD, the home of steel "physics," has frightened off the Iron and Steel Institute; four leading firms, JOHN BROWN & Co., CHARLES CAMMELL & Co., THOMAS FIRTH & SON, and VICKERS, SONS & Co., having declined to allow the members to visit their works. Are they getting to be so far behind the times that they must hide their inferiority behind the unsociable plea that they are afraid foreign rivals would steal their valued improvements? We trust that, when the Iron and Steel Institute comes to this country, as it undoubtedly will, sooner or later, the Sheffield iron-masters, who rule out foreigners, will remain at home, wrapt up in the contemplation of their own excellence and superiority.

THE programme for the Pittsburg meeting of the American Society of Mechanical Engineers has just been issued. It includes a joint session on the 20th of May with the Engineers' Society of Western Pennsylvania, the subject to be discussed being "Natural Gas for Industrial Purposes." On the morning and in the evening of the second day, there will be sessions for the reading of papers. Thursday will be visiting day, including an inspection of the works of the Spang Steel and Iron Company, the Isabella Furnace, the Natrona Soda Company, the Keystone Bridge Company, the Pittsburg Locomotive Company, and the Crescent Steel Company. On Friday, there will be a trip by water including a visit to the Edgar Thomson Steel-Works, and to the Duquesne Forge of W. Miller & Co.

THE pressure of the outside stockholding interest appears to have had its effect upon the management of the Alice Gold and Silver Mining Company, and has led to the publication of a quarterly report by the secretary, showing receipts and expenditures, which, we presume, will be a feature in the future. Some of the old oddities are, however, retained, among them, the crediting of the bullion at the "assay value," $1.29·29 per ounce, and the debiting of a so-called "discount on silver." The product of the mine was $256,314.07, while the expenditures were $4466.29 for expressage on bullion, $20,669.02 for permanent improvements, $28,905.61 for prospecting and dead-work—still a heavy amount, it will be noticed—$48,765.49 for ore extraction, $72,869.94 for ore reduction, $5316.15 for general supplies, and $8965.72 for expense accounts, including $2668.31 interest on company notes. The net gain during the quarter was $66,301.49, of which $25,000 were used for the payment of company notes in January and February, leaving cash in the hands of the treasurer, including a balance of $2953.86 on the 1st of January, of $44,255.35. The debt of the company is, therefore, now reduced to $200,000. Its profits are roughly estimated at the rate of $250,000 per annum, so that, as we stated in our review of the annual report in our issue of March 1st, the company ought to be free from its burden at the close of this year, and might then be able to yield to its stockholders $200,000 per annum, without neglecting development-work and permanent improvements, if it has any thing like the amount of ore in sight that is claimed for it.

IN the case of the Kankakee Coal Company against the Illinois Central Railroad Company, which was recently decided by the Railroad Commissioners of Illinois, some points concerning alleged discrimination in freights were decided. It appears that the Kankakee Coal Company, operating mines at Clarke City, Illinois, 83 miles from Chicago, was assured that it should have as favorable a rate as any mine on that division of the Illinois Central Railroad, completed late in 1882. It claimed that an adjacent concern, the Central Illinois Coal Company, at Tracy, had a contract under which it was to pay 75 cents as a minimum price, and as much in addition thereto as thirty per cent of the selling price of the coal in Chicago would produce more than that. A provision in the contract was, that the Central Illinois Coal Company should ship 50,000 tons of coal the first year, and 75,000 tons the second year, and provide its own terminal facilities in Chicago. During the first year, the coal company shipped only 13,000 tons; and in 1883, partial settlements were made on a basis of 83, 79, 78, and 75 cents a ton. No final settlement had been made, and consequently no definite rate had been established for the period covered by the complaint.

The Commissioners held that, since the complainant was not relying on an open or published rate, but was seeking special privileges, he was afforded complete protection from injury thereby. They are emphatic in their statements against any concessions made to volume of business, and they are equally decided against the granting of lower rates to competitive points than are charged for intermediate points on the same railroad.

THE annual report, published in the English mining papers, of the Tharsis Sulphur and Copper Company, is worthy the study of our mining community, and particularly of those interested in our growing pyrites industry, and in our copper mines, the most formidable competitors of which the Spanish pyrites companies undoubtedly are. One of the principal items of cost of the Tharsis mines is the expenditure for stripping, or "removing the overburden," as the report puts it. In 1883, the quan-

tity of material thus cleared away from the different lodes was 303,973 cubic meters, or about 10,750,000 cubic feet, a fact that will convey some idea of the magnitude of the operations. The amount of ore raised from the Tharsis and Calanas mines was 490,033 tons in 1883, against 486,860 tons in 1882, the shipments of pyrites being 186,366 tons of lump and 15,952 tons of smalls in 1883, against 218,218 tons in 1882. The quantity of precipitate shipped was larger in 1883, being 6717 tons in that year, against 5534 tons in 1882. The production of iron ore was 196,475, of which 179,811 tons were invoiced. The net profits of this enormous business were £355,689, including a balance, carried forward from the preceding year, of £21,197. Out of this, a dividend of £323,032, or 27½ per cent on the capital of the company, was paid, carrying £10,000 to the reserve fund, and a balance of £22,648. Since operations were commenced in December, 1866, the gross profits of the concern have been in seventeen years, £4,771,148, or roughly, $23,150,000, which has been appropriated as follows: £3,324,354 dividends, £684,578 written off for property and plant, £471,568 for salaries, management, interest, and bad debts, £100,000 for sinking fund for railroad and docks, £10,000 for alteration of railroad, and $160,000 for reserve fund. The capital has steadily increased from £300,000 in 1868 to £785,071 in 1869, £838,797 in 1870, £900,000 in 1872, £1,136,660 in 1879, £1,143,560 in 1882, and £1,174,660 in 1883, at which figure it now stands, 37,670 shares at £2 being still unissued and held for emergencies. The company had a debenture debt, on December 31st, 1883, of £279,100, of which £143,100 have since fallen due, and have been paid, leaving the amount of outstanding bonds £66,000, bearing 5 per cent, and £70,000 bearing 4 per cent interest.

MR. JOSEPH NIMMO, Jr., Chief of the Bureau of Statistics, has submitted to the Treasury an interesting report on the operations of the new tariff during the last six months of 1883, as compared with the operations during the corresponding six months of 1882 of the law then in force. One of the leading schedules that was examined in detail is that of iron and steel, the value of the imports of which is shown in the following table for the years 1881, 1882, and 1883, and the six months ended December 31st, 1882, and 1883:

PERIOD.	Value.	Ordinary duty collected.	Average ad valorem rate of duty collected.
Year ended June 30th—	Dollars.	Dollars.	Per cent.
1881	66,096,403	25,610,391	38·73
1882	70,552,097	29,013,931	41·12
1883	57,529,466	21,582,554	37·52
Six months ended December 31st—			
1882	32,499,426	12,713,996	39·12
1883	23,766,583	8,207,133	34·53

Of the whole amount of duty collected during the last six months of the year 1883, as high as 83 per cent was from specific rates, and the reduction of the average *ad valorem* rate of duty, noted in the above table, is due to the reduction made in the duty on such articles as pig-iron, scrap, tin plates, and steel rails. The reduction of the average *ad valorem* rate would, however, have been considerably larger, had not the decline in the values of iron and steel and its manufactures counteracted it. Mr. NIMMO computes that, had the law remained unchanged, the reduction of the average *ad valorem* rate would have been from 39·12 in the last six months of 1882, to 32·97 during the corresponding period in 1883. Another important factor tending to make the reductions of the new tariff appear trifling, while in reality they are not inconsiderable, is, that there has been a very marked decline in the imports of that article in which the reduction was greatest. We refer to steel rails, and it is to the commercial conditions which affect the importation of rails that Mr. NIMMO has devoted a special study, interesting from more than one point of view. His figures bear particularly on one point, on which we insisted when the question of reducing the duty on steel rails was discussed, that, while there was little danger of competition, except in times of exceptional inflation at Atlantic ports, the Southern and Pacific markets were a territory more easily open to invasion. The following table by Mr. NIMMO will fully illustrate this fact:

YEAR ENDED JUNE 30.	Tons (of 2240 pounds) of steel rails imported at—				
	Atlantic ports.	Gulf ports.	Pacific ports.	Northern lake ports.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
1880	50,317	15,988	.....	.....	66,305
1881	113,392	51,888	11,242	3,459	179,981
1882	51,622	97,170	63,287	2,244	214,323
1883	8,206	49,915	54,166	550	112,837
Six months ended December 31st, 1883	679	5,785	469	.....	6,933

Mr. NIMMO thus clearly explains the situation:

"It has, however, been quite practicable to import English rails at Southern Atlantic and gulf ports, and at Pacific coast ports, since the year ended June 30th, 1881. The greater cost of delivering rails from works in the United States at points in the Southern Atlantic and Gulf States, and on the Pacific coast, than from England, leaves a margin of cost in favor of English rails. For example: During the year ended June 30th, 1883, the average freight rate on steel rails from England to San Francisco was only $4.87 per ton; whereas, during the last two years, the combined freight charges on steel rails by rail and ocean from works in Eastern Pennsylvania to San Francisco, via New York or Philadelphia—the cheapest route for such transportation—has averaged a little over $11 per ton. The manufacturer in Pennsylvania had therefore a margin of a little over $6 against him, and was of course unable to compete for rails deliverable on the Pacific coast, except as to the Northern Pacific Railroad, which is required by law to be laid with rails of American manufacture. The margin of difference in cost of transportation in favor of the use of English rails has not been so great with respect to the Southern Atlantic and gulf ports; but still it has been sufficient to enable English rail manufacturers to compete sharply with American manufacturers in supplying rails deliverable at those ports.

"The low ocean rates from England to San Francisco are due to the fact that the amount of tonnage required to move wheat from that port to England is largely in excess of the amount of tonnage required to transport merchandise from England to San Francisco, therefore the rates to that port are very low, being commonly known as 'ballast rates,' that is, rates which yield somewhat better results than sailing in ballast. The same is true with respect to New Orleans, Savannah, and Charleston. The amount of tonnage required to move cotton from these ports to England, as well as grain from New Orleans, is much greater than the amount of tonnage required to transport merchandise of all sorts from England to the ports in this country just mentioned; hence, low rates prevail for west-bound cargoes."

OFFICIAL STATEMENTS AND REPORTS.

THE BATOPILAS GROUP OF MINES, MEXICO.

THE CONSOLIDATED BATOPILAS SILVER MINING COMPANY.

The annual report of the Consolidated Batopilas Silver Mining Company for the period from November 4th, 1882, to January 5th, 1884, is a well-printed pamphlet of forty-one pages. It is the third annual report thus far rendered by the general manager and superintendent, Alexander R. Shepherd. This company, it will be remembered, was organized by Shepherd and Stevens, promoters, December 1st, 1879, and Shepherd was appointed its general manager and superintendent. This report is in many ways unpleasantly different from those of corporations desiring to give stockholders a clear insight into their business, such as the Ontario and the Horn-Silver. It contains no reports by either president, secretary, or treasurer, but consists of a short rambling statement by the general manager, followed by five exhibits supposed to show the operations of the company, certified by no one; seventeen statements of construction and other accounts, certified by no one; and three reports from employés as to ore, etc., remaining in their departments. From the amount of space devoted to surface construction accounts in this and the previous reports, it might be inferred that this was a land improvement company, and not a silver mining company. It in reality owns and works mines which we have no reason to doubt are exceedingly valuable. For the first time in its history, an account of silver produced is given in this report, and it must be very satisfactory to the stockholders, since hitherto they have only received ill-digested and uncertified building accounts, in which the same class of work never seemed to be done twice at the same rate. From this silver account, contained in the general manager's statement, we find that the San Miguel mine produced from November 4th, 1882, to January 5th, 1884, ore that yielded $198,261.78 in bars, of which $130,705.11 were credited to the mine at regular tariff rates, and $67,556.67 were credited to the reduction-works. The San Pedro and Giral mines, owned by the company, produced $8658.03 in bars, of which $3766.86 were attributed to the mine, and $4791.17 to the reduction-works. This silver was produced from the following ore, as per statement No. 5:

	1st class.	2d class.	3d class.
San Miguel mine, tons	44·542	56·801	4185·900
San Pedro mine, "	6·645	46·895	29·283
Giral mine, "	0·595	77·312	3·247

We find also that ore has been bought at tariff, mainly from mines of which Governor Shepherd is a principal owner, and treated for profit and loss. These ores bought and reduced, added to the above ores of the company, aggregated $720,864.77 in bar product; a profit was made over tariff rates of $227,908.50, which was credited to the reduction-works. It seems, therefore, clear that receipts of this company from ores and reduction for the year were the sum of the above figures, namely, $130,705.11 + 3766.86 + 227,908.50 = $362,380.47. Turning to Exhibit No. 1, we hoped to find in it a balance-sheet; but no such thing as a balance-sheet can be found in this report or the one preceding it. Exhibit No. 1 professes to be an account of receipts and disbursements from November 4th, 1882, to January 5th, 1884, and consists of a list of items followed by columns of figures, disbursements, and receipts. The first item reads under receipts: "Reduction-works, $138,731.02." As we have just learned, over the signature of the general manager, that these receipts were $227,908.50, it seems interesting to learn what caused this sudden shrinkage. Nothing in this report, however, explains it. A little farther down in this account, we find only $46,941.71 credited to the San Miguel mine, instead of the $130,705.11 already stated; and singularly enough, on page 34 we find this item appearing as $110,211.11, and by addition of the amounts paid San Miguel on account of ore in the ore purchasing accounts, pages 18–25, we find it actually is $131,868.39. This kind of book-keeping does not seem very profitable to the stockholders; for we find these columns footing up with a balance of just $5278.62. One of the items of disbursement seems peculiar. It is: Paid A. R. Shepherd and L. H. Stevens $95,909.92. It is a very unusual thing for a superintendent to lend his company so large a sum as this, and still more strange for him to repay himself without full vouchers as to the indebtedness. No such statement is attached. Hoping to trace this indebtedness, we refer to previous report of November 4th, 1882. A balance-sheet is also lacking here, and in the list of disbursements we again find paid to A. R. Shepherd and L. H. Stevens $42,417.82, without vouchers. Still on another page of this previous report, among the total receipts and disbursements since the organization up to November 4th, 1882, we find received from A. R. Shepherd and L. H. Stevens $99,790.02. Deducting the above $42,417.82, with which they have repaid themselves for a loan the object of which is not stated, we have evidently $57,372.20

remaining. This, therefore, is the figure that should be carried to the present report and discharged, if really due, with vouchers attached; but without any new item of indebtedness to them being added, $95,909.92 is the sum paid themselves. While the amount of money made by this company has unaccountably shrunk on the credit side, the disbursement to A. R. Shepherd and L. H. Stevens has just as unaccountably increased. Proceeding to Exhibit No. 2, certified by nobody as before, we have an account entitled, "The amount of receipts and disbursements since organization, December 1st, 1879, to January 5th, 1884." This is evidently the proper place to credit the item "working capital, $150,000," but no such item is noted. We are, however, informed that, on the organization of this company, $150,000 worth of stock was set aside as working capital stock, and that L. H. Stevens and A. R. Shepherd, promoters, made themselves liable that the money should be forthcoming when wanted; and that further, the money was actually paid in by them on account of this stock by a series of installments shown on treasurer's books. From this same Exhibit No. 2 we learn the total receipts of this company from all sources since its organization to January 5th, 1884, have been $925,892.30, without any mention of the working capital. The items which compose this are:

Reduction-works	$664,006.91
Assay-office	3,199.93
Transfer balance	27,406.29
State of Chihuahua (?)	19,000.00
Sundry accounts per balance-sheet, January 5th, 1884	208,688.65
Silver	3,590.52
	$925,892.30

The San Miguel mine is credited with nothing except that $93,490.06 have been disbursed for it. From the manager's statement that the mine had produced in the last year $198,261.78 in bars, we should think this account must be incorrect in crediting nothing; but just as Exhibit No. 1 ruthlessly reduces this amount to $46,941.71, so Exhibit No. 2 obliterates it entirely, and proves satisfactorily that the mine in four years never produced any thing except a disbursement of $93,490.06. This missing balance-sheet of January 5th, 1884, is referred to again in Exhibit No. 3, showing the assets and liabilities of the company, in which occurs the item "Sundry accounts as per balance-sheet, . . $242,033.65," as a liability without any particulars. It may be noted for comparison that the Horn-Silver mine, of Utah, which last year produced more than three million dollars, ends its last report with the words, "Liabilities—none!" The Ontario mine, also, in its report for two years just published, showing receipts of more than six million dollars, states its liabilities outstanding $54,016.04. These mines, however, are only managed by simple mining men, who always show vouchers, balance-sheets, and bills of particulars.

The construction accounts need a word. The following will show the amount of money spent on surface improvements, mills, walls, bridges, etc., to January 5th, 1884, found in Exhibit No. 5:

December 1st, 1879, to October 15th, 1881	$134,489.39
October 15th, 1881, to November 4th, 1882	83,475.74
November 4th, 1882, to January 5th, 1884	78,776.45
	$296,741.58

It is noted in these accounts that only $167,000 have been sent forward to New York as dividends; but this figure seems incorrect, as six dividends were paid in 1880 and 1881, aggregating $280,000. The plant consists to-day of a thirty-stamp steam mill, a fifteen-stamp mill driven by water, a lixiviation-works, railroad to mine, bridge, river walls, hacienda, etc. This property is in fact too well equipped for the way the mining work is carried on. The San Miguel mine is represented on all sides to be a very valuable property, consisting of a tunnel cutting some fifteen or sixteen different silver-bearing veins, and always producing heavily when well treated. At the time of the purchase, 1879, we recall a bonanza had just been struck into at the junction of the Mesquite and Veta Grande veins. Under Shepherd management, the main and almost only work done on the mine has been in this bonanza. No new exploration-work of value has been initiated, and the ores of this bonanza are now decreasing in richness and amount, with no reserves developed. In the time covered by this report of fourteen months, we find that $65,114.65 were spent on the mine, of which only $16,880.02 were on exploration-work. This exploration-work might have been effective had it been guided by a good plan; but we find a few feet driven here, and a few feet there in a good many places, but no continuous developing work. It is stated that the San Miguel mine has been purposely placed in this shape by its manager, and that the whole force of this company has been wasted in subordinating it to the milling and other needs of the mines of which A. R. Shepherd is a main owner, and that now the mine being a little overworked and under-prospected, the mills double what the property justified by its ore output, a proposed consolidation is mooted by L. H. Stevens and the manager to unite it with the companies mainly owned by them. In this way, the other properties will get for nothing the mill built by Consolidated Batopilas Silver Mining Company money mainly to accommodate them.

Since this report contains scattered through it various totals which, in the aggregate, undoubtedly have formed the main expenditures of the business, it seems well to calculate from them a partial balance-sheet:

	Dr.	Cr.
Total receipts December 1st, 1879, to January 4th, 1884 (Exhibit 2, p. 13)		$925,892.30
Total expenditures San Miguel mine 1879 to 1884 (p. 34)	$205,546.42	
Total expenditures San Pedro mine 1879-1884 (p. 35)	53,683.25	
Total expenditures Giral mine 1879 to 1882 (Report 1882, p. 17)	19,987.45	
Total construction accounts 1879 to 1884 (Exhibit No. 5, p. 16)	296,741.58	
Total dividends New York, 1879 to 1884	280,000.00	855,958.70
		$69,933.60

It seems clear, therefore, that the property has made enough to pay its dividends, its construction accounts, and its mining accounts with almost $70,000 beyond to pay its other expenses. These other unspecified minor expenses must therefore have amounted, according to this report, to this $69,933.60, *plus* liabilities (Exhibit 3) $242,033.65, *plus* amounts paid to L. H. Stevens and A. R. Shepherd, without particulars, of $42,417.82 at one time and $95,909.92 at another. In other words, the *minor expenses of the business* have amounted to $450,294.99, or almost a half-million of dollars, for which no accounts are rendered. The report ends with a menace: "The *working capital fixed in the organization* (already noted as wanting in the receipts (has proved to be entirely inadequate for building (*sic*) up of such a business as is and was required for this remote mining district. By dint of personal sacrifices, great labor, and much personal discomfort, *this lack has been supplied;* but those who are equally interested in the enterprise should assist in carrying out what is necessary to make a permanent mining industry here. . . . Some arrangement by which necessary further outlays can be met is needed. I commend the subject to your attention." If it is not attended to, the frightened stockholder may naturally ask, Are these liabilities, per balance-sheets not rendered and without particulars, to be piled on and on, until the mine becomes the property of L. H. Stevens and A. R. Shepherd? Before closing, a last quotation from the statement of the general manager and superintendent would seem to cover the whole matter. It is found on page 10, near the top: "While I have great faith in the property, I think it has, up to this time, been the victim of poor superintendence." We quite agree with him!

OTHER REPORTS.

Four other companies publish their reports in one pamphlet. They are all prospecting enterprises managed by A. R. Shepherd, and all have the same officers and directors for convenience; but they do not thereby constitute a syndicate or a consolidation of companies. Each is a separate company.

THE CAMUCHIN CONSOLIDATED.

This mine produced, from December 30th, 1882, to January 5th, 1884, $117,130.07, as against $81,133.52 of expenditures, of which $53,253.49 are expenditures on mine, and $27,457.53 are a payment of advances made by L. H. Stevens and A. R. Shepherd, leaving a balance of $48,042.04 deposited in the hands of the Consolidated Batopilas Silver Mining Company. The ore was all sold to the reduction-works at tariff rates. In closing the report, he says: "It will be a lasting property in my opinion; but it will require a good reserve fund to render its working a success. It will not do to let it need money for development. The mistake with the organization of all the Batopilas companies was lack of sufficient working capital. These have been supplied at *great sacrifice by Mr. Stevens and myself.*" The original working capital was, we understand, $25,000, and the promoters, Stevens and Shepherd, agreed to put up $25,000 additional as needed. No balance-sheet showing working capital, and no reports by president, secretary, or treasurer.

THE DESCUBRIDORA CONSOLIDATED SILVER MINING COMPANY.

In this report, the manager states: "My faith is shown by advances by me aggregating nearly $50,000. My belief is, that in a few years (for it is a big property) it will be equal to any in the mineral, and will be yielding when we and our immediate descendants shall have passed away." This does not seem very encouraging for stockholders! This company was organized with a working capital of $75,000, and the present manager as promoter promised to put up $25,000 additional. A large amount of this money was spent for a premature mill, instead of underground, and in buildings. This report shows an indebtedness to L. H. Stevens and A. R. Shepherd of $49,257.30. Another quotation: "As the advances made by me are in excess of my undertakings, *I recommend an advance to this company be made from the Camuchin* at the discretion of the directors of the New York companies, *as the debt practically places the property in my hands,* and the other stockholders *might* lose their interests should any thing occur to Mr. Stevens or myself." This whole business of a manager lending the company he is superintending money, disbursing it himself, lavishly or foolishly, as the case may be, and then levying on product or on the property itself for reimbursement is of very doubtful morality, and the recommendation to one company to grab the cash balance of another company, and thus pay an unauthorized debt of this kind, needs no comment. No balance-sheet, or reports by president, secretary, or treasurer.

VALENZUELA CONSOLIDATED.

In report January 25th, 1883, the manager says: "I inclose statement to credit of this company on books of the Consolidated Batopilas Silver Mining Company aggregating $5810.09." No statement attached. In report January 5th, 1884, this amount fades away to balance advances by A. R. Shepherd and L. H. Stevens. The report concludes: "Every thing is in favor of this property, location, tradition, records—the only thing lacking is success." Very little continuous work has ever been done on this property. Working capital $25,000 and $25,000 additional from promoters. No general balance-sheet. No reports by president, secretary, or treasurer.

ANIMAS MINE.

In report January 25th, 1883, he says, "I should regard this property as likely soon to be in bonanza;" but in the present report he says: "My belief in the value of the property is departed. I do not believe it will pay to work it; but before abandoning it shall await the action of the directors." This property is stated to be still in the debt of A. R. Shepherd and L. H. Stevens $6022.81, although they have not yet paid up all the extra working capital of $25,000, to which as promoters they bound themselves. No general balance-sheet. No reports by president, secretary, or treasurer.

COAL BIDS FOR THE PHILADELPHIA GAS TRUST.—Bids were opened April 24th, by the Gas Trust, for 350,000 tons of coal to be furnished to the Philadelphia gas-works. The awards will not be made for two weeks. It is thought that they will be given to James Boice, of Baltimore, who offers 100,000 tons of Youghiogheny coal at $4.14 a ton, and to the Westmoreland & Pennsylvania Gas-Coal Company, which offers the rest at $4 a ton. Last year, the contracts were let at $4.35 a ton, and the year before at $5.50 a ton.

LOW PRICES OF LEAD IN ENGLAND IN THE LAST CENTURY.

The burden of the discussion at meetings of lead mining companies has naturally for a number of years been the low price of that metal. Mr. John Taylor, at the Fortuna Company's meeting, presented curious statistics in the handwriting of Mr. John Taylor, the founder of the firm of John Taylor & Sons, and the grandfather of the present John Taylor. The statistics were drawn up by the founder of the firm when he had reached an advanced age, and are not the least remarkable as an admirable specimen of calligraphy. He remarks: "The prices of pig-lead per ton during the forty years previous to 1820 are exhibited in the following table, calculated from the books at the smelting-works of the Duke of Devonshire, at Grassington, in Yorkshire:

	£	s.	d.		£	s.	d.
1780	11	7	6	1800	19	16	0
1781	12	18	6	1801	22	8	6
1782	16	13	0	1802	24	16	6
1783	19	12	0	1803	27	15	6
1784	16	8	0	1804	28	0	0
1785	16	1	0	1805	27	11	6
1786	16	2	6	1806	35	12	6
1787	21	4	0	1807	30	3	0
1788	21	10	0	1808	30	1	0
1789	19	17	6	1809	31	3	0
Ten years' average, £17 3s. 4d.				Ten years' average, £27 14s. 9d.			
	£	s.	d.		£	s.	d.
1790	16	1	6	1810	28	16	0
1791	18	2	6	1811	24	0	6
1792	19	8	0	1812	23	3	6
1793	19	3	0	1813	25	14	0
1794	14	10	0	1814	26	11	0
1795	16	15	0	1815	20	16	0
1796	18	6	0	1816	16	5	0
1797	16	17	0	1817	18	5	0
1798	15	7	6	1818	27	5	6
1799	16	9	6	1819	22	11	0
Ten years' average, £17 2s. 0d.				Ten years' average, £23 6s. 9d.			

"Thus we see that the exertions of the miner were stimulated by a great increase in the value of his product, holding a tolerably even course for twenty years, in which only one period of depression occurred, and that was soon followed by a return to high prices. During this period, the supply of lead from other parts of Europe was not very considerable. The countries which produced it were Hanover, Saxony, Carinthia, Silesia, and Hungary; but, excepting the first, which exported to Holland, they had little more than supplied the demand of the districts of the continent in their vicinity. Spain, indeed, possessed lead mines, but the law prevented the export of their produce and paralyzed every effort to work them extensively.

"*Capital Engaged in Lead Mining in Great Britain in* 1820.—I find very great difficulty in giving any estimate with respect to this part of the subject. The mines are spread over so many different districts, and in any one district I should doubt whether two mines would be found to correspond in this respect. In one case, a considerable sum is expended, no adequate discovery is made, and the greater part is lost; in another, by the application of a very small amount of capital, an annual profit more than twenty-fold the sum invested has been gained.

"Many mines must be considered as having long ago repaid the capital invested, and others again in which all has been lost."

RUSSELL'S IMPROVED PROCESS FOR THE LIXIVIATION OF SILVER ORES.—I.*

With Critical Remarks on other Methods of Copper, Silver, and Gold Extraction.

By C. A. Stetefeldt, New York City.

For the convenience of those who do not care to enter into the details of this long essay, I begin with a summary of the most important results it presents.

The extraction of silver by the lixiviation process from ores that have been subjected to a chloridizing roasting is based upon the fact that silver chloride is easily soluble in solutions of sodium or calcium hyposulphite, and that silver is precipitated from such solutions by an alkaline sulphide, with regeneration of the hyposulphite salts. In case the ore contains lead, a large portion of the latter is also dissolved, lead sulphate being soluble in hyposulphite solutions. If, at the same time, copper is present, the sulphide precipitated from the solution contains silver, copper, and lead, a combination of metals not desirable for subsequent treatment.

Mr. E. H. Russell, of Park City, Utah, is the inventor and the patentee in the United States and in several foreign countries of a new lixiviation process, based upon the chemical facts discussed in this paper. Mr. Russell has discovered that lead can be completely separated from a sodium hyposulphite solution, as lead carbonate, by sodium carbonate or purified soda-ash, without precipitating any copper or silver. After decanting the solution from the lead carbonate, silver and copper are obtained from it in the usual way. This method of separating lead prohibits the use of calcium polysulphide as a precipitant for the sulphides, because any calcium entering the regenerated lixiviation solution would also be precipitated as a carbonate with the lead by soda-ash. Hence, a sodium sulphide must be employed. A full investigation has demonstrated that this is by no means detrimental. Sodium sulphide and hyposulphite are more advantageously used in the lixiviation process than the corresponding calcium salts. Another defect in the lixiviation process consisted in the necessity of a very perfect chlorination of the silver in the ore, because silver in any other combination, or in the metallic state, would be only imperfectly extracted by sodium or calcium hyposulphite. Mr. Russell discovered that a solution of a double salt of cuprous hyposulphite and sodium hyposulphite, formed by mixing sodium hyposulphite with copper sulphate, exerted a most energetic dissolving and decomposing action upon metallic silver, silver sulphide, and its combinations with antimony and arsenic. Hence, if a charge of ore is first lixiviated with ordinary sodium hyposulphite solution to dissolve the silver chloride, and subsequently with cuprous hyposulphite—this solvent is called the extra-solution—an additional amount of silver is extracted that would have been lost in the tailings by working according to the old method alone. This process can also be introduced with profit to extract silver from ores without roasting, or after they have been subjected to an oxidizing roasting.

The sulphides of silver and copper, obtained as precipitates in the lixiviation process, are dissolved by nitrated sulphuric acid, the escaping nitric acid being reconverted to nitric and nitrous acid according to well-known chemical principles. From the solution, cement-silver is precipitated by metallic copper, and copper sulphate results by crystallization. A part of the latter is again needed for preparing the extra solution. Having thus briefly and generally stated the substance of Mr. Russell's discoveries, I now proceed to consider the subject in detail.

Mr. Russell, being in charge of the assay-office at the Ontario mill, Utah, has carried out a series of experiments, the results of which have led to his improved process for lixiviating silver ores. These researches are so thorough and extensive, they cover so much untrodden ground, and have brought to light such novel and interesting facts, that they must command general attention, not only for the sake of their practical importance, but also for their purely scientific value. Having procured for Mr. Russell the support of Mr. R. C. Chambers, the General Manager of the Ontario Silver Mining Company, in testing the practical value of his discoveries by experiments on a large scale, and having followed the progress of his work with ever-increasing interest, I have prepared the results of his investigations for publication.

I propose to describe Russell's process principally from a scientific, and not from a technical stand-point, leaving a description of the plant and the manipulations, and a full consideration of all economic questions, as the subject of a paper to be published hereafter.

In the lixiviation of silver ores, by means of a hyposulphite solution, which process was first proposed by Prof. John Percy, two difficulties have heretofore been met with which have rendered the process inapplicable in many cases. These are: 1st. The difficulty of producing bullion free from lead. 2d. The necessity of a very perfect chloridizing roasting, since the hyposulphite solution acts only imperfectly upon metallic silver and such of its combinations as have not been transformed into the chloride by the roasting process.

In the amalgamation of roasted silver ores, silver bullion almost entirely free from lead is produced if certain precautions are taken, even in case the ore contains a large percentage of lead minerals. If native silver occur in the ore, which is not entirely converted into chloride by roasting, this silver amalgamates readily. Silver compounds, too, that are not converted into chloride are decomposed to a certain extent, and the silver is amalgamated, especially if the roasted ore contains soluble copper salts. Hence, a larger percentage of silver is in many cases extracted by amalgamation than that shown to be present as chloride according to the customary chlorination tests.

To make lixiviation applicable in all cases, was the object of Russell's researches; and how well he has succeeded will be demonstrated in the following pages.

The solubility of a substance in a liquid may be considered as a function of temperature, concentration of the liquid, and time of reaction, other conditions being equal. In regard to the solubility of certain combinations of silver and other metals in a solution of sodium hyposulphite, we may state here at once that temperature enters, in so far as an important factor, as moderately warm solutions, say from 25 to 50 degrees C., act more energetically and dissolve in less time than cold ones. A much higher temperature of the solution, however, must be avoided.

In making chlorination tests of roasted silver ores with a sodium hyposulphite solution, it has been generally assumed that the silver extracted is all in the form of chloride. This is not correct. The solution reacts, more or less, upon metallic silver, and also upon many silver combinations other than chloride, especially if the roasted ore contains a considerable amount of soluble copper salts. The silver bromide and iodide do not interest us here.

In the following investigations on solubility, it might have been of interest if, in every case, a series of experiments had been conducted with the view of arriving quickly and surely at saturation-points by using less solution, and a large surplus of the substance to be dissolved. I do not think, however, that my general conclusions, drawn from these researches, would be affected by such additional information. This has been verified in special cases. I also wish to say that, if others should repeat similar experiments, they should not be astonished at finding numerical results differing, more or less, from those recorded here. They will undoubtedly arrive at the same general conclusions as those presented in this paper.

I. THE REACTIONS OF A SODIUM HYPOSULPHITE SOLUTION.

Silver forms, with the hyposulphites of sodium, potassium, and calcium, two series of double salts. The one has the formula $2RS_2O_3 + Ag_2S_2O_3 + 3aq$, and the other $RS_2O_3 + Ag_2S_2O_3 + 2aq$.

Of these double salts, the former are easily soluble in water, and the latter much less so.

§ 1. *Solubility of Metallic Silver.*

[In all the following experiments, the metric system is used.]

0·500 gm. cement-silver were treated cold (at about 15 degrees C.) for forty-eight hours with 1000 c. c. of solutions containing respectively 10, 25, 50, 100, 150, 200 and 250 gm. $Na_2S_2O_3 + 5aq$. The result was, that the 1 per cent solution dissolved as much silver as the 25 per cent solution, namely, 0·030 gm. Solutions of intermediate strength gave figures somewhat higher or lower. This shows that the dissolving energy of the solution is not increased by concentration, a peculiarity that will be met with frequently in subsequent experiments. In repeating this experiment at a temperature of 50 degrees C., the solubility of the silver was materially increased. The 20 per cent, 15 per cent, and 5 per cent solutions dissolved 0·100 gm. silver each, and the others somewhat less.

§ 2. *Solubility of Metallic Gold.*

0·050 gm. gold-leaf was treated for forty-eight hours with 1000 c. c. of solutions of different concentration as in § 1. In every instance, about 0·002 gm. gold was dissolved, the deviations from this quantity being

* Read at the Cincinnati Meeting of the American Institute of Mining Engineers.

exceedingly slight. No differing results were obtained with cement-gold.

§ 3. *Solubility of Silver Sulphide.*

No silver was dissolved after exposing 2 gm. Ag_2S to hyposulphite solutions of different concentration for twenty-four hours.

§ 4. *Solubility of Gold Sulphide.*

Gold sulphide is decomposed by a solution of sodium hyposulphite. For energetic action, heating to 50 or 60 degrees C. is necessary. In treating 2 gm. Au_2S_3 for twenty-four hours cold, 0·066 gm. gold was dissolved, while at a temperature of 65 degrees C. 0·117 gm. gold went into solution in two hours. An alkaline sulphide again precipitates Au_2S_3 from the solution.

§ 5. *Solubility of Silver Arsenate.*

Silver arsenate was prepared which contained, by fire-assay, 67·75 per cent silver. This corresponds nearly with the formula Ag_3AsO_4. 1 gm. of this salt treated with 500 c. c. of a 5 per cent sodium hyposulphite solution, without heating, showed, after twenty hours, only a residue of 0·003 gm. undissolved.

§ 6. *Solubility of Silver Antimonate.*

Silver antimonate was prepared which contained, by fire-assay, 36·46 per cent silver. This corresponds with the formula $AgSbO_3$. In treating 1 gm. under the same conditions as in § 5, 44 per cent, or 0·160 gm. of the silver, went into solution, and a residue of 0·177 gm. was left undissolved. The composition of the latter was not ascertained.

§ 7. *Solubility of Cuprous Chloride.*

Cuprous chloride, Cu_2Cl_2, is dissolved by sodium hyposulphite with the formation of double salts, the nature of which will be fully considered in subsequent paragraphs.

§ 8. *Solubility of Lead Sulphate.*

Lead forms a sodium hyposulphite double salt of the formula $2Na_2S_2O_3,PbS_2O_3$, without water. The solubility of lead sulphate in sodium hyposulphite is characteristic on account of its being principally a function of the concentration of the solution. If the same quantity of sodium hyposulphite is dissolved in varying quantities of water, the solubility of the lead sulphate increases materially with the concentration of the solution. The following figures, deduced from a series of Mr. Russell's experiments, will illustrate this :

Concentration of the solution in $Na_2S_2O_3 + 5aq.$	Amount of $PbSO_4$ dissolved for one part of $Na_2S_2O_3 + 5aq.$
5 per cent.	0·080
6·6 "	0·102
10 "	0·131
20 "	0·194
25 "	0·226

This peculiarity is very favorable for working on a large scale, where hyposulphite solutions of low concentration are used, and the quantity of lead sulphate dissolved is thus brought to a minimum. Cold solutions seem to be better solvents than warm ones.

§ 9. *Solubility of Calcium Sulphate.*

The solubility of calcium sulphate or gypsum per unit of sodium hyposulphite is principally a function of the concentration of the solution. The more dilute solutions are relatively better solvents than more concentrated ones. The following figures are deduced from a series of Mr. Russell's experiments. The solubility of calcium sulphate is decreased by elevating the temperature of the sodium hyposulphite solution. The experiments below were made at about 18 degrees C.

Concentration of the solution in $Na_2S_2O_3 + 5aq.$	Amount of $CaSO_4$ dissolved for one part $Na_2S_2O_3 + 5aq.$
5 per cent.	0·157
6·6 "	0·143
10 "	0·119
20 "	0·117

The solubility of gypsum in calcium hyposulphite is somewhat less than in the sodium salt.

§ 10. *Solubility of Silver Chloride.*

In dissolving AgCl by sodium hyposulphite, both double salts mentioned at the beginning of this chapter are formed.

Two methods can be used in determining the solvent energy of sodium hyposulphite for silver chloride.

1st. By exposing freshly precipitated AgCl to the solution.

2d. By adding $AgNO_3$ to a hyposulphite solution that contains sodium chloride. In this case, the AgCl is dissolved "*in statu nascendi*," and as soon as saturation has taken place, the solution becomes turbid.

If, in the second method, a silver solution of known standard is taken from a graduated burette, the result is sufficiently accurate for practical purposes to ascertain the strength of a lixiviation solution in hyposulphite. The exact end of the reaction, however, is not plainly visible.

The first method gives somewhat varying results if a large surplus of AgCl is used, and left exposed to the solution for a long time. Then the less soluble double salt $Ag\ S_2O_3 + Na_2S_2O_3 + 2aq.$ is formed. By using solutions of more than 10 per cent concentration, the AgCl hardens into lumps, because in such cases the quantity of water present is not sufficient to dissolve the argentic double salts. For solutions of lower concentration, the solvent energy is almost entirely a function of concentration, and increases in proportion to the quantity of sodium hyposulphite present.

Mr. Russell's determinations by the first method give an average coefficient of 0·301 Ag, or 0·400 AgCl, for one part of $Na_2S_2O_3 + 5aq.$

By the second method, the coefficient is Ag. or AgCl (*see* Postscript to this paper), for one part $Na_2S_2O_3 + 5aq.$ The latter figures are to be considered as the more correct ones.

It is of considerable interest to know in what degree the solubility of AgCl is influenced, if other soluble salts are mixed with the solution, or if the latter has been saturated with salts not very soluble in water, but soluble in sodium hyposulphite. The principal combinations that in this respect play an important part in the lixiviation process are the sulphates of lead, calcium, and sodium ; and these alone we shall consider.

Influence of Lead Sulphate.—If lead sulphate has been dissolved in a sodium hyposulphite solution, and the latter is tested for its solvent energy for silver chloride, the results show a marked decrease. It is not astonishing that this should be so, because a part of the sodium hyposulphite is consumed in the formation of the lead salt. Assuming that this has the formula $2Na_2S_2O_3,PbS_2O_3$, and calculating the amount of sodium hyposulphite necessary in its formation, we find that the dissolving energy of the solution for silver chloride has been less reduced than should be expected, taking Mr. Russell's value of 0·400 for the solubility of silver chloride as a basis for calculation. From Mr. Russell's experiments, I have deduced the following table :

Solution contains for one part $Na_2S_2O_3 + 5aq.$ dissolved parts of $PbSO_4$	Decrease of dissolving energy for AgCl.	Decrease expected by the formation of $2Na_2S_2O_3,PbS_2O_3$.
0·045 parts.	8·6 per cent.	11·0 per cent.
0·054 "	11·2 "	13·2 "
0·059 "	12·6 "	14·4 "
0·086 "	15·4 "	21·0 "
0·107 "	23·8 "	26·2 "

Influence of Calcium Sulphate.—In testing the solubility of silver chloride in a sodium hyposulphite solution saturated with gypsum, no marked decrease of solvent energy was clearly established. The reason is obvious. A double salt of sodium and calcium hyposulphite is formed, and sodium sulphate. Any decrease in solvent energy would most likely be produced by the presence of the last-named salt.

The same results were obtained in saturating a calcium hyposulphite solution with gypsum.

Influence of Sodium Sulphate. (*See* Postscript.)

§ 11. *Solubility of the Carbonates of Silver, Copper, Lead, and other Metals.*

Mr. Russell has discovered a reaction of which I have found no previous record, namely, that $PbCO_3$ is insoluble in a sodium hyposulphite solution, while the carbonates of silver and copper are soluble, which latter fact was known. Hence, if Na_2CO_3 is added to a hyposulphite solution containing lead, silver, and copper, $PbCO_3$ alone is precipitated. If a solution of pure $PbSO_4$ in sodium hyposulphite is so treated, the precipitation of the lead is so complete that H_2S gives no reaction in the filtrate. Upon these reactions is based the separation of the lead from silver and copper in Russell's lixiviation process. In effecting this on a large scale, it is most economical to use the commercial soda-ash. The latter, if manufactured by the old process, contains more or less Na_2S, and precipitates Ag_2S with the $PbCO_3$, whereby a product results rich in silver. In order to purify the soda-ash, Mr. Russell makes use of the fact that $CuCO_3$ is soluble in a hyposulphite solution, and CuS is not. He dissolves the soda-ash in water containing about 1½ per cent $Na_2S_2O_3 + 5aq$, and then adds a solution of copper sulphate. Copper sulphide is precipitated, and the soda-ash so purified yields a lead carbonate retaining a trace of silver only. But the soda-ash may also contain caustic soda. The latter, if present in a hyposulphite solution, has an injurious effect in extracting silver by lixiviation. In order to remove it, the soda-ash solution is first boiled with sulphur, whereby sodium polysulphide and hyposulphite are formed, and then the sodium polysulphide is decomposed by copper sulphate as stated above. The carbonates of iron, manganese, and zinc, and also of calcium, share with the lead the peculiarity of being insoluble in a hyposulphite solution. In well-roasted ores, only traces of iron salts exist, and these, as well as the chlorides and sulphates of zinc and manganese, are removed by the wash-water. Hence, none of these carbonates is precipitated with the $PbCO_3$.

(TO BE CONTINUED.)

CLAPP & GRIFFITHS'S FIXED CONVERTER.

A new patent low-pressure fixed vertical converter has been introduced by Messrs. Clapp & Griffiths, of Nantyglo, South Wales, and has been adopted by a number of firms in Great Britain, including the Ebbw Vale Iron and Steel Company ; Messrs. Nettlefolds, of Birmingham ; Messrs. Hatton, Sons & Co., of Bilston ; Messrs. B. Conway & Co., of Newport, etc. The American patent has been sold for a large sum to a syndicate, which is about to adopt the process, and it is also in course of adoption in France. The converter, according to the *Iron and Steel Institute Journal*, is likely to become a rival to the Siemens open-hearth furnace rather than any other existing system or process, its inventors claiming for it that it is specially suited to the manufacture of soft steel for tin plates, etc. The special merit of the converter is said to lie in the fact that the plugs or valves, which are worked automatically, make a fixed converter a practical success, which has not hitherto been the case ; the plugs enabling the supply of blast to the converter to be regulated as desired, and by closing them as soon as the "blow" is down, the metal is prevented from being oxidized while tapping. At the same time, the metal is prevented from entering the tuyeres. The tuyeres are placed horizontally, from 8 to 9 inches from the bottom of the converter, which enables a very soft blast, of from 5 to 6 pounds per square inch, to be used. The slag, as it rises on the surface of the metal during the operation of blowing, is run off, and the analysis of the steel is said to show a remarkable freedom from silicon, seldom giving more than a trace. The metal obtained is usually of a uniformly mild nature, and suitable for purposes where great ductility and welding properties are required, especially for boiler plates, ship plates, welded tubes, etc.

The following tests of steel from these converters were made at the works of the Leeds Forge Company, Leeds :

1. Tensile strength per square inch, 27·33 tons. Elongation, 30 per cent.
2. Tensile strength per square inch, 27·33 tons. Elongation, 30 "
3. Tensile strength per square inch, 29 23 tons. Elongation, 25 "
4. Piece welded tube, ¼ inch thick, 2½ inches diameter, tested to 1500 pounds per square inch by hydraulic pressure without altering its form.

The converters now worked are adapted to charges varying from 1 ton to 3 tons, and thus bring the production of soft steel within the reach of small manufacturers. The cost of a plant is small, compared with rival systems ; and wherever forges have small blowing-engines, they can be adapted to this system, leaving the cost of the plant very small. The inventors state that their converter will turn out from 16 to 18 charges per working day.

ON PRECAUTIONARY MEASURES AGAINST EXPLOSIONS OF FIRE-DAMP.—IV.*

By M. Hoernecke, Halle, Germany.

The safety-lamp is the simplest and best means to ascertain the presence of fire-damp and to judge of danger; and even in its present construction, it is the best and safest means to light underground workings in mines showing fire-damp. Although some engineers claim it to be the aim of ventilation to supply all the workings with fresh air in such a manner that it would be possible to work with open lights, there are many reasons why their use might lead to explosions; for instance, accidents in the ventilation, the carelessness, often great, of the workmen, and the fact that it is impossible to determine in every case in what manner and when the fire-damp will appear. Therefore explosions are best avoided by the use of the safety-lamp. Its construction is based upon the fact, ascertained by experiments, that the explosion of marsh-gas, inclosed in a narrow tube, is only transmitted to a certain distance from the point of ignition, because the products of combustion are cooled to such an extent that they can not ignite other particles of gas. The narrow tubes are formed in the safety-lamp by meshes of wire-cloth around it, the wire being thicker or the cloth having a greater number of meshes as the mixture of gas is more or less easily ignited. The combustion of marsh-gas entering through the meshes then takes place only within the wire-cloth of the safety-lamp; and even if the air in the mine contains a high percentage of explosive gas, the wire, whether it be iron or copper, will only become red-hot without permitting the flame to pass outward and light the fire-damp. The temperature of ignition of the gaseous mixture is higher than that of red-hot iron; but the gradual burning away of the wire-cloth is a reason why it should not be allowed to remain at such a temperature for any length of time.

Too violent a current of air is much more readily capable of driving a flame out beyond the wire-cloth, and therefore has been the main reason for a great variety in the construction of the safety-lamp. Bainbridge states that not a single lamp affords security as long as the current of air reaches a velocity of 3·06 meters a second. Another point influencing the passage of flame is the movement of the lamp.

The safety-lamp was invented by Davy in 1815, though opinions differ even in England whether he, or Clanny, or Stephenson was the first inventor. In the Davy lamp, a conical wire-cloth simply surrounds the flame, and at the same time serves as the chimney for taking off the products of combustion. As a consequence, it needs only a low velocity of the current of air to cause the ignition of the explosive gas mixture when there are 144 meshes to the square centimeter. Other lamps afford perfect safety with as narrow a mesh. Besides, a light, when surrounded by metallic cloth, loses from sixty to eighty per cent of its effect, and therefore the power of the Davy lamp is only ·018 candles. This disadvantage is avoided in the Clanny lamp by replacing the lower part of the wire-cloth by a glass chimney or cylinder from fifty-five to sixty millimeters high. The power is thus increased to ·029 candles, and at the same time the lamp is protected against the current of air. The air necessary for the combustion enters through the wire-cloth about the glass cylinder, the air descending along the sides of the latter to the wick, while the hot products of combustion escape upward through the center. The design of Boty in Belgium and France is similar to that of Clanny, and a further improvement of the latter is the lamp invented in 1836 by Mueseler, the advantages of which were determined by a commission appointed in 1868 in Belgium. Its use was made compulsory by a decree dated June 17th, 1876, for all Belgian collieries where vegetable oil is used. The Mueseler lamp has a glass cylinder above the oil receptacle, and above the wick has a conical sheet-iron chimney covered by an almost cylindrical wire-cloth, so that the lamp is completely isolated. Besides this, a metal ring, attached to the upper edge of the glass cylinder, bears a horizontal wire-cloth which covers the annular space between the chimney and the outer wire-cloth. The air required for the combustion enters through the outer wire cylinder and the horizontal wire-cloth, thus reaching the flame from above, while the products of combustion are carried off through the sheet-iron chimney. The ventilation, therefore, is more rational in the case of the Mueseler lamp, and therefore its power is somewhat greater than that of the Clanny. The dimensions prescribed in Belgium are the following: Outer diameter of glass cylinder, 60 millimeters; thickness, 5½ millimeters; hight, 62 millimeters; inner diameter of chimney, from 10 to 30 millimeters; hight above the horizontal wire-cloth, 90 millimeters; below it, 27 millimeters; and distance of its lower edge from the wick, 22 millimeters. The outer wire-cloth cylinder has a hight of 109 millimeters, the wire being ½ millimeter thick and having 144 meshes per square centimeter. These dimensions are here given in such detail because the Belgian Commission attached the greatest importance to them, and because they may be looked upon as the standard measurements for the construction of the safety-lamp.

Another form that became known simultaneously with the Davy is the Stephenson lamp, which has been the original form for all safety-lamps supplied with air from below. The air is conducted into it through a series of fine holes through the lock-ring, the flame being covered by a high glass cylinder and a cap of perforated copper which is protected by a wire-cloth cylinder. This, however, affects the intensity of the light, and its power is only about equal to that of the Davy.

Comparing these three types, which have been the basis of all later improvements in safety-lamps, it should be noted that the simple Davy is the most sensitive, and that in it a close study of the flame itself is not prevented. It is therefore particularly useful as a lamp for the examination of a mine, though it is less adapted to regular working on account of its low power. Its flame is easily extinguished in fire-damp, and any strong current of air makes the flame easily pass through the wire-cloth. The objection is frequently made to the glass lamps that the cylinder cracks easily when the lamp is inclined or drops of water touch it, and that the connection between the cylinder and the oil receptacle and wire-cloth is difficult to make tight. So far as the cracking of the glass is concerned, the cracks are always so fine that they do not admit the fire-damp. The connections of the glass cylinder can be well made by carefully grinding its edges. Those lamps that are supplied with air from below have the disadvantage that they are easily extinguished when suddenly moved downward, because the velocity of the air entering the lamp drops to zero, and the flame is deprived for a moment of the necessary oxygen. The Clanny lamp has the advantage, as compared with the Mueseler, that it is possible to light the roof better, and that it is not so easily extinguished. So far as the first point is concerned, the reason is, that there is no chimney to cover the light; and the second point is explained by the circumstance that the chimney will carry off the products of combustion completely only when it hangs vertically. The Mueseler lamp extinguishes in fire-damp when there is seven per cent or more of marsh-gas in it, because the flame becomes so large that the chimney can not carry off the products of combustion; the latter, spread outside of the chimney, prevent the supply of oxygen to the wick, and so stop the process of combustion. On the other hand, the flame in the Mueseler lamp is better protected by the chimney and the horizontal wire-cloth against the action of a current of air, and a passage of flame is not to be as much feared with it as it is with the Clanny. Both forms may be looked upon as the best working lamps, and the Clanny or Boty system is preferable when there are only small quantities of fire-damp in seams whose roof is weak, while the Mueseler system has until now proved the safest one under all circumtances.

It is true that, in the case of those lamps that are supplied with air from below, they avoid the disadvantage of being extinguished when rapidly moved downward, and they are extinguished easily also in highly explosive mixtures; but when the air-supply passages are too wide, there is danger that the flame will pass downward more easily. On the other hand, these passages become clogged very easily, the supply of air is insufficient, and then it requires more work to keep them clean. It is hardly fair, therefore, to claim for the lamps having the air supply from below that they are safer, and, so far as the power is concerned, the Stephenson ranks much lower than either the Clanny or the Mueseler lamp.

In the German coal regions, the Davy lamp is used now only for a preliminary investigation of the ventilation of some mines; the Mueseler is employed only in some parts of the Worms District, and in the Rhenish parts of the Saar Basin, in the Saarbrücken District, in Saxony, Silesia, and a number of mines in Westphalia; while the Clanny or Boty construction is most generally used. It is partly so modified that the upper part of the wire-cloth cylinder consists of sheet-copper perforated with a corresponding number of fine round holes, in order to prevent the burning through of the cylinder cover which otherwise might easily occur. The standard lamp in Saarbrücken has a glass cylinder 65 millimeters high, with an outside diameter of 58 millimeters, and a thickness of 6 millimeters, the wire-cloth having 144 meshes to the square centimeter, and being made of ½ millimeter wire. In the greater number of the Westphalian mines, however, the so-called Westphalian lamp and the Herold lamp are used. The former is supplied with air from below through a perforated brass ring carrying a glass cylinder on an average 60 millimeters high, and above the latter a conical wire-cloth from 85 to 95 millimeters high. In the Herold lamp, the air enters through openings in a ring about the oil receptacle, covered by wire-cloth, thus avoiding the danger of the action of the flame upon the fire-damp. In the Westphalian lamps, the number of meshes varies from 100 to 131 per square centimeter. They are too large to afford safety against the passage of the flame in a strong current of air. The orifices for the supply of air are as high as one millimeter in diameter, and, being small in number, their total section often does not even reach one per cent of the area of the meshes of wire-cloth. The supply of air is not sufficiently large, and the openings themselves are too great to avoid the danger of ignition of an explosive mixture, so that the lamp, while having a low power, hardly offers any security against the danger of explosion, and must, therefore, be utterly condemned. Gildemeister and Kamp have attempted to improve the Westphalian lamp, by using two concentric glass cylinders and double wire-cloth, like the Morrison lamp. Rosenkrantz has supplied a second wire-cloth ring below, and a second wire-cloth cylinder, with from four to five-millimeter openings; but when the mesh is too great, a double wire-cloth protects as little against the passage of the flame as too great a size of the air-supply openings does against their ignition.

An important part in the construction of a safety-lamp is the locking apparatus. The best lamp has value in the hands of an ordinary workman only when it can not be opened by him whenever he so desires, and the recklessness of many miners is only equaled by their skill in picking a lock apparently the safest. The simplest lock is a screw going through the oil receptacle and working into the lower ring of the flame. It is, however, easily opened. Other locks are those designed by Schwetz and by Schroeder, who use metallic rivets. The best control of the lock is by the workmen themselves or by a lamplighter elected by them.

So far as the care of the lamps themselves is concerned, this is done in all the German mines by specially selected men, who clean the lamps, supply them with oil, and turn them over locked to the miners, it being optional with the latter to assure themselves that they are in good condition. To test them, it is a very good plan to provide for an apparatus filled with a mixture of illuminating gas and air, in which the men must, for a short time before entering the mine, hold their lamps. It would furthermore be a good point, in order to avoid danger, to keep in reserve at certain points in the mine a sufficient number of lamps ready to use, so that the men could easily exchange defective lamps without much loss of time.

Electric Illumination.—The small amount of light which safety-lamps give, and the fact that the danger of explosion is not entirely avoided by their use, led at an early period to experiments to introduce the electric light in workings containing fire-damp. In 1861, proposals were made to provide an electric light for safety-lamps by means of an electro-magnetic apparatus. The first form for an electric safety-lamp was constructed by Benoit and Dumas. It consisted of a zinc-carbon battery, a Ruhmkorff induction apparatus, and a Geissler tube. This lamp was for a time used in the Saarbrücken mines; but it was too heavy and too fragile, and as, moreover, its illuminating power was comparatively low, its use has been very much limited. In English collieries, experiments have lately been made to introduce for underground lighting Swan electric lamps, run by Gramme machines. After preliminary trials, such lamps have now been introduced into the Earnock colliery, Scotland, four horse-power being required to run the Gramme machine at a speed of 1564 revolutions, supplying 22 lights. The main conductor is covered with gutta-percha and partly with iron tubing, to protect it against injury, the branch wires

* Verhandlungen des Vereins für Beförderung des Gewerbfleisses.

being simply firmly tied to the main conductor. The whole is again covered with gutta-percha. The lamps average from 15 to 20 candles, but vary a good deal. This electric illumination has the great advantage over safety-lamps of providing more light, thus increasing the amount of work done and avoiding many dangers by fall of roof, etc. In fire-damp, it is safer, because the light is entirely cut off from the surrounding air, and works on even in the mixtures in which safety-lamps will not burn. On the other hand, the fire-damp may possibly be ignited by electric sparks when the conductors have been injured, and in this respect the dangers in narrow underground workings are very much greater than on the surface, and the wires can not be very well protected at the working-face, where, moreover, they are apt to interfere with the men and their work. So that, for the present, electrical illumination seems applicable only to shafts or main galleries until science and engineering have succeeded in removing the dangers growing out of an electric spark and introducing into the remotest and narrowest workings this means of safe lighting in fire-damp.

THE GEOLOGICAL SURVEY OF CANADA.

Under date of April 10th, a select Committee on Geological Surveys submitted a report, signed by Mr. R. N. Hall, as chairman, to the House of Commons of the Dominion Parliament. This document, while commending the excellent earlier work of Sir William Logan, Dr. T. Sterry Hunt, and others, asserts that the administration of the department under its present management is unsatisfactory. "This results, as your committee believes, principally from the following causes: Lack of system in conducting the work, the defective method of publication, the delay in communicating results to the public, a lack of accord between the director and his staff, and inattention to the economic mineral resources of the country."

The committee is particularly urgent concerning the necessity of giving attention to the mining industries of the country in actual operation. On this point, we quote from the report as follows:

"The attention of the survey to the mineral and economic resources of the country—its gold, copper, iron, phosphate, lime, gypsum, manganese, etc.—appears to be much less than it formerly was, even, although the importance of the subject and the means of acquiring and publishing information in reference to it have largely increased. An attempt was made in 1871 to procure statistics of the products of our mines, by sending blank forms to the different mining companies with the request to furnish full information as to the gross and net result of their operations. Very few replies were received, and the effort was discontinued. The result demonstrated, as has been proved elsewhere, that an officer of the department must be specially detailed to procure information of this kind, and must overcome the natural prejudice against inquisitorial demands of this nature by personal interviews and explanations. That such information may be obtained, when judiciously sought, is evident from the result of such efforts in the United States, as shown by the volume recently published under the direction of the Geological Survey there, giving the fullest and evidently most reliable details not only of the quantity and quality of the different ores produced, but of their values both at the mines and after transportation to market. Nothing could illustrate more forcibly the importance of the subject of the mineral resources of the country, as compared with its other resources of wealth, than the fact established by the returns in question, that the aggregate value of the metals and minerals, including coal produced in the United States, amounted in the year 1882 to the enormous sum of $453,000,000. The collection of these returns, in this complete form, is a new feature in the management of the Geological Survey of the United States; but the result has attracted marked attention there to the importance of the subject, not only as a guide and incentive to proper legislation for encouraging their mining industries, but as throwing light upon questions affecting the fiscal policy of the country. Even if, in the opinion of the director of the survey, its functions do not include the collection and preservation of mineral statistics, still it would seem that the great geological and scientific facts demonstrated by the opening and continued prosecution of these mining industries would attract the attention of the department, and that a record of them would be preserved for the proof or refutation of existing theories, and more especially for the guidance of future explorers in similar fields. In the development of the mines before referred to, in which a depth of over 1000 feet has been reached, geological facts both of a scientific and practical character must have been developed, of which no record whatever has been preserved, the existence even of the mines themselves being apparently unknown to the officer of the staff to whom the duty was assigned of recording the mineral progress of that province. An equally significant omission is found in the reports in reference to the undeveloped or recently discovered deposits of mineral and other economic resources of the Dominion. Minute attention to particular properties in which minerals are believed to exist would not be desirable; but the communication to the public of general information as to the probable extent and probable characteristics of recognized mineral deposits, and their availability and adaptability to the commercial uses of this and other countries, is certainly a legitimate field for the attention of our geological survey, and would tend more to the material prosperity of the country in attracting the application of capital and proving the value of our resources than the purely scientific researches so much indulged in, which seem devoted rather to upsetting preconceived theories of antecedent or rival scientists than to the discovery of new principles or the addition of new information in reference to mineral deposits and mining operations. In the opinion of the committee, the primary objects of the survey should be to obtain and disseminate as speedily and as extensively as possible practical information as to the economic mineral resources of the country, and scientific investigations should only be treated as of secondary importance, except when necessary in securing practical results. A perusal of the report leads us to infer that the attention of the survey is directed, first, to the descriptive representation of the surface of the country; secondly, to a scientific dissertation upon existing geological theories, with the object principally of controverting them; and last of all, to practical study of the useful mineral deposits, with no reference whatever to actual mining operations. The frequent sketches and photographic views of scenery, the long descriptions of the trivial incidents of the journey, anecdotes of the Indians, dissertations even as to their habits and dialects, while all entertaining, should, in the opinion of the committee, absorb no prominent part of the attention of a field party sent out to study the geology of the country, and certainly should occupy no portion of the published reports.

"The committee does not wish to be understood as deprecating in any manner attention to field-work; it realizes fully its importance, and would recommend even that the parties engaged in it be increased in number; but it is of opinion that more practical results should be secured, or at least reported by them. It also thinks that an exaggerated impression prevails as to their relative cost, as compared with the other expenditures in connection with the survey."

The results of the inquiry are embodied in these conclusions:

"That the present administration of the geological survey is defective in practical results; that a more systematized plan of operations should be established, either by additional legislation or by departmental regulations; that the field operations should be confined to subjects more closely allied, practically and scientifically, to a geological survey; that reports of such explorations and surveys, with illustrative maps, should be published not later than the succeeding season after the work has been performed; that such reports and maps should, as a general rule, be published separately for each district explored, and at a nominal price not exceeding the actual cost of printing and binding.

"Your committee begs also to recommend that a mining engineer be appointed, with the rank of an assistant director, whose province it shall be to inspect and report upon the mining and metallurgical developments of the country, and to procure and preserve a record of their progress and statistical information as to their products; and desires to add that, in its opinion, these changes and improvements may be effected, under judicious management, without additional expense to the country."

THE WORLD'S PRODUCTION OF IRON AND STEEL.

Mr. J. S. Jeans has prepared a series of very valuable reports on the iron and steel trades of the leading producing countries abroad. The following tables present in summary form the total production and exports of the several states, and show in each case the increase or decrease in 1883, as compared with the previous year:

PRODUCTION OF PIG-IRON BY THE PRINCIPAL IRON-PRODUCING COUNTRIES IN 1883, COMPARED WITH 1882.

Country.	Production of pig-iron. 1882. Tons.	1883. Tons.	Amount of increase or decrease. Tons.
Great Britain	8,493,287	8,490,224	— 3,063
United States	4,623,323	4,595,510	— 27,813
Germany	3,170,957	3,380,788	+ 209,831
France	2,039,067	2,067,387*	+ 28,320
Belgium	717,000	770,669*	+ 53,669
Austria-Hungary	585,000	595,000*	+ 10,000
Russia	470,000	480,000*	+ 10,000
Sweden	391,000	390,000*	— 1,000
Totals	20,489,634	20,769,578	+ 279,944

EXPORTS OF PIG-IRON FROM DIFFERENT COUNTRIES IN 1881, 1882, AND 1883.

Country.	1881. Tons.	1882. Tons.	1883. Tons.
United Kingdom	1,482,354	1,758,152	1,564,137
Germany	245,000	187,000	259,014
France†	10,497	8,245	5,168
Belgium	18,000	24,000	12,744
Austria	4,487	5,000	7,500
United States	6,700	5,979	.....

TOTAL EXPORTS OF IRON AND STEEL FROM DIFFERENT COUNTRIES IN 1883, COMPARED WITH 1882.

Country.	Exports of iron and steel. 1882. Tons.	1883. Tons.
United Kingdom	4,350,297	4,044,270
Germany	1,065,000	1,232,505
France†	102,087	108,885
Belgium	468,870	459,180
Sweden	286,600	.....
United States	10,214	.....

PRODUCTION OF BESSEMER STEEL IN DIFFERENT COUNTRIES IN 1883, COMPARED WITH 1882.

Country.	Production of steel ingots in 1882. Tons.	1883. Tons.	Increase or decrease. Tons.
United Kingdom	1,673,649	1,553,380	— 120,269
United States	1,191,883	1,119,576	— 72,307
Germany	993,000	955,000	— 38,000
France	430,000	440,000*	+ 10,000
Belgium	200,000	220,000	+ 20,000
Sweden	46,603	50,000*	+ 3,397
Russia	330,000	340,000*	+ 10,000
Austria	180,000	175,000*	— 5,000
Totals	5,045,135	4,852,956	— 192,179

NEW SLATE MINES.—An important discovery of slate was made a short time ago at a spot about one mile from l'Anse, Mich., which, report now says, is proving of immense magnitude. The following is given in a press dispatch: A depth of 25 feet has been reached, which shows a deposit of excellent billiard and roofing slate. The vein dips toward the southeast to a distance of 300 feet in width as far as the test-pits have been made, then runs west, crossing the Marquette, Houghton & Ontonagon Railroad to an indefinite distance. The outcroppings on the sections show the slate to be within three feet of the surface. The facilities for shipping are excellent. With the railroad to the left of it 200 feet, and the Keewenaw Bay one mile in front of it, the markets of Chicago, Buffalo, and other leading ports can be reached at a cost of from 50 to 60 cents a square. The discovery is looked upon with great interest, and may lead to the establishing of a leading industry in the Upper Peninsula. Stripping and test-pitting and other work to improve the property is in progress. The slate is equal to that which has been selected for covering the new Board of Trade Building in Chicago.

* Estimated.

† The returns for France include the iron received *en franchise temporaire* for re-export.

NOTE ON SOME HIGHLY PHOSPHURETED PIG-IRONS.*

By Prof. N. W. Lord, Columbus, Ohio.

There have been made at one or two places in Ohio, during the last year or two, some irons of rather unusual phosphorus percentages.

The first of these that I had occasion to examine came from Moxahala Furnace, in Perry County. The furnace was built originally to smelt an ore found in large deposits near its furnace in the "black band" horizon. The deposit was easily exposed by simple "stripping;" it was from six to eight feet thick, being a blue carbonate ore, very free from silica. This ore yielded, on analysis, from two to three per cent of phosphorus, when carefully sampled. The furnace company had trusted entirely to old analyses made on "outcrop" ore, well weathered, and received all other results with indifference. The result of the first run of the furnace was an iron in large whitish-gray crystals, and so brittle that it could be pulverized in a mortar. This iron contained 4·90 per cent phosphorus. A limited quantity only was made, which was gradually disposed of, as a great "softener," to foundries. The Moxahala furnace was subsequently run on Lake Superior ore mainly.

The second case of such iron occurred last summer at Mount Vernon furnace. A deposit of what was locally known as "Hallelujah" ore was opened for the furnace. This ore was a blue carbonate, similar to the first-described. The iron made was pure tin-white in color, and showed large crystals without a trace of the grain of the ordinary pig-iron. It was supposed at the furnace to be spiegeleisen, and was sent to me to be examined for manganese, of which, however, it only contains a small amount. It contains, however, phosphorus, 4·30 per cent; silicon, ·05 per cent. It is remarkable in its very low silicon percentage. This element was determined by Dr. Drown's nitric and sulphuric acid methods. The iron contains no graphitic carbon, but dissolves completely in nitric acid to a brown solution. The carbon was not determined, owing to pressure of other work. The above facts show that, when basic steel manufacturers want an iron with little silicon, and from 4 to 5 per cent of phosphorus, we can furnish it *ad libitum*.

THE PROPERTIES OF BASIC REFRACTORY MATERIALS.

About two years since, the Berlin "Verein zur Beförderung des Gewerbfleisses" offered a prize for the best paper on the properties of basic refractory materials, a subject which was just at that time attracting unusual attention on account of the introduction of the Thomas-Gilchrist-Snelus Bessemer process. The prize has now been awarded to Herr A. Wasum, of Bochum, whose paper has recently been printed in the transactions of the society.

Lime and magnesia are in themselves as refractory as the best other materials, not a trace of melting being shown on pieces exposed to the highest temperatures of steel-melting furnaces. It is a different matter, however, when lime and magnesia are subjected both to chemical action and elevated temperatures. Herr Wasum made a series of experiments, his main aim being to imitate as closely as possible the conditions of actual practice. He made bricks of dolomite, lime, magnesia, and magnesite, using different binding material and additions, whose action upon the base was to be examined. These bricks were pressed with as little water as possible, in iron molds, dried, and were then exposed to the highest white heat attainable in kilns used for making basic Bessemer brick, the shrinkage being simultaneously noted. A part were kept in the dry air, in order to test their resistance to disintegration. A second set was heated to redness, when red-hot was cooled in water, and was then kept in the air until it disintegrated; while a third set was treated in the same manner, but, after cooling in water, was again heated to redness, and this kept until the brick fell to pieces. The crude materials used had the following composition:

	Dolomite.	Magnesite.
Lime	31·62 per cent.	1·69 per cent.
Magnesia	20·19 "	44·98 "
Silica	1·70 "	0·10 "
Alumina	0·09 "	0·84 "
Protoxide of iron	1·22 "	1·63 "
Protoxide of manganese	trace "	0·29 "
Carbonic acid	43·35 "	50·57 "
Total	100·17	100.00

	Limestone.
Carbonate of lime	98·80 per cent.
Insoluble residue	1·07 "
Total	99·87

The magnesia was prepared by burning the magnesite at a white heat.

In all, 71 experiments were carried out with each of these four materials, in order to test the action of clay (with 49·4 per cent silica), silica, phosphoric acid, oxide of iron, sequioxide of iron, sequioxide of manganese, and a basic converter cinder. The latter had the following composition: 8·14 per cent of silica, 48·25 per cent of lime, 4·65 per cent of magnesia, 15·85 per cent of phosphoric acid, 9·48 per cent of protoxide of iron, and 6·14 per cent of peroxide of iron. In the case of dolomite, the investigation embraced experiments on the action of protoxide of iron, phosphate of protoxide of iron, and phosphate of peroxide of iron. Herr Wasum has tabulated the results, and draws from them the following conclusions:

1. *The Manufacture of the Brick.*—Good brick may be made of dolomite, limestone, and of magnesia burnt at a white heat, without the addition of any binding material. This, however, is not the case with magnesite, because the latter, when ground, is not sufficiently plastic. Much finer brick are obtained when clay is added; and under these conditions, even magnesite yields faultless brick. Unless the new material used for the manufacture of the brick is very inferior, the addition of clay may go as high as 5 per cent without materially affecting the refractory character of the brick. They must be burnt at the highest white heat for a long time.

2. *The Action of Air upon the Brick.*—Dolomite and lime brick, made without any binding material, will, on an average, last three weeks in dry air. By the addition of clay, their durability is materially increased. Brick made of magnesia or magnesite, with or without clay, last more than three months. The temperature at which the brick have been burned greatly influences their durability. The higher it has been, the better the brick in this respect. In practice, brick from the same kiln will show marked differences in regard to resistance to weathering, a fact attributed to differences in the temperature of burning. It is important, therefore, in designing the kilns, to have the flues so arranged that the temperature is uniform throughout the entire kiln.

3. *The Durability of the Brick after Cooling with Water.*—Dolomite and lime brick, cooled with water when red-hot, fall to pieces very rapidly; but this disintegrating process is much retarded by adding clay in their manufacture, in direct proportion to the percentage added. When the brick are, after cooling with water, reheated to redness, they do not entirely recover their resistance to weathering, but it takes a few days longer for them to disintegrate. Cooling with water has little effect on magnesia and magnesite brick. They had not fallen to pieces after they had been kept a year. More or less all basic brick crack by cooling in water when red-hot, but these cracks are rarely so large that they break at once. When, however, disintegration sets in, the brick split in the direction of these cracks, generally, in conformity with their form, at right angles to their two axes. In the case of magnesia and magnesite brick, also, a slight disintegration is noticeable, it being possible, after a few months, to break them by strong pressure of the hand in the direction of these cracks. The surface of these cracks is dull, while the fracture of the brick is otherwise brightly crystalline.

4. *Shrinkage in Burning.*—Dolomite, lime, and magnesite brick, unless made of impure material, shrink about 24 per cent when exposed to the highest white heat. Brick made of strongly calcined magnesia shrink only 4 per cent. All substances that tend to decrease the refractory character of basic brick increase their shrinkage.

5. *Action of Acids and Metallic Oxides Formed in Metallurgical Processes.*—Lime and dolomite brick are equally attacked by the cinder formed in metallurgical processes, while magnesia brick show much more resistance. The oxides of iron are the worst enemies of basic brick, and therefore particular pains must be taken in choosing raw material, with the view of having them as free as possible from oxides of iron, which make the brick less refractory without at the same time increasing their durability in dry air. Silica, phosphoric acid, and the oxides of manganese are not so destructive to basic brick.

Summarizing, Herr Wasum states that undoubtedly the best material for basic brick is magnesia preheated at the highest white heat. The brick made from this material are remarkable for their durability in dry as well as in moist air, for their power of resistance to the action of cinder at high temperatures, and for the small amount of shrinkage.

One great practical drawback of the lime and dolomite brick is, that they disintegrate in so comparatively short a time, so that it is impossible to manufacture a large stock of them. The heavy shrinkage, too, is disagreeable, leading to the production of very many irregularly shaped brick, and causes large joints in the masonry, which in turn lead to its rapid destruction. All these drawbacks disappear with the magnesia brick. Notwithstanding this, their cost excludes them, and they would be available only if, at present prices, they would last from three to four times longer than lime or dolomite brick. Practical experience has shown, however, that their resistance to the action of cinder is not much greater.

THE DUTY ON EMERY WHEELS.—The Treasury Department has decided that emery wheels are not entitled to classification under paragraph 426, at one cent per pound, but to be dutiable at 20 per cent, *ad valorem* as a non-enumerated manufactured article.

ELECTRIC TRANSMISSION OF POWER FOR PUMPING.—At the Trafalgar collieries, South Wales, the electrical transmission of power has been applied to pumping. The engine and dynamo are on the surface, and the pump underground 600 yards away from them. The pump is double acting, throwing a gallon each stroke, and may be run at a speed of from 60 to 70 strokes a minute. It has been working constantly and satisfactorily since December, 1882.

COAL CONSUMPTION OF LOCOMOTIVES.—The master mechanic, while testing coal consumption, finds that consol engines on the Peoria division of the Indiana, Bloomington & Western Railroad average to haul 28 loaded cars 17 miles with one ton of coal, while the mogul engines average to haul 20 cars 19½ miles on one ton of coal. On the middle division, the consol engines haul 35 cars 20½ miles with one ton of coal, and on this division the passenger engines average to run 47 miles on each ton of coal consumed.

PROPOSALS FOR FUEL.—Sealed proposals, in duplicate, will be received at the Quartermaster's Office, U. S. Marine Corps, Washington, D. C., until twelve o'clock noon, of the twenty-ninth day of May, for supplying wood and coal to the United States marines at one or more of the following stations, from July 1st, 1884, to June 30th, 1885: Portsmouth, N. H.; Charlestown, Mass.; Brooklyn, N. Y.; Philadelphia, Pa.; League Island, Pa.; Annapolis, Md.; Washington, D. C.; Gosport, near Norfolk, Va.; Mare Island, Cal.; and Pensacola, Fla.

A NEW STYLE OF GUN.—The Otis Iron and Steel Company, of Cleveland, has a contract with the government for furnishing for its use steel wire, or material from which it will be drawn, for a new style of heavy gun, invented by Dr. Woolbridge. This will have a 10-inch bore, and be from 24 to 25 feet in length, consisting of a steel cylinder surrounded by 12 hammered-steel bars, 4 inches in diameter and reaching the entire length of the gun. These will stand the longitudinal strain. Around these steel bars, is wrapped the wire. Ordinarily, one would suppose that the interior coils of the wire would have to withstand the strain. This, however, is provided for. The part of the Otis Iron and Steel-Works is to manufacture steel billets of the finest quality of metal, according to the government's specifications. These are sent to Toronto to be drawn into wire $\frac{1}{10}$-inch cross-section without annealing. This will resist a strain of from 180,000 to 190,000 pounds to the square inch. The wire, while under tension, is wrapped around the bars, which have been placed around the steel cylinder of the gun. Thirty thousand of these billets will be manufactured, a part of which will be used on a heavy gun to be made at the South Boston Iron-Works, in which a cast-iron cylinder will be reinforced near the breech by steel wire.

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*Read at the Cincinnati Meeting of the American Institute of Mining Engineers, February, 1884.

RIO TINTO shares have rushed up to 530 francs, according to mail advices, in consequence of the discovery of a body of six per cent copper ore.

THE POCAHONTAS COMMITTEE.—An examination of this mine is now making by a committee of experts appointed by Mr. J. C. Bayles, President of the American Institute of Mining Engineers. This investigation originated in a request of the Southwest Virginia Improvement Company, of Philadelphia, which owns the mines. The committee of experts is made up of Messrs. Irving A. Stearns, of Wilkes-Barre, Pa., J. H. Bramwell, of Roanoke, Va., and Stuart Buck, of Coalburg, Kanawha, West Va.

ARTIFICIAL GRAPHITE.—Dr. Aron exhibited in a recent meeting of the Electrotechnical Society of Berlin various specimens of vegetable carbon made conductive and incombustible within limits by strong heating *in vacuo* or in a neutral atmosphere. Heat appears to render carbon first conductive, and then at the highest degrees practically incombustible. Dr. Aron showed incombustible wadding, paper, post-card, and other carbonized specimens. They resist the heat of a Bunsen burner, and even that of a glass blow-pipe, so that they might be used for lamp carbons. As high conductivity and incombustibility are characteristic of graphite, carbons prepared in this way may be called artificial graphites, although they do not, under this treatment, assume the crystalline structure of natural graphite. The electric current is of course very suitable for their preparation. Under very strong heat, soot becomes a better conductor than graphite, and might thus replace the latter in electro-metallurgical operations. It further results, from Dr. Aron's experiments, that, if the amount of hydrogen in a graphite really determines its combustibility, as is often asserted, the influence can only be due to the amount of combined hydrogen, as carbons do not become more inflammable by being rendered incandescent in a hydrogen atmosphere.

GEORGES LESCHOT, INVENTOR OF THE DIAMOND DRILL.—Georges Auguste Leschot, who died at Paris on the 4th of February, at the age of eighty-four years, was a very remarkable man. It is to him that we owe the plan of employing the black Brazilian diamonds, or "carbonados," for piercing rocks, an invention that has proved of immense value. Leschot was the son of a skillful mechanician, Jean Frédéric Leschot, whose automata, singing-birds, artificial limbs, and so forth, were the admiration of the celebrated Vaucanson. He also effected great improvements in the manufacture of watches by mechanical means, in connection with the Geneva house of Vacheron & Constantine, receiving in 1845 a prize from the French Academy of Sciences in recognition of his services. In 1861, the black, amorphous, but very hard diamonds of Brazil, known as "carbonados," came to Europe, and Leschot's son, being then engaged in Italian railroad work for the house of Vitali, Picard & Co., knowing the idea of his father that diamonds might be used instead of steel tools to cut rocks (an idea which had occurred to him in examining the fine striations cut in some specimens of ancient red porphyry), communicated with his father on the subject, and the result was, that Leschot devised the diamond drill, which has been in use ever since, especially in England, Germany, and America.

THE ELECTRICAL QUALITIES OF ALUMINIUM WIRE.—At a recent meeting of the Philosophical Society of Glasgow, Professor Jamieson said he had obtained some specimens of nearly pure aluminium wire from the Aluminium Crown Metal Company, the same being prepared by Webster's process. On analysis, the wire gave 98·39 per cent of aluminium, 1·24 per cent of iron, and 0·37 per cent of silicon, the specific gravity being 2·786. As the wire was only in short lengths, he had been compelled to determine the electrical resistance of the metal by the "fall of potential" method with chemically pure copper wire as well as with a standard B.A. unit; and he had found that the aluminium had 1·96 times the resistance of the copper wire of the same gauge and length, and but little more than half the resistance of pure copper for the same length and weight. The conclusion arrived at, therefore, was, that aluminium had by far the least resistance of any known metal for its weight. In the course of his investigations, he had elicited a very curious fact, namely, that the introduction of a very small percentage of aluminium into copper not only raised its tensile strength immensely (the specimens shown having a breaking stress of about 45 tons per square inch), but also enormously increased its resistance. So far as his tests had gone, the specimens shown had a resistance of 25 times that of pure copper. He pointed out the probable uses of such wire, as, for example, in the construction of high resistance coils. Other qualities might be found well adapted for telephone wires, and the purer kinds of aluminium, owing to the great lightness of the metal, could be used for military purposes, in which lightness of baggage was an important desideratum.

"RACKAROCK" ABROAD.—In one of his letters to the *Colliery Guardian*, Mr. George G. André, F.G.S., M.E., says: "I learn that a new explosive is about to be introduced into European mining works from the United States, where it is said to be competing very successfully with dynamite and the gun-cotton class of compounds. It has been designed mainly to escape from the difficulties of manufacture and transport that now attend the high explosives. It consists of two ingredients, each in itself non-explosive, and these two are mixed at the mine. In this way, it may be manufactured in any place without license or restriction of any sort, and sent by railroad as ordinary goods. These are obviously very great advantagesand such as are likely to give the new compound a good chance of success. There is nothing new in the notion of separate manufacture and mixing at the works where it is to be used. I remember seeing something of this kind several years ago, and attempts were then made to bring the explosive into common use. But there were practical difficulties in the way at that time that prevented its adoption, and nothing more was heard of the scheme. Since that time, however, considerable improvements have been made, and it is now said that complete success has been achieved. At any rate, it has stood the test of experience in the United States, where it has been largely used during the past year. It is said to be fully equal in strength to the best dynamite, and it is to be sold at half the price. In the matter of safety in handling after being mixed, it appears to rank high, for it can be fired only by means of a very powerful detonator. All of these qualities are testified to by many well-known American mining engineers and men of science, and there seems no reason to doubt the statements made by the assignees of the patent rights in Europe. The invention is likely to be of great importance in mining, and if it accomplish all that is claimed for it, it will constitute another important step in the progress which mining has made in recent years."

FURNACE, MILL, AND FACTORY.

The Weimer Machine-Works Company, of Lebanon, Pa., which has acquired a national reputation for building vertical iron blast-furnace blowing-engines, has just issued a handsomely illustrated catalogue. The different styles of engines for anthracite, coke, and charcoal furnaces are shown, and detailed drawings are submitted of the Weimer water-cooled blast-furnace first introduced at Chester, New Jersey, with its housing and mantle; of the Weimer suspended pipes hot-blast stoves; the rack and pinion; and the gearless stock hoist; the Weimer friction winch charging apparatus; the Weimer water-cooled furnace top, metal trucks, scales, charging-barrows, tilting cinder trucks, and the Birkinbine fire-hydrant. A particularly interesting new departure is the regenerative hot-blast stove, recently patented, of which the catalogue modestly says: "As the stove has yet to be tested by trial, we prefer not to enter into any discussion of its merits." The Weimer Machine-Works Company also builds the well-known Taylor Langdon gas ore-roasting furnaces and the Grittinger kiln.

Cleveland and Pittsburg capitalists are negotiating for the purchase of the Nes Silicon Steel-Works, of Sandusky, Ohio, with the view of transferring the establishment into a mill for the manufacture of Mushet steel and Norway iron. Parties in Sandusky are also endeavoring to get hold of the works, and, if they succeed, will start a nail mill.

The Ohio Fire-Brick Works, of Ironton, Ohio, a co-operative company, whose works are at Petersburg, four miles above Ironton, are in full operation. This is a new work started during the past year. The production will be gradually increased.

The old Baxter stove-works, in Salem, Ohio, have been sold to Charles M. Carey and James Boyle, who will at once put them in operation.

The fire-brick works of the Portsmouth Fire-Brick Company, at Portsmouth, Ohio, are again in full operation.

William Harty, proprietor of the Harty Steel-Spring Works at Portsmouth, Ohio, has made an assignment. Assets, $15,000; liabilities, $13,000.

At Youngstown, Ohio, the Falcon furnace of Brown, Bonnell & Co. is again in blast, and the Girard Iron Company is having a satisfactory run at its furnace. The rolling-mills throughout the city are nearly all on full-time.

The Atlantic Dynamite Company has moved to its new quarters, No. 245 Broadway, New York City.

Mr. Henry B. Murray, representative in New York of the Pacific Iron-Works, Messrs. Rankin, Brayton & Co., of San Francisco, has changed his headquarters from No. 35 Broadway to 145 Broadway.

We note the removal from No. 57 Broadway to No. 239 Broadway, corner of Park Place, of the Hecla Powder Company.

The Rand Drill Company and the Rendrock Powder Company, manufacturers of "Rackarock," have removed to 23 Park Place, New York City.

An adjourned meeting of the stockholders and creditors of the iron manufacturing firm of Brown, Bonnell & Co. was held at Youngstown, Ohio, April 29th. The attendance was large, about $1,000,000 of the $1,250,000 indebtedness being represented. An adjustment of all the difficulties under which the receiver was appointed in February, 1883, was consummated. It was agreed to organize a new company, called the Brown, Bonnell Iron Company, with a capital stock of $1,200,000, for the purpose of purchasing and operating the rolling-mills, furnaces, and coal-banks of Brown, Bonnell & Co. The extensive rolling-mills, furnaces, and coal-banks of the company, under the management of Receiver Brown, of Cleveland, have only been operated part of the time, but have been profitable.

Abram S. Hewitt and Edward Cooper, of New York, have begun suit in the United States Circuit Court at Cleveland, against the Cleveland Rolling-Mill Company, for $200,000 damages for alleged infringement of patents. The petition asserts that Emilio and Pierre Martin were the inventors of a process of converting cast-iron into steel. They were residents of France, but a patent was issued in this country in December, 1867. Owing to a technical error, a new issue was granted in August, 1868. In May, 1875, Hewitt & Cooper bought Pierre's interest. In July, 1871, Emilio died, and his heirs secured the appointment of Hewitt as administrator, and he appears in this suit in that capacity. The petition asserts that the Cleveland Rolling-Mill Company used the process, and repeatedly refused to pay royalty. The attorneys for the plaintiffs are Strawbridge & Taylor, of Philadelphia, and Lloyd & Taft, of Cincinnati.

The Rogers Locomotive-Works are building some locomotives for the Valls, Vallenueva & Barcelona Railroad, in Spain. These engines are for a narrow-gauge line. Three of them are eight-wheel passenger engines, and three are moguls.

The extensive additions made to the iron-works of Shickle, Harrison & Howard, of St. Louis, Mo., are about completed, and will require the employment of 400 additional workmen.

The Quinnimont furnace, coke-works, and mines, at Quinnimont, West Va., have been shut down. They may be started up again in September or October.

The Greenwood Rolling-Mill, at Tamaqua, Pa., has been abandoned and will be dismantled.

The West Lebanon Rolling-Mill Company (Limited) has purchased the Harrisburg Chain-Works, and will remove the entire establishment to Lebanon, Pa.

No. 4 blast-furnace of the Pennsylvania Steel-Works, Steelton, was lighted recently. Its capacity is 200 tons a day.

The bolt and nut manufacturers of the United States have formed a pool for the purpose of restricting production and establishing profitable selling rates. A meeting will be held at Pittsburg about May 1st, to revise the rates and discounts, and to limit the time fixed for the pool agreement.

Messrs. Benedict & Cole, mining engineers, have removed to No. 32 Liberty street, this city.

The office of the John Ashcroft Manufacturing Company is now located at No. 52 John street, this city. The manufacturing department will be removed to Brooklyn.

It has been decided by the Mount Hickory Iron Company to rebuild the rolling-mills burned at Erie, Pa., last winter. The company's blast-furnace at Sharpville will also be removed to Erie. Pierce Brothers, members of the company, opposed the rebuilding, and asked for an injunction, which the court refused.

LABOR AND WAGES.

A cable from London states that advices from Cape Town mention the occurrence of a strike and serious disorders in the diamond-fields. The cause of the difficulty is stated to be the fact that the men are searched at the conclusion of their day's work.

The 2000 miners who struck ten days ago resumed work April 28th, the Westmoreland Coal Company yielding to their demand to remove the one-inch screen.

At Troy, New York, the Arbitration Committee of the Troy and Albany Stove Manufacturers' Association, April 29th, ordered a closing by May 3d of all the

mounting departments, owing to the action of the Mounters' Union in directing a strike. This will throw the molders out of employment.

The operators of the fourth pool have decided to order a reduction of a quarter of a cent in the mining rate on May 1st. The miners employed at the Camden and Allequippa Works in the second pool struck, April 28th, against a reduction of a quarter of a cent per bushel. Walton & Co., the largest coal operators on the river, will close down their works in the first pool this week and in the second pool next week. Over 1000 men will be thrown out of employment by the shut-down.

April 26th, a circular addressed to the miners in the Hocking Valley, Ohio, was circulated by the Columbus & Hocking Coal and Iron Company and the Ohio Coal Exchange. This circular states that the markets of those operators have been taken from them by Pittsburg coal. The Indiana block coal mines having accepted a reduction of 15 cents per ton, the Hocking Valley operators can not compete. The circular holds that various other points in Ohio are enabled by lower rates for mining to shut out Hocking Valley coal; therefore the operators declare that they must have a reduction in the price of mining or be compelled to shut down their mines during the summer. The men held a meeting, and decided to strike rather than accept a reduction. The operators have threatened to import Hungarians and Italians, and the men declare that no foreigners will be allowed in the mines. If strangers are taken, it is feared there will be trouble, as the sympathy of the people is with the miners.

The largest meeting of iron manufacturers ever held in Pittsburg met May 1st. It was the gathering of the Iron Manufacturers' Association, an organization effected during the progress of the long strike of 1882, and nearly all the mills west of the Alleghanies were represented. Although the session was held with closed doors, it was learned that the manufacturers concluded to insist upon the proposed reduction, for a time at least. Secretary Weeks said that there would be no request from the manufacturers for another conference with the workmen.

RAILROAD NEWS.

Mr. J. W. Hopkins, fuel agent of the Chesapeake & Ohio Railroad Company, sends us the following report of the total output and distribution of coal and coke received from the mines on the line of the railroad (including mines on the Lexington Division) for the month ended March 31st, 1884, in tons of 2000 pounds:

	For March.		From Jan. 1 to March 31.			
Kind of coal.	1884.	1883.	1884.	1883.	Increase.	Decrease.
Cannel	427	3,554	706	8,264	.....	7,558
Gas	25,286	29,840	74,258	81,134	.....	6,876
Splint and Block	6,856	6,083	18,823	29,131	.....	10,308
New River, etc	46,842	38,884	123,546	104,322	19,224	.....
Coke	3,783	12,026	14,550	31,468	.....	16,918
Totals	83,194	90,387	231,883	254,319	19,224	41,660

	For 31 days.	
Distribution of above:	1884.	1883.
Fuel for use of company	20,397	18,200
Shipped at Huntington, on Ohio River	.....	871
Delivered on line of Elizabethtown, Lexington & Big Sandy Railroad.	1,173	4,358
Delivered on line of Chesapeake & Ohio Railroad, excepting Richmond	14,678	17,209
Delivered at Clifton Forge to Richmond & Alleghany Railroad	333	1,509
Delivered at Staunton to Baltimore & Ohio Railroad	.....	34
Delivered at Waynesboro' to Shenandoah Valley Railroad	12	7
Delivered at Charlottesville to Virginia Midland Railroad	5,417	5,542
Delivered at Richmond, Fredericksburg & Potomac Junction to Richmond, Fredericksburg & Potomac Railroad	98	232
Delivered at Richmond for consumption, including tugs, dredges, etc.	9,591	11,770
Shipped at James River wharves	.....	5,221
Delivered at Newport News for consumption, including tugs, dredges, etc	981	189
Shipped at Newport News wharves	30,514	25,245
Totals	83,194	80,387

The Atchison, Topeka & Santa Fé Company's engineers are surveying a line from Socorro, New Mexico, to Silver City, where connection will be made with the branch from Deming that the company purchased a few months ago. It is said that the line will be continued from Silver City southwest to Benson, Arizona. This branch, if built, will give the company a connection with its Sonora line independent of the Southern Pacific.

The recent lease of the State Line & Sullivan Railroad by the Lehigh Valley secures to that company the transportation of the product of the coal mines at Berenice. The State Line & Sullivan is only about twenty-five miles long, running from Towanda in the Lehigh Valley in a southwesterly direction to Berenice, where the company owned coal mines producing about 7500 tons a month. The road has not proved very profitable to the projectors, as the earnings were barely sufficient to pay the operating expenses and interest on its debts.

A narrow-gauge road from Confluence up the Youghiogheny into Garrett County, Md., is contemplated. It would develop large quantities of coal and timber.

At a meeting in Philadelphia, April 24th, a settlement in the railroad coke pool, in which the Pennsylvania, the Baltimore & Ohio, and the Pittsburg, McKeesport & Youghiogheny railroad companies are interested, was effected. The basis of settlement is understood to be the same as that of the old agreement, no change being made in the percentage of any of the roads interested. The agreement is to stand for six months. The percentages are as follows: Pennsylvania, 55; Baltimore & Ohio, 30; Pittsburg, McKeesport & Youghiogheny, 15.

Articles of incorporation have been filed for the East Trenton Railroad Company and the South Trenton Railroad Company. The East Trenton Company will build a railroad from the Trenton branch of the Philadelphia & Reading Railroad two miles and a half through the brick-yards and potteries. The South Trenton Company will run a line of the same length along the Trenton Water-Power Railroad, through the heart of the city of Trenton, New Jersey, reaching most of the factories and the large iron mills. H. S. Little, E. C. Knight, Henry C Kelsey, A. G. Richer, Samuel K. Wilson, and others, interested in the Reading road, are the incorporators of each company. The South Trenton's capital is $100,000, and the East Trenton's $60,000. It is said that the construction of the roads will be begun at once. They will enable the Reading to obtain the best part of the freight traffic of the city, and by means of the South Trenton line, a passenger station can be placed in the heart of the city.

Contracts have been made by the Norfolk & Western Railroad Company with the owners of coal lands in the Flat Top soft coal region of Virginia, whereby they agree to develop their properties at once, and give their entire tonnage to the railroad company.

President Keim, of the Reading Railroad Company, says: From present appearances, the company will do as well as last year, which showed a surplus over all fixed charges of $2,157,233, or equal to 7 per cent on the preferred stock, and 6 per cent on the common stock, and a balance of $57,634 in excess. The opening of the Clearfield feeder of one hundred miles this summer may increase this very considerably.

COAL TRADE NOTES.

COLORADO.

At Erie, the only mines that are running work about three days out of the week. A number of miners have left the town.

The coke-ovens of the Colorado Coal and Iron Company at Crested Butte, which have been idle since the explosion of January 24th, will soon be fired up.

A test has been made of the Grand River coal, found near Grand Junction, Gunnison County, with the following results: Water, ·72; volatile matter, 34·18; fixed carbon, 61·24; ash, 3·43; sulphur, ·41.

ILLINOIS.

A report states that coal has been discovered at Streator, at a depth of 248 feet, the vein measuring ten feet.

INDIAN TERRITORY.

Parties who have recently made a visit to this territory report that the Missouri Pacific Railroad Company is making extensive arrangements for developing large fields of coal in the Indian Territory. This company is mining within the limits of the Choctaw Nation at the rate of a quarter of a million tons a year. The railroad company is extensively prospecting large fields lying easterly from McAllister and Savannah, in the Choctaw country, and is meeting with the most encouraging results in finding a clean vein of coal averaging four feet in thickness, and in some localities two veins as good as those now mined at McAllister or Savannah. Within a year, the output of coal in the Choctaw Nation will be at least half a million tons, and it is not unlikely that in the Creek country valuable discoveries will be made under the direction of Governor Brokmeyer.

OHIO.

For the past weeks, the prospects at Chapman have been a little better. Mountain ran steady last week, and Sippo is doing fairly. There is some talk of the Willow No 5 resuming.

At Weathersfield, the Pine Hill shaft is double shifted and expects to be in the coal in two weeks. The mines on the ridge are very slowly worked—but 1½ days last week.

The coal mines at Vesuvius station, operated by the Lawrence rolling-mill, Bellfont rolling-mill, and the New York iron and steel rolling-mill, are all running full-time, supplying coal for the three large mills in Ironton. The coal-seam runs from three and a half to four feet. The miners receive seventy-five cents a ton for coal run over an inch and a quarter screen. Between sixty and seventy men are employed in and about each of these works. The work is regulated by the running of the mills, as all the coal put out is consumed there, except such as is furnished the employés of the company. As nearly all the blast-furnaces in this region are out of blast, work in the extensive ore-fields back in this section of country is going slowly. The charcoal furnaces are doing but little, and it is likely a number of them will not go into blast at all this season.

The National mine of J. M. Walter & Co., at Washingtonville, is employing 225 men and mining from 300 to 400 tons of coal a day, all of it being sold on reaching the surface.

PENNSYLVANIA.

ANTHRACITE.

The inspectors' reports for the month of March are as follows: Pottsville District—Samuel Gay, Inspector: Accidents, 11; killed, 6; injured, 5. Total number of employés, 6767; average number of days employed, 12; number of tons of coal shipped, 89,138 16.

Shenandoah District—Robert Mauchline, Inspector: Accidents, 17; killed, 1; injured, 16. Total number of employés, 12,836; average number of days employed, 11¼; number of tons of coal shipped, 240,583·05.

Shamokin District—James Ryan, Inspector: Accidents, 22; killed, 3; injured, 19. Total number of employés, 14,235; average number of days employed, 14⅛; number of tons of coal shipped, 308,222·14.

Packer colliery No. 5, at Rappahannock, will be the largest structure of its kind in the coal region. There will be five sides to the breaker, which will be supplied by coal from the shaft by four tracks. The depth of the shaft will be 1400 feet. It will take over 700 men and boys to run this colliery.

Wolf Creek colliery, abandoned for years, is to be reopened.

The three collieries, Park Nos. 1, 2, and 3, of Lentz, Lilly & Co., near Mahanoy City, will employ about 1000 men and boys in the near future. Extensive preparations for large shipments of coal are making at each of the collieries, an immense new breaker for the preparation of the coal from No. 1 and 2 being in course of construction. Nearly a hundred tenement-houses, for the accommodation of the miners, will be built during the summer.

In a shaft sunk by the Amity Coal Company at Taylorville, a shot fired by a workman, April 25th, uncovered a feeder from which a large volume of gas began to issue. It was immediately set on fire, and the flames ascended one fourth the length of the shaft. The fire was not discovered until a late hour in the night, when some of the men, who intended to work all night, were lowered into the pit. When they were within fifty feet of the bottom, they were terrified by the discovery that they had been lowered into a veritable pit of fire. They gave an alarm, but more than a minute elapsed before the workmen at the top of the shaft could ascertain why it was sounded. As soon as they realized the predicament of their fellow-workmen, they hoisted the bucket. The sinkers were fearfully burned, and it is probable that they will die.

Nearly four acres of the surface above the workings of Haddock & Steel's Black Diamond Colliery, at Luzerne Borough, has settled several feet, in consequence of the crushing of the pillars in the mine. It is feared that much damage will result to the mine.

The Hanover Coal Company, which purchased the Moffet property some time ago, and put the works in active working order, is now daily making large shipments.

The West End Coal Company has discovered coal near the eastern end of its lands, between Wanamie and Morgantown, on a tract at one time known as the James Farm, a spot where it was hardly thought that coal to any great extent existed. The vein is 15 feet in thickness. This will prove the most valuable body of coal owned by the West End Company.

COKE.

At a meeting of the New York & Pennsylvania Coal, Iron, and Coke Company at Philadelphia, the following officers were elected: President, Samuel Bonnell; Secretary, William P. Watson; Treasurer, M. W. Keim. The directors are John C. Short, Francis A. White, William Guylager, Jacob Zimmerman, and A. H. Coffroth. Operations are to be commenced at once.

One hundred and fifty coke-ovens are to be erected by Painter & Co., the coming summer, on the Pfoutz farm, near Tarr's station.

B. F. Rafferty & Co. have orders for 77,000 tons of coal.

The United Coal Company is about to build three hundred additional ovens in the Pleasant Unity District.

The idle ovens at Loyalhanna, in the Latrobe District, have been kindled up again. The product goes to Bethlehem.

The Port Royal Coal and Coke Company is operating a new mine on the Pittsburg, McKeesport & Youghiogheny road. It owns 1000 acres of coal, and has a shaft on the Baltimore & Ohio.

The Mahoning coke-works will be started as soon as the water can be pumped out of the mine.

GENERAL MINING NEWS.

ARIZONA.

GRAHAM COUNTY.

ARIZONA COPPER COMPANY.—The London *Mining Journal* says: The report of the directors and accounts to be presented at the adjourned meeting shows the concern to be in a state of hopeless insolvency, while the prospects appear to be such that the shareholders can only avoid further loss by immediately winding up and abandoning the enterprise. On September 30th, 1883, the debts due by the company were, as shown in the balance-sheet: 1st. Balance of purchase price of properties acquired, £177,527 14s. 3d. 2d. Balance and debts due to bankers, £38,687 10s. 8d. 3d. Sundry debts due by the company, including interest to vendors, £49,935 1s. 9d.—amount, £266,150 6s. 8d. To meet which there were available: 1st. Calls in arrear (if recovered in full), £26,079 8s. 6d. 2d. Calls not due (if recovered in full) less amount paid in advance, £67,329 10s. 7d. 3d. Sundry debts due to the company, £3606 18s. 7d. 4th. Copper bullion on hand, £5401 4s. 9d. = £101,417 2s. 5d. Deficiency of available assets to meet debts, £164,733 4s. 3d. In addition to the deficiency thus appearing on the balance-sheet, there had to be provided a large sum for the completion of the railroad and smelting-furnaces. In October, 1883, it was anticipated by the directors then in office that the requirements of the company would be met by debentures to the amount of £300,000. The company now requires, as above, £110,000, and this is on the footing of having borrowed from the Mortgage Company £360,000—£470,000; difference, £170,000. The shareholders are fully naare of the difficulty which has arisen as to the title to the mines and waped property in Arizona. Further advice has been taken on that subject, both in England and in America, with the result that there can be now no doubt that, by the law of Arizona, no foreign corporation can hold real estate there; while, by the constitution of this company, it is disqualified from holding the shares of the American company, which was formed in order to obviate the former disability. This very serious difficulty has, for a time and to some extent, been got over by the incorporation of the Mortgage Company, which can hold the shares of the American company, and can take the place of the American mortgagees; but if this company is to hold and control this important property as its owner, it is necessary that it should possess such a title as will enable and entitle it to exercise directly the powers if it has the responsibilities of ownership. How this is to be effected is a question to which the board to be now appointed will require to give its immediate attention. In the mean time, the fact remains that the money of the company has been paid away, and no title obtained in its favor for the property thus paid for. All the money thus paid has passed through the hands of Mr. Underwood, who was himself a promoter and vendor of the company; and the directors, having ascertained that Mr. Underwood contemplated the speedy removal from this company of the large interests which he possesses in companies subject to the jurisdiction of the courts of Scotland, has deemed it necessary for the protection of the interests of the shareholders to adopt proceedings which might preserve recourse against these funds, should it be necessary to resort thereto. Besides the action against Mr. Underwood above referred to, the directors also raised an action against him for calls upon shares. An action has had to be raised at the instance of the company for payment of the calls on 1232 shares, allotted on May 11th, 1883, to Mr. Dymock. These proceedings are still in dependence.

CORONADO.—Preparations are making to begin the shipment of ore.

DETROIT.—Work is continued on this claim. The foundations for the new reduction-works at Morenci are completed, and the work of erecting buildings will be immediately commenced.

LONGFELLOW.—At the northeast end of this property, an open cut has been started in a northern direction, from which considerable carbonates and red oxides are being out.

MODOC.—A shaft has been started to open this property. It is down 25 feet, with green carbonate ore on all sides.

PIMA COUNTY.

Three new mining companies, the Little Giant, Arlie, and the Pima, each with a capital stock of $10,000,000, have been incorporated for the purpose of working mines in this county.

CANADA.

SILVER ISLET.—According to the Toronto *Mail*, this mine will be closed finally on May 1st.

PROVINCE OF MANITOBA.

A correspondent of the Montreal *Gazette* writes from Winnipeg that mining matters there are almost in a state of stagnation. The shares of any one of the companies that were booming a year ago do not now find a place in the quotations of the Winnipeg stock market. By this, it is not meant to say that the investments are not good and solid. It has been clearly demonstrated that the Lake of the Woods, as a mining field, is rich in ore, and would compare favorably with some of the best locations in the Black Hills or other regions of the American mining world; but, owing to the general business depression in the Northwest, and the want of ready capital, mining operators have been unable to secure the means to pursue the work on the claims which have been already located. The only booming talk now is concerning the rich finds said to have been discovered in the vicinity of Silver City. The interest felt in that region continues to increase, and numbers are still going out.

COLORADO.

CLEAR CREEK COUNTY.

CLEAR CREEK.—This mill at Georgetown, which has been undergoing repairs for the treatment of the Corry City ore, is ready to begin operations.

PAY ROCK.—The pay-streak ranges from 2 to 4 inches in width. The 2d level east is extending. It is 1000 feet in length, and it is to be continued 200 feet farther, in order to cut the main ore-body. Drifting below the tunnel level goes rapidly ahead

CUSTER COUNTY.

Another experimental run of the Duryee furnace, at Silver Cliff, will soon take place.

GUNNISON COUNTY.

CHRONICLE.—At a depth of 130 feet, a body of high-grade galena, bismuth, etc., has been encountered. Regular shipments are to be made to Denver. The Chronicle mill on this property will also start up and treat the lower grades in the drifts.

HORSESHOE.—Work at the tunnel continues. It will run through the whole length of Cascade Mountain, and will cut the principal mines of Poverty Gulch, at a depth of 2400 feet. While the company owns a number of properties that will be tapped by this tunnel, it is the intention to continue this tunnel through the main range into Dark Cañon, and, when completed, it will be three miles in length.

LAKE COUNTY.

The Leadville *Herald* has the following items:

AMIE.—The lessees who are working No. 5 shaft on a lease, have opened a promising streak of ore.

CHRYSOLITE.—The test run on 1000 tons of iron ore from the dumps was begun at the Kearney mill April 22d. The run is continued at the rate of fifty-five tons a day, and twenty days will suffice to determine the value of the Chrysolite dumps and the milling quality of the ore. At a recent meeting of the board of directors, a resolution was passed suggesting that no further leases be granted on the property, and that at the expiration of the existing contracts the property be worked under the exclusive control of the manager.

CLIMAX.—The mine will be sold May 10th by the receiver, unless enjoined by the courts. The property is estimated to bring any thing from eight to twelve thousand dollars.

DENVER CITY AND LEE BASIN.—Considerable difficulty is experienced in placing the bonds of both companies, and considerable time may elapse before these properties resume operation.

EVENING AND MORNING STAR.—The pumping machinery on the upper Evening Star shaft has been started up again, and is throwing a large stream of water. It is said that several of the neighboring mines have volunteered to contribute toward the expense of keeping this plant going, as its operation relieves them of large quantities of water and lightens the burden of their own pumping machinery. A number of leases have been let.

FOREST ROSE.—A very promising ore-body has been opened in this mine on Little Ellen Hill. The ore is said to assay thirty ounces in silver to the ton, from thirty-five to forty per cent in lead, and one tenth of an ounce in gold.

NEW PITTSBURG.—The lessees of Section No. 9 have begun sinking a new shaft near the Stonewall Jackson. The lessees on the Bates shaft have made a favorable iron contract, and are preparing to take out considerable quantities of this mineral. A shaft-house and engine are erecting at the Bates.

ROBERT E. LEE.—Considerable ore is shipped.

OURAY COUNTY.

CHARTER OAK.—This mine, situated on Red Mountain, has developed a body of black copper.

SAN MIGUEL.—These sampling and crushing works, at Telluride, one of the largest sampling-works in the San Juan, have been purchased by parties who propose making some extensive additions.

PARK COUNTY.

LONDON.—An attachment has been obtained against this company by the First National Bank, of Denver, which is said to hold a claim for $27,000.

PITKIN COUNTY.

The old Shepherd smelting-plant at Aspen is to be converted into a sampling-mill by Messrs. McMurchy & Plumb.

PUEBLO COUNTY.

ST. LOUIS VS. ARGENT.—A decision was rendered by the court in favor of the St. Louis Smelting and Refining Company *vs.* the Argent Mining Company, by consent, giving a judgment for $67,519.

SAN JUAN COUNTY.

SILVER PEAK.—The sheriff advertises for sale this property at Silverton.

DAKOTA.

A company has been formed in Chicago for the purpose of prospecting the Harney Tin mines. The erection of concentrating-works will soon be commenced. It is the intention of the company to erect a mill that will cost about $25,000, concentrate the ore, and ship it to the East, and then, if the prospect is satisfactory, it will at once proceed to build works that will cost $100,000.

FATHER DE SMET.—The report for the week ended April 22d shows ore extracted from the first, second, and third levels, 2065 tons. Ore milled, 1975 tons.

GREENWOOD.—This gold mining and milling company has been incorporated under the laws of Illinois, with a capital of $5,000,000, for the purpose of developing mines in the Black Hills.

GUSTIN BELT.—The company is working a large force of men. A tunnel has been run 700 feet into the mountain, at the breast of which a chamber is opening for the extraction of ore.

LANCASTER.—The mill has been thoroughly overhauled, and has started up. The mine has a tunnel in 450 feet, and works a force of twenty men.

IDAHO.

Respecting the Cœur d'Alène gold excitement, Prof. J. W. Tiernan, in an interview with a correspondent of the New York *Tribune*, said: I think there are at least 9000 people at the mines or in the little towns near the railroad, waiting for the snow to disappear so that they can go in. When I left Spokane Falls about 500 or 600 men were on the ground. The season is unusually backward, and it will be a month probably before active operations in the placer mines can begin. Even then, it will be some time before the real prospects of the new gold-fields can be ascertained. Of course, the most flattering reports are sent out. My opinion is, that the history of the Colorado mining region will be repeated in the history of the Cœur d'Alène District: the real wealth will be found in the baser metals. Machinery for saw-mills has been taken into the country, and when the season opens, there will be a supply of lumber to build sluices and for the other uses of placer mining. The mining fever is raging everywhere in the West—in Minneapolis, St. Paul, Chicago, and even in cities farther East. I stopped two days in Cleveland on my way here, and at least one hundred men came to see me and asked questions about the Cœur d'Alène mines.

EMERSON.—The company is preparing to put machinery on its Humbug mine, near Bellevue, and a concentrator to work the low-grade ores. Not much work has as yet been done on the property, but it is proposed to push developments as soon as the weather permits.

MAYFLOWER.—After nearly two years of active search, the continuation of the Mayflower vein has been found at a depth of about 200 feet below the old ore-stopes and about 200 feet westerly of where it was sought for at first.

MINNIE MOORE.—Extensive improvements are to be made on this property, near Bellevue. The concentrating-works are to be enlarged by the addition of new machinery so as to enable them to handle much larger quantities of ore.

MICHIGAN.

The Williams slate quarry near L'Anse has been sold to the J. M. Brunswick & Balke Company, Chicago, for $75,000 cash. The purchasers intend to build a mill at once for the purpose of getting out slate slabs such as are used in the construction of billiard-tables, and will employ a force at quarry and mill of about 250 men.

COPPER MINES.

CONGLOMERATE.—The wood-yards being full, the force of wood-choppers has been laid off. The item in last week's news was an error, as official reports received state that the Conglomerate is working two shifts as strong as ever.

HURON.—The second Ball's head in the Huron dressing-works has been started up. To meet the demands of this addition to the mill, an extra boiler had to be provided. An annex or extension has been built on the wash-floor end of the mill, which is fitting up with slime-tables. It will not be long now before these improvements are available, when the Huron will be able to turn out about 125 tons of mineral every month.

PEWABIC.—The court has refused to appoint a receiver. It held that the stockholders had a right to sell the mine, giving old stockholders the privilege to take stock. The court further decided that the price placed on the property is too low, and restrains the sale until the court can ascertain its valuation. Work on the mine is to be continued under the present management,

IRON MINES.

CURRY.—This mine, which was announced to be totally barren of mineral some months ago, will, says the Ishpeming *Iron Agitator*, send out 15,000 tons of fine hematite ore this season.

LAKE ANGELINE.—A plant of hoisting machinery is in course of construction at the Iron Bay foundry. This plant is to replace the one recently destroyed by fire.

GREAT WESTERN.—The working force is gradually increasing. About 50 men are employed. Considerable dead-work is doing. Shipping has begun, the ore going to Florence, and a cargo of 450 tons being sent to the Leland Iron Company's furnace.

LAKE SUPERIOR.—Shipments of hematite ore and of hard ore have begun, the ore going to the port of Escanaba. The new plant of pumping machinery at the hematite mine is in place and working smoothly. At No. 1, the new hoisting plant is getting into position, and will be ready to do service in a few weeks.

REPUBLIC.—Shipments of ore have begun.

SWANZEY.—An entire suspension of mining work has been ordered by the management. Litigation affecting the title of the property is said to be the cause of this move.

MONTANA.

GALLATIN COUNTY.

It is reported that the Homestake and other mines at Cooke City have been sold for the sum of $160,000.

The mining and shipping of iron ore is a new and an important industry springing up in Emerson Mining District, near Bridgeville, says the Bozeman *Courier*. The ore at present is shipped in considerable quantities to the smelting-works at Wickes, where it is used as flux in reducing the high-grade refractory ores of that camp.

JEFFERSON COUNTY.

ELKHORN.—About a year ago, this company was organized and put up a ten stamp chloridizing mill at the A. M. Holter mine. The former wet-crushing mill that had been erected had not been able to save over fifty per cent of the silver. A marked improvement at once resulted, the present mill saving ninety per cent. The main shaft is down upon the lead over three hundred feet, and near the bottom of it an east and a west level have been pushed along the lead to a distance of about sixty feet each way. The vein is about six feet in width in these levels, and the ore-body averages about eighty ounces in silver to the ton and a small percentage in gold.

LEWIS & CLARKE COUNTY.

The Bald Mountain Mining Company, the Clancy Creek Mining Company, and the Crown Point Mining Company, each with a capital of $2,500,000, have been organized for the purpose of developing mines tributary to Helena. Work is to be commenced at once. The business offices will be in Minneapolis, Minn. Mr. T. G. Merrill, of the firm of Merrill & Ingalls, of Helena, organized these companies.

MADISON COUNTY.

A great deal of work has been done in the Tidal Wave District, the past winter, says the correspondent of the Butte *Miner*, by parties, having leases and contracts. Galena ores seem to predominate in the district, although in lime and granite formation some very rich gold and silver leads are shown up. The galena on an average will assay from 45 to 65 ounces silver, 60 per cent lead, and $10 or $12 in gold. Most of the galena veins are found between the granite and slate. A four-foot vein of solid galena has been uncovered in the Magnolia and High Ridge mines.

The twenty-ton water-jacket smelter, owned by a Philadelphia company, that was erected in the vicinity of Sheridan last fall, is about to start up.

SILVER BOW COUNTY.

BELL.—The smelter is treating daily 30 tons of ore in one of its blast furnaces, and is producing eight tons of matte, which is sent regularly to Swansea. It assays over 50 per cent copper, and contains more silver than any other matte produced in Butte, except that of the Colorado smelter. The concentrator to be run in connection with the smelter was to have started up April 21st, and as a result the matte will be of much better quality than heretofore. The condition of the mine is quite satisfactory. The 400-foot level is yielding about 30 tons of ore daily from the faces and stopes. In the west drift, the ore was of low grade until recently, but a large body of a much better quality has been struck this week. It assays well. In the east drift, no change has occurred, the vein being of uniform extent and richness. Connection by winze with the level above has been made. It is the intention soon to increase the working force of the mine and start up the other stack at the smelter.

CLEAR GRIT.—Some high-grade copper-silver ore is produced. The sinking of the shaft will be resumed from the 220-foot level to an additional depth of 100 feet.

LEXINGTON.—Cross-cutting from the 650-foot station has not yet begun, the water being troublesome and the rock very hard.

MOUNTAIN VIEW.—The developments made in the lower levels of the mine show favorable results. The north vein shows eight feet of twenty-five per cent ore, and the south vein has been penetrated for a distance of ninety feet, and the hanging-wall has not been reached.

SHONBAR.—Work at the mine, which was some time ago placed in the hands of a receiver, is principally confined to the 300-foot east drift, in which, at a point 250 feet from the shaft, a winze to connect with the 225-foot level is now rising, and is up 25 feet in ore assaying from $55 to $70. Fifty feet farther east in the drift, or 300 feet from the shaft, a cross-cut is extending north to tap a ledge lying parallel with the old one, and about 50 feet distant. This north ledge crops very plainly, but has never been developed. On the dump of the Shonbar, which is now assorting, are about 250 tons of second-class ore, for which the Colorado smelter pays from $9 to $25 per ton, and several thousand tons of a still lower grade, that can also be profitably sorted.

NEVADA.

ELKO COUNTY.

ELKO CONSOLIDATED.—The attachment has been raised from this property, and work will probably be soon resumed in the mine. The suit was the result of a misunderstanding in regard to the terms of a business matter, which has been satisfactorily adjusted.

NAVAJO.—Work in and about the mine running smoothly. During the week ended April 24th, 502 cars of unassorted ore were produced. The usual progress at all points has been made, and the usual grade and amount of ore milled. The shipments were $8188.78.

ESMERALDA COUNTY.

SILVER LINING.—The shaft of this mine, at Aurora, is down 60 feet in a ledge varying from 18 to 20 feet in width. Drifts have been run north and south respectively 40 and 15 feet, and 1000 tons of ore have been contracted for.

HUMBOLDT COUNTY.

The reduction-works at Winnemucca are to be started up again this spring. All judgments held against the property having been paid, the works will be repaired and new machinery will be added.

EUREKA COUNTY.

According to the *Sentinel*, parties at Eureka are taking steps to lease the old Matamoras furnace (capacity 40 tons) and run it in the reduction of custom ores. They are negotiating with a number of mine-owners and superintendents with the view to have them guarantee them the ore from their mines for a reduction for a given period. The new company proposes to reduce ore for $10 per ton.

EUREKA TUNNEL.—It is thought that the company will redeem the property recently sold by the sheriff.

LINCOLN COUNTY.

MEADOW VALLEY.—The company's property has been sold at auction in Pioche for $7000.

STOREY COUNTY—COMSTOCK LODE.

The resumption of the work of sinking the Combination shaft was begun April 22d. It is doubtful whether the shaft will be sunk to the 3000 level. It will be sunk to the 2900 level, however, and a station excavated for another set of Cornish pumps. These pumps are indispensable for handling water that may be encountered on the 2800 level. The sinking will not interfere with the work of running the southeast drift.

NEW MEXICO.

GRANT COUNTY.

The smelter at Kingston is running full-time, treating about forty tons of ore daily, from the Iron King mine. The mines are yielding all the ores that can be handled at present. It is the intention to erect another stack, and every thing is prepared to erect a third smelter of 60 tons capacity, thus making 120 tons.

MEXICO.

The copper properties, located in Nacosari Cañon, Sonora, that were recently purchased by a syndicate of Newark, N. J., have begun the work of development. Two thirty-ton smelters have been ordered, and are now *en route*, and will be erected in the near future.

BOSTON & SONORA.—This property (familiarly known as the Mina Grande), purposes starting up.

NEW HAMPSHIRE.

From a report by Prof. E. T. Cox, formerly State Geologist of Indiana, addressed by him to Mr. C. C. Howe, of Meriden, Conn., we take the following on a mica property formerly owned by J. N. Kinne, situated at Groton, Grafton County:

The mica-bearing rock is white granite and feldspar, which appears in three separate belts on this land, and they have a trend a little east of north and west of south. The first or lowest belt is near the foot of the mountain and close to Mr. Kinne's house, which has an elevation by barometer of 1770 feet above the sea. The mica appears in distinct bunches, which are of various sizes, and lie wedged in between the quartz and feldspar in every conceivable direction; and this is the case at all the exposure of the gouge-rock. A few hundred feet beyond the first is what may be called the middle mica belt, and it resembles the first in every important particular. The upper belt is about 2000 feet above the sea, and 230 feet above the lowest.

The only work done by your company is on this upper belt. Here, a drift has been started into the face of the mountain, where there is an immense exposure of this mica-bearing rock, thickly studded with bunches of mica. The rock rises here very abruptly, and shows an exposure of the mica rock from 20 to 30 feet wide, and from 150 to 200 feet high. The drift has reached a depth of from 12 to 15 feet, and is still pushed so as to give shelter and protection to the miners during the severe winter weather. On the left side of this exposure, is a wall of yellowish micaceous schist, more or less soft and decomposing. The general country-rock is hornblendic granite. Three men were engaged at work driving this tunnel. The rock is hard, and has to be blasted. Two charges that were fired during my stay broke down 500 or 600 pounds of rock, and with it 10 or 12 pounds of mica, some 4 or 5 pounds of which would cut into good sizes for market.

At the three other large exposures of this mica-bearing rock on this property, no important work has been done, though they are well filled with pockets of mica, and give promise of favorable results.

I visited two other mica properties in the immediate vicinity, and, judging from the exposed mica and the convenience of working, it is my opinion that you have much the most valuable property in the county.

I am assured that good miners can be employed at $1.50 a day of ten hours; and, from what I saw, it is my opinion that ten miners will turn out at least 30 pounds of mica that will be worth on an average $3 a pound, taking salable sizes, large and small. Ten miners' wages for 26 working days will be, at the above rate, $390. Making a liberal estimate for powder and extras at $110, we have total expenses for a month's work $500. Allowing the very low estimate of 30 pounds of mica a day, the monthly yield is 780 pounds, which, at $3, is $2340, less expenses, $500, leaving a monthly profit of $1840. I believe this estimate of profits to be fully within the capabilities of your mines, if judiciously managed. The color of your mica is excellent, and good sizes will command a ready sale. The present price of mica ranges from 50 cents to $12 a pound, according to quality and size of sheets.

UTAH.

BEAVER COUNTY.

CAVE.—It is proposed to erect near Milford extensive works for the reduction of the ore, if the Utah Central Railroad will extend the road from Milford to Iron Springs, a distance of fifty miles. Plans have been so far made, and partly arranged. The property is comparatively but little developed. The ore is said to be clean oxide of iron, carbonate of lead, and lime.

VIRGINIA.

Reports from Greenville, Augusta County, state that that section is in a fair way to have its mineral wealth developed, as, within a radius of six miles, a number of iron properties have been leased, and from one a hundred tons of ore shipped, with orders for much more.

A number of Philadelphia capitalists have recently made large purchases of mineral lands in Appomattox County, and propose to expend considerable capital in mining and working the products.

The Bertha Zinc-Works, in Smythe County, are now in full blast, running four furnaces. There is an option for their purchase by Northern capitalists for $400,000, which, if closed, insures the erection of a larger plant.

WYOMING.

G. E. Bailey, of Cheyenne, Geologist of Wyoming, states that the soda deposits discovered in the territory are unique. One series is on the old Laramie Plains, fourteen miles from Laramie City, where there is a chain of so-called lakes, from five to twenty-five acres in area, averaging fifteen feet in depth. These deposits are sulphate of soda. In the Sweetwater Valley, near Independence Rock, are thirty-four deposits varying in size from three and four acres up to thirty-two acres. A few of these are simply bodies of water highly charged with sulphate of soda. Many others contain a mixture of sulphate and carbonate to a depth of forty-eight feet. The depth and extent of these beds have only recently been known. Experimental works have been erected at Laramie City to manufacture carbonates and bicarbonates. In the Sweetwater region, bicarbonate is found on the surface.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, May 2.

The mining market this week was quite active, and the transactions afford some new and interesting features. The principal feature of the market was the strong advance in the Comstocks. With but one exception—California—all of these stocks rallied in sympathy with the San Francisco market, and ruled at stronger prices than for some time past. On the other hand, the Bodie stocks were an item of interest on account of their weakness. Especially is this the case with the Standard and Bulwer, which have suffered a very heavy decline. The Leadville and Tuscarora stocks ruled steady. Rappahannock was quite strong, and was very actively dealt in. The low-priced stocks were rather neglected, and remain at steady figures. The total number of shares sold agregates 155,020 shares, as against 115,695 last week.

The Comstock shares were quite actively dealt in and ruled at very strong prices. California was the exception, being quiet and steady at 22c. Consolidated Virginia was very active, and sold at strong prices; it was quoted from 16@33@29c. Sierra Nevada was also very strong and was fairly dealt in; it sold from $1.35@$2.50@$2.25. Union Consolidated ruled at strong prices with a small business; it sold from $1.60@$2.65. Mexican rallied and sold from 85c.@$1 40@$1.35; it was fairly dealt in. Ophir was strong, with a small business, selling from $1.30@$1.75. Consolidated Imperial sold at 2c. Hale & Norcross was very strong, selling from $1.60@$3.25; it was moderately dealt in. Sutro Tunnel was very actively dealt in at steady prices; it sold from 12@14@15c.

The Leadville stocks were rather quiet, but sold at steady prices. Amie was quiet and steady at 8@7c. Chrysolite also sold at steady prices, under a moderate business; it was quoted from 98@95@96c. Breece ruled firm, and was actively dealt in; it sold from 25@30c. Iron Silver was quiet and steady, selling from 85@87c. Little Chief sold from 45@42c.

The Bodie stocks were inclined to weakness, although but moderately dealt in. Bodie Consolidated was fairly dealt in at about steady prices, selling from $4 50@$4 25. Standard was quite weak, selling from $1.75@$1.30; it was moderately dealt in. Bulwer was very weak under a small business; it declined from 85@40c.

The Tuscarora stocks were but moderately dealt in, and sold at steady prices. Grand Prize sold at 26c. Belle Isle was quiet and steady, selling from 38@35c. Navajo was actively dealt in at strong prices; it sold from $2.35@$2.55.

In the miscellaneous list, Alice was strong under a moderate business, selling from $3.05@$2.50. Bassick was strong, selling at $7.50. Eureka Consolidated records a fair business at irregular prices; it sold from $4.25@$3.90. Hall-Anderson sold at steady prices, under a small business; it was quoted from $1.40@$1.35. Horn-Silver was a little weak under an active business; it declined from $7@$6.63@$6.75. Robinson was fairly dealt in at steady prices, selling from 19@20c.

Barcelona was quiet and steady, selling from 16@14c. Caledonia sold at 50c., and Central Arizona at 20c. Harlem sold at 5c. and was moderately dealt in. Lacrosse was actively dealt in at steady prices, selling from 14@13c. Oriental & Miller sold from 11@13c. under a small business. Rappahannock records a very active business at strong prices; it sold from 16@19c. Silver Cliff sold from 7@5c., and was moderately dealt in. Sonora was moderately dealt in at steady prices, selling from 7@6c.

On the 2d day of May, 1883, Thomas B. Pheby was arrested on the application of the Inyo Consolidated Mining and Milling Company on the charge of converting the moneys of that company to his own use. Judge Truax has vacated the order of arrest, with costs. After remaining for nearly a year under the stigma of this false charge, Mr. Pheby has judicially been declared innocent.

MEETINGS.

The following companies will hold their annual meetings for the election of trustees at the times mentioned:

Atlanta Hill Gold Mining and Milling Company, Mills Building, Floor 5, Room 4, New York City, May 7th, at three o'clock P.M.

Consumers' Coal Company, No. 1246 Broadway, New York City, May 17th, at twelve o'clock M.

Golden Rule Consolidated Mining Company, office of Myer S. Isaacs, No. 115 Broadway, New York City, May 9th, at two o'clock P.M.

Leadville Consolidated Mining Company, No. 92 Broadway, New York City, May 20th, at two o'clock P.M.

Lykens Valley Railroad and Coal Company, office of Edward F. Hoffman, No. 115 Chestnut street, Philadelphia, Pa., May 5th, at one o'clock P.M.

DIVIDENDS.

Horn-Silver Mining Company, of Utah, has declared a dividend of $300,000, payable May 15th.

Lehigh & Wilkes-Barre Coal Company, of Pennsylvania, announces the payment, on and after May 15th, of 3½ per cent on its registered income bonds.

Wilmington Coal Mining and Manufacturing Company announces the payment of interest due May 1st, on bonds of the company.

PIPE LINE CERTIFICATES.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows for the week:

The market to-night closes just five cents above the closing last Saturday. The lowest price for the week was 93⅜c., and the highest $1. The market through the week has been irregular and largely influenced by reports from Macksburg, which has been an uncertain quantity for the past two weeks. The general speculative condition of affairs in Wall street, and the state of trade throughout the country, do not favor a speculative bull market in any thing; but with a statistical position much less favorable for wheat than the situation in oil, the Chicago speculators were able to make a 15-cent advance. The decline in petroleum was considerable, and this encouraged large short sales, which are now serving as material to aid the advance that has taken place during the week, and that promises to continue till oil gets well above $1. The event of the week was the meeting in this city of the producers from the oil regions. They represented about two thirds of the entire production, and while the result of their deliberation is not known, it appears that they were harmonious. Fears of Macksburg have have diminished, and the monthly report of development-work published by the Oil City *Derrick* is more bullish than expected, the chief item being the average of 12½ barrels for wells opened in April, against 15½ in March, 17⅓ in February, and 13½ in January. The Pipe Line statistics of this month will show an increase of from 350,000 to 400,000 barrels. Refined unchanged, at 8⅝c.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

		Opening.	Highest.	Lowest.	Closing.	Sales.
April	26....	$0.93⅞	$0.95⅛	$0.93¾	$0.94⅝	5,919,000
	28....	.94⅛	.94⅞	.93⅝	.93¾	4,654,000
	29....	.93⅛	.94¾	.93⅝	.93¾	5,778,000
	30....	.94⅝	.96¾	.94⅛	.96¾	7,134,000
May	1....	.97⅝	.99⅛	.96⅝	.96¾	10,305,000
	2...	97	1.00	.97	.99⅛	10,843,000
Total sales ...						44,733,000

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, May 1.

The market for copper stocks the past week has been stupidly dull and inactive, but prices have been fairly sustained, and the pressure to sell has not been great. Calumet & Hecla continues to be the most active stock on the list, but the sales aggregate only about 150 shares, as compared with 400 last week and 700 the week previous. The price has fluctuated from $174 to $171, with the later sales at $174 again. Ingot copper has began to yield to the pressure upon the market, and is now quoted at 14⅝ to 14½c. for Lake, and other brands at 13½c. to 13¾c. It is reported that a pool has been formed to take Lake copper at 14c, and there is a good prospect that it will succeed. Quincy has ruled a fraction higher, with sales at $36¼@$37, the last sale being at $36¾. There is very little doing in it, and any pressure to sell would result in much lower prices. Osceola declined on sale of 20 shares from $14½@$12½, and Atlantic from $8@$7⅞ for 50 shares only. Allouez sold at $1, same as last sale. The above were all the stocks dealt in, and serve to show the extreme dullness pervading the market, and there is nothing in the outlook for the future to warrant any improvement for some time to come. Franklin seems to be entirely neglected, although $8@$8¼ is bid for it. There is no disposition on the part of holders to let it go; at this price, it is doubtless cheap, and any change in the market would put it at much higher figures. Pewabic is quiet at $1¼ bid, $1⅛ asked; no sales. The status of affairs as regards reorganization is unchanged. Reports from the mine, which is still worked, appear to be favorable.

In silver stocks, there is very little activity at either of the boards. Bonanza declined to $1. Sullivan, to 10c. Harshaw sold at 40c. Bowman Silver, steady at about 16c. Empire, dull at 10c. The rest of the list is without any special feature.

3 P.M.—At the afternoon Board, Calumet & Hecla sold up to $175, and closed firm at the same price bid. Quincy sold at $36½, and was offered at that, $36 bid. Allouez, offered at $1. Atlantic, $7½ bid. Franklin, $8 bid. Pewabic, $1¼ bid, $1⅜ asked.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. April 25.	April 26.	April 28.	April 29.	April 30.	May 1.
Albion	...	...	...	...	...	....
Alpha	...	...	...	...	...	....
Alta	.75	.85	1½	1⅝	1⅝	1⅝
Argenta	...	...	...	...	...	....
Bechtel	...	...	...	...	...	....
Belcher	1	.95	1	1⅛	1⅛	1⅛
Belle Isle	...	...	...	...	...	....
Best & Belcher	1¼	1⅜	1¾	1⅞	1⅞	2
Bodie	4¼	4½	4½	4⅜	4¼	3½
Bullion	...	...	...	...	...	....
Bulwer	...	...	...	...	...	....
California	.20	...	...	.25	...	.25
Chollar	.75	.85	1⅜	1½	1⅝	2⅛
Con. Pacific	.30	...	...	.25	...	....
Con. Virginia	.20	.20	.20	...	.25	.25
Crown Point	1⅛	1⅛	1¼	1¼	1⅜	1⅜
Day	2	...	2	...	...	....
Elko Cons	...	...	...	...	...	....
Eureka Cons	4	...	4	4	4	....
Exchequer	...	...	...	...	...	....
Gould & Curry	1	1⅛	1¼	1½	1½	1⅝
Grand Prize	...	...	...	...	...	....
Hale & Norcross	.90	.95	1½	2	2¾	3⅛
Independence	...	...	...	...	...	....
Martin White	...	...	.55	...	...	....
Mexican	.75	.85	1⅛	1¼	1¼	1⅜
Mono	...	...	...	...	...	....
Mount Diablo	...	...	...	...	...	....
Navajo	2⅛	2⅛	2⅜	...	2⅜	2⅜
Northern Belle	...	...	...	...	...	....
North Belle Isle	...	...	...	...	...	....
Ophir	.30	.30	.50	.50	.60	.60
Overman	...	...	...	...	...	....
Potosi	.35	.40	.55	.60	.60	.85
Savage	.20	.25	.40	.65	.60	.80
Scorpion	...	...	...	...	...	....
Sierra Nevada	1¼	1⅛	1¾	2	2⅛	2¼
Silver King	...	...	...	...	...	....
Tip Top	...	...	...	...	...	....
Union Cons	1⅝	1¾	2	2⅜	2⅜	2⅛
Utah	1¼	1¼	1⅝	1⅝	1¾	1⅝
Wales Cons	...	...	...	...	...	....
Yellow Jacket	1⅝	1⅝	1¾	2	2⅛	2⅛

BULLION MARKET.

NEW YORK, Friday Evening, May 2.

A decline in silver in London and in sterling exchange here is reflected in the figures of the accompanying table:

DATE.	London. Pence.	N. Y Cents.	DATE.	London. Pence.	N. Y. Cents.
April 26	51	112	April 30	50⅞	111¾
28	51	112	May 1	50 13-16	111½
29	51	112	2	50¾	111⅝

Foreign Bank Statement.—The governors of the Bank of England, at their regular weekly meeting, May 1st, made no change in the bank's minimum rate of discount, and it remains at 2½ per cent. During the week, the bank lost £182,800 bullion, and the proportion of its reserve to its liabilities was reduced from 49 to 48½ per cent, against 34 1/16 per cent at this date last year.

Shipments of Gold.—The steamship Aurania, which sailed this week, took $1,300,000, all in gold bars. This will make $30,784,000 gold shipped since February 21st.

BULLION PRODUCTION FOR 1884.

MINES.	States.	Month of March.	Year from Jan. 1st, 1884.
		$	$
*Alice, G. S.	Mont.	† 89,465	298,761
*Belmont	Mont.		8,081
Bodie, G.	Cal.	26,293	88,976
*Bonanza King, S.	Cal.	36,844	135,161
*Boston & Montana, G.	Mont.	58,114	132,813
*Chrysolite, S. L.	Colo.	16,023	32,278
*Consolidated Bobtail, G.	Colo.	7,915	24,326
*Contention, S. G.	Ariz.	54,872	195,164
*Deadwood-Terra, G.	Dak.	40,409	128,703
*Derbec Blue Gravel, G. S.	Colo.	9,628	29,296
*Father de Smet, G.	Dak.	39,898	96,075
Grand Prize, S.	Nev.		25,000
*Hecla Cons., G. S. L.	Mont.	‡	162,178
*Homestake, G.	Dak.	99,682	301,053
*Hope, S.	Mont.	2,547	17,980
Horn-Silver, S. L.	Utah.	258,087	582,087
*Iron Silver, S. L.	Colo.	58,287	184,169
*Kentuck, G. S.	Nev.	3,606	11,639
*Lexington, G. S.	Mont.	96,494	299,896
*Little Pittsburg, S.	Colo.	7,169	25,134
Moulton, S.	Mont.		122,000
*Mount Diablo, S.	Nev.		24,830
*Navajo, G. S.	Nev.	13,877	85, 50
*Ontario, S. L.	Utah.	197,727	536,205
*Original, S. C.	Mont.		11,135
*Oxford, G.	N. S.	3,102	10,262
*Paradise Valley, S. G.	Nev.	16,322	45,164
*Plymouth Consolidated, G.	Cal.	89,277	275,778
*South Yuba, G.	Cal.	3,779	5,819
*Syndicate, G. S.	Cal.	5,982	35,841
*Tombstone, S. L.	Ariz.		122,756
United Gregory, G.	Colo.		7,174
Total amount of shipments to date			$4,061,474

* Official. † Assay value. ‡ Not including value of lead. G. Gold; S. Silver; L. Lead; C. Copper.

METALS.

NEW YORK, Friday Evening, May 2.

Copper.—The negotiations to which we alluded in our last report have been concluded. They are reported to aggregate 12,000,000 of pounds of Lake ingot for delivery in June, July, August, and September, at 14c., a figure which can only be looked upon as the direct outcome of the low sale of a large block abroad some time ago. It may well be questioned whether it was good policy to force so large a block of copper on the foreign markets at one time, which, too, was not particularly well chosen. It seems almost as though the low figures at which these two large sales were made were in pursuance of a policy to crush out the weaker producers of the Lake and elsewhere. The immediate result, so far as the smaller Lake companies are concerned, will be a steady effort to carry down cost by an increased production, and it is probable that it will take some time before even the weakest of them has exhausted its treasury and has worn out the faith of its stockholders. The Calumet & Hecla will presumably strain its gigantic plant to add a few millions of pounds annually to its output, to make up for lower prices. The bulk of the Arizona product is that of companies who can hold their own for a time to come, while Montana will go on undisturbed, throwing a very large increase of product upon the markets of the world. We do not, therefore, look for any decline in the production of this country, but, on the contrary, expect it to go increasing. Relief can only come from an expansion of the consumption, and this is only possible when the copper manufacturers consent to abandon the policy of a small production with high profits for a heavy output and moderate returns. We quote Lake copper 14¼@14½c., and other brands 13⅝@14c.

England has fairly maintained the recent slight rise, Chili Bars being quoted at £57 7s. 6d., while Best Selected has receded to £62.

Tin.—The market has been very active during the past few days, rising, until to-day it reached 19½@19⅝c. spot cash, while futures are 19¼c. The moderate spot stock is concentrated in a few strong hands, and London has advanced from £85 5s. yesterday to £86 17s. 6d. to-day.

Lead.—The market has been exceedingly dull, transactions during the week aggregating about 300 tons in small lots from 3·65c. down to 3 62½c. Now the best bids are 3·60c., with very little disposition to buy.

Messrs. John Wahl & Co., of St. Louis, telegraph to us as follows to-day:

Our market is steady. Sales for the week sum up to 330 tons of Refined lead at 3·50c. There is nothing doing in Common lead. As yet, no change is reported in freight rates East.

From Chicago, Messrs. Everett & Post wire us as follows to-day:

Our market is very dull, and there are no buyers here at over 3·40c. Sales for the week sum up over 700 tons, mostly for shipment East. Our market closes nominally at 3·45c. asked.

Spelter.—In spite of the fact that ores are reported to have risen in price in the West, and that most of the smelters insist that their lowest limit is 4·60c. here, ordinary Domestic Spelter is offered at 4·50@4·62½c., and there are rumors of even lower figures. England cables £14 10s. for Silesian.

Antimony.—Unchanged. We quote: Cookson's, 11¼c.; Hallett's, 10¾c.; and Pontifex, 10½c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 2.

American Pig.—If any thing, there is a slight shade of weakness, though not affecting standard brands. The demand continues sluggish, but on the other hand the offerings are light.

We quote No. 1 Foundry at $20@$21; No. 2, $19@$19.50; and Gray Forge, $17.50@$18.50. There have been no sales of foreign Bessemer pig, which remains quiet at $20 ex ship, while Domestic made of foreign ores has sold at $18.50 at furnace. Twenty per cent Spiegel is quoted in round lots at $28@$28.50 ex ship, some sales having been made at the lower figure. Ferro-manganese 45 per cent, is worth $45.

At the Metal Exchange, there were no sales of pig-iron during the week.

Scotch Pig.—There is no change whatever to note.

We quote ex ship and to arrive: Coltness, $22@$22.50; Langloan, $22@$22.50; Summerlee, $21.50; Dalmellington, $20.75; Gartsherrie, $21.50@$22; Eglinton, $20.25; and Glengarnock, $22@$22.25.

At the Metal Exchange, the following cable quotations have been received: Coltness, 56s. 6d.; Langloan, 52s. 9d.; Summerlee, 51s.; Gartsherrie, 52s. 9d.; Glengarnock, at Ardrossan, 48s.; Dalmellington, 48s.; and Eglinton, 45s. Warrants, 42s.

Steel Rails.—No business of any importance has been transacted. We quote $33 at Eastern mill.

Old Rails.—The transactions have not been large in volume, and quotations remained unchanged at $20.

Philadelphia. May 2.

[From our Special Correspondent.]

Pig-Iron.—The continued dullness of the demand for pig-iron has led to the blowing out of a number of furnaces within the past week or ten days, and, unless an improvement should take place, more furnaces, two or three probably, will follow. There are considerable offerings of low-grade pig-iron on the market, and these are responsible for some of the weakness in prices; the stocks of good irons, especially of No. 1 Foundry, are so light that makers are able to hold prices pretty firmly, although concessions are demanded by old customers, and some companies have granted them, rather than lose the business. Only small lots of Forge and Foundry Iron are moving, and the usual prices are $20@$20.50 for No. 1, $18.50 for No. 2, and $17.75@$18 for Gray Forge. Out of inquiries for between 30,000 and 40,000 tons of ore, about 20,000 tons have sold at 8¾c. per unit at Baltimore, 8⅛c. here. This ore was in two lots of 10,000 tons, one to the Pennsylvania Steel Company; the other to the Chester Steel-Works, for Porman. There is a good deal of inquiry for Bessemer, and lots are offered at $18.50@$18.75 at furnace, with a probability of business within a few days.

Foreign Irons.—There is very little demand for any kind of foreign irons. Holders are very anxious for business, and would probably shade asking prices to secure a good order. Bessemer would be sold at $20 or a little less to a good buyer, but only a few lots have been taken. Spiegeleisen is unchanged at $28.50 for 20, and $21@$24 for from 10 to 12 per cent. There is nothing doing in Scotch iron.

Muck-Bars.—There is very little demand; $31 and $32 50 are the limits of quotations.

Blooms.—Charcoal Blooms are selling in small lots at $55@$56; Anthracite, $45@$46.

Steel Rails.—Under the hammering-down process, steel rail prices have been reduced to $33 at mill, and some business at this figure is done for summer delivery. It is rumored that lower prices have been taken, and it is known that large buyers could place orders at very near $32. The competition of two or three mills has effected the break in prices, and it is probable that rails will sell below $32 in a comparatively short time.

Manufactured Iron.—There is a good deal of business done, but the orders are invariably small and for immediate requirements, and the market is consequently weak and mills short of orders; a few are well supplied for a few weeks, but none of the manufacturers have orders enough ahead to make them feel safe. Best Refined Bars command 2c. in small lots. Large lots would be taken at 1·90c. Iron called refined has sold as low as 1·80c. Western iron is still coming in, but in less quantities, and is selling at very low prices. Country mills are taking some orders for common iron, but the business is of smaller proportions than is looked for at this season. The manufacturers are looking forward with a good deal of interest to the settlement of the scale question in the West, expecting to profit greatly by a suspension, should one be agreed upon.

Plate and Tank Iron.—The fact that steel plates are coming into more general use is increasing the dullness in iron, a number of establishments giving a great deal of attention to steel manufactures, and it is gradually crowding iron, in this as well as in other departments. Common Iron Plate has sold in some cases as low as 2·10c., although 2·15@2·20c. are the usual prices. Tank is almost entirely neglected. Shell is quoted at 2·75c.; Flange, 3·7c.; Fire-Box, 4·75c.

Structural Iron.—Some large deliveries are making on old bridge contracts, but very little new business of importance is coming along. The Phœnixville Bridge-Works lately secured a 1000-ton contract for an ocean pier. In several specifications lately submitted, steel shapes have been called for. There is some prospect of large orders being placed soon, but nothing definite can be stated at present. There are large requirements waiting, but buyers are very indifferent, and though they could secure very favorable terms at present, they seem to think it best to delay purchasing as long as possible. Bridge Plates and Angles are quoted at 2·20@2·25c; Tees, 2·70c; Beams and Channels, 3·50c.; in small lots.

Sheet Iron.—Mills are doing a little more business than they have been, especially in thin sheets and galvanized. A meeting of the galvanized iron manufacturers was held in Pittsburg on the 30th ult., a combination was formed, and prices are to be advanced in a short time. Heavy sheets are very dull. Prices remain at the low rates quoted for a month or two past, and no improvement seems probable, in spite of the improving demand, because of the large producing capacity. The prospects for summer business are generally considered fair.

Wrought-Iron Pipe.—A moderate amount of business is coming in, at firm prices, but no heavy orders are being placed.

Nails.—Quotations are continued at $2.50@$2.60, but these figures have been shaded on good orders. The production is large, and stocks are beginning to accumulate. There will be an active demand all through this month and June, to supply building requirements, but a further weakening in prices is probable.

Old Rails.—Shipments of T rails are offered at $22, and this would be very likely shaded, but there are no buyers for large lots. Small lots are selling at $22@$23, according to quality. Bridge and D. H. rails are quoted at $23.50@$24.50.

Scrap-Iron.—There is very little to report in scrap; sales are few and small. Best No. 1 commands $23.50 in trifling lots. Cargo lots are $22 quoted, with no business.

Pittsburg. May 1.

[From our Special Correspondent.]

Pig-Iron.—Some sales are now reported in this commodity, but still only enough for present use. The market is in full sympathy with the market for manufactured iron and steel. Prices may be quoted at $16.50@$17.50 a ton for Forge iron. Up to the week ended Monday, when the last report was made, 2410 tons of pig were sold; but this is very little improvement over the average of the past six months. The drop of from 25 to 50 cents per ton, according to grade, still holds good. Here are the rates at which

some sales have been made this week: Charcoal No. 1 Foundry, $25, four months; Cold Blast Charcoal, $26 cash; Coke smelted, native, and Gray Forge, $17 cash. Close Gray, $16.50 cash. Coke smelted, lake ore, Gray Forge, $18, four months. Coke smelted, lake ore, Bessemer, $20.50 cash. The uncertainty about the iron scale has a tendency to depress prices.

Manufactured Iron.—Prices are irregular and unremunerative, and all in all there is little change in the merchant iron trade this week. Orders do not arrive as they should. The bridge and other structural establishments are running full, but the barmills are not working more than half-time. Some hope is expressed that trade will improve within the next few weeks, but no one is building too much on it.

Nails.—Prices remain unchanged, the card being about the rate at which sales are made, namely, $2.35, 60 days, 2 per cent off for cash. Orders are few for this season of the trade, but the trade must certainly improve under the amount of building done throughout the country. The reports sent out that there is a hitch in the arrangements of the nail pool are erroneous. Three or four manufacturers have not signed yet, but will in time. The workmen want a 20 per cent advance on the iron nail scale for cutting steel nails, but the manufacturers say they will not give it.

Galvanized Iron.—A meeting held in the city this week perfected the preliminaries for a pool of galvanized iron men to maintain prices. Pools are becoming very popular.

Muck-Bar.—Dull. Sales at $31 four months, and $30.50 cash.

Wrought-Iron Pipe.—Demand backward. Discounts remain unchanged.

Steel Rails.—Prices here are $35, notwithstanding the lower quotations East. The rail mills are making good time.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 2.

Anthracite.

Business drags along, and the bulk of it is captured by individual operators who are considerably underselling those companies which insist upon an approach to circular rates. Of course, there is always a small number of buyers who take coal from the companies, and are content to pay the differences in price. The stocks here are heavy throughout, and matters might take a serious turn were it not for the fact that the Western markets are now opening. That they will take a good deal of coal is evident from the fact that the stocks there are very low. Nevertheless, no immediate improvement can be looked forward to here, especially since the effect of the restriction is to some extent counterbalanced by the extreme activity prevailing at the mines during periods of full work, leading to a very heavy production in a brief time.

From Boston, comes news that is not very encouraging, being the gathering of a cloud which may possibly assume threatening dimensions. One firm there, Messrs. J. R. White & Co., having facilities for the rapid unloading of large steamers and vessels, is stated to have considered the premium a sufficient profit, and has sold its coal at very low prices. This has created an opposition that has led to the publication by Messrs. G. W. Winslow & Co. of the following wharf prices: Lackawanna stove coal, $4.75; nut, $4.75; egg, $4.50; free-burning furnace, $4.25; hard white ash furnace, $4.40; Lehigh furnace, $4.50; and Franklin, $6.50. Cumberland coal, $3.75. By deducting $1 per ton, the New York f. o. b. prices are reached.

Bituminous.

Business has not changed materially. Low prices continue to be the order of the day, and some exceptionally low figures are mentioned as the basis of some of the contracts awarded.

Philadelphia. May 2.

[From our Special Correspondent.]

On the 30th of April, a circular was issued, announcing the suspension of work in the anthracite region, on the 5th, 6th, 7th, 8th, 9th, 10th, 22d, 23d, and 24th days of May. This determined course of the companies is imparting additional strength to the trade, and will probably bring into market at an early day a good many of the buyers who have been hanging back in expectation of lower prices. The coal combination has proved that it is strong and able to hold its own, and buyers will gain no advantage by further delay in placing orders. If this restriction will not answer the desired purpose, a further suspension of work will be ordered. Coal brokers and representatives of the coal companies are of the opinion that trade will improve from this out, and give a number of reasons for thinking so, all of which have their weight. But they do not look forward to much benefit from the manufacturing demand, for an indefinite period. The movement in manufacturing channels has been very light. The demand for all kinds of iron and steel has fallen off, rather than increased, and most concerns are buying in a hand-to-mouth way, thinking it better not to buy heavily before seeing the outcome of the restriction policy. Taking the trade as a whole, prices are rather weak, and it will take decided action on the part of the companies to maintain them at present limits. The markets are still quite bare of stocks. The local and line trades are doing but little outside of taking care of current requirements. But the opinion is expressed by trade authorities that requirements are unduly withheld, and that they must and will be presented in full force within a month. Should the Western markets buy as heavily as it appears from present indications that they will, the coal trade here will enjoy considerable activity. The whole matter seems to hang upon the question of prices. If a considerable shading on asking prices were taken, business would be done. But as it is, orders are and will be for small lots, as they have been for some time past. Concessions are granted on inferior coal only. Pea coal is more active than any other size. The larger sizes are abundant and move very sluggishly. Port Richmond stocks are large. Freights are declining, as the supply of vessels increases. Extensive preparations have been made, and will be made, at Buffalo for the handling of larger quantities of coal.

The bituminous coal operators have become so accustomed to a gloomy view that they scarcely know how to express any other opinion, and can see nothing in a favorable light. The total amount of bituminous coal sent to Eastern markets so far this year has been nearly 1½ million tons, which is a trifling increase over last year's shipments to the same date. Two or three operators expect to secure some good contracts for their products where anthracite has heretofore been placed, and they will probably succeed. But prices have been cut down so low that there is nothing in the business. Bituminous operators are not securing as much of the anthracite trade as they expected a month or two ago, as anthracite prices have been shaded and graded down to meet this competition, and a good deal of the business which bituminous men expected to secure fell, at the last moment, into old hands.

Pittsburg. May 1.

[From our Special Correspondent.]

The railroad coal trade is brisk. The river is slacking up. Coke is unchanged.

The interest in the trade this week is centered along the river, where a number of questions, and very difficult ones, too, are to be solved. The run is almost over, and in two weeks more, at the most, barring a rise, idleness will be the busiest thing along the stream. There is now a strike in the second pool, where O'Neil & Co., at the Camden pits, and Lysle & Son, at the Allequippa, have posted notices of reduction in wages to 2¾ cents. The other operators have held aloof, preferring to finish the run at 3 cents and have no trouble. It is suspected that the notice of reduction is intended as a warning to the men that the price in that pool must be one fourth cent lower. In the present downward tendency of values, the operators are attempting to establish rates for mining that will allow them to compete with the Kanawha region. There the men get 2½ cents for digging, and the operators of that region have the advantage of saving the cost of transportation between Pittsburg and the Kanawha. As a rule, the Monongahela operators are in favor of making a 2½ cent price for digging here, and in the present disorganized condition of labor may succeed. As yet, there is no united action looking to this end, but appearances indicate that it is coming. The second and first pool men say the 2½ cent rate should properly rule in the first, second, and third pools, but the operators of the latter pool insist that their mining must be ¼ cent below the rate in the first and second pools to pay them for extra lockage, etc. I believe the claim is a little strong, as the coal is about the same in the two pools, while in the fourth pool it is thicker, and the miners can dig more. So the situation resolves itself into this: Whether the 2¾ or 2½ cent rate should be established in the lower pools? The third pool men will insist on still a lower rate, and there is no telling when the matter may stop. I can quote some better news from below this week. The low dry weather has stiffened prices at Cincinnati, where stock is pretty well cleared out of first hands, and from 7 cents a bushel 7½ was reached, and they are now asking 8 cents. At Louisville, big stocks keep prices unchanged; likewise at New Orleans.

Along the railroads, the pits are running full-time. This is especially true about the Pan-Handle. Contracts are arriving in better shape than a week ago and the busy season will continue for some time, the operators can get cars. There is considerable difficulty experienced in securing cars just now, but the railroad companies will remedy it as rapidly as possible. The price is still as quoted on the wall, 5¾ cents, and not likely to change just yet. All the operators, both under the Tribunal agreement and out of it, are paying 3 cents for digging, so they have no margin to cut on at 5¾ cents. The strike of 1500 men at Irwin's, on the Pennsylvania Railroad, has ended satisfactorily, the company withdrawing the order for one-inch screen, in anticipation of some large Eastern contracts. The local demand is good for the last day or two; but if the mills should shut down, the home supply would receive a heavy blow.

I must not forget to mention the death of the well-known coal man, J. N. O'Neil. He was riding with his daughter, Monday, at Elizabeth, and was thrown out of his buggy, receiving injuries from which he died the following day. His death is universally regretted.

The coke trade is without a particle of change. Prices are as last reported, and some increase of the output may be made in a few days. The three independent operators, Rainey, Cochran, and Moore, controlling 806 ovens, still remain out of the producers' association, and continue to cut prices. Their limited productive capacity will not allow them to do much harm

Buffalo. May 1.

[From our Special Correspondent.]

The bituminous coal trade continues very unsettled, dealers quoting prices only for twenty-four hours. It is understood that large contracts have been made on the low freight basis to railroads, gas companies, manufacturers, and for propellers and general steam purposes. Rates, or even approximate rates, can not be ascertained, as the most profound secretiveness prevails among buyers and sellers. I hear from very good authorities, however, that the New York, Lake Erie & Western has offered to supply the New York Central, delivered at all points on divisions west of Rochester, with from 125,000 to 150,000 tons at $1.60 per net ton! Messrs. Powers, Brown & Co. have the Buffalo Grape Sugar Company's contract; quality, Reynoldsville; price and quantity not reported. Manufacturers continue cautious at this point, many working only short hours.

Coke is steady, no change in prices expected during May; local demand fair.

I need say nothing about the last meeting of the Western Anthracite Joint Committee of Fifteen in New York, as your readers are already posted on the action taken. The meeting of our local freight agents at Cleveland last week resulted in some unimportant changes. You have published the schedule I sent, which was practically unchanged at said meeting; a few local points only were interested in a few of the details.

Trade in anthracite is very dull at Buffalo, and likely to continue so for the next sixty days. The new schedule of prices shows only a reduction of 15 cents a ton on the opening figures of last year, which is a very great disappointment to the trade. Prices should have been fixed considerably lower, for the reason that bituminous coal of all

grades, petroleum, grain, pig-iron, and many leading articles have declined heavily, and are likely to continue low. Most of those of the trade that I have conversed with say, in effect, that the action of the committee is practically a combination movement without justice to sustain its decision. However, it is the trade's funeral, not mine.

The following is the schedule of prices delivered at this point for local trade :

Grate, 2000 pounds		$4.90
Egg,	"	5.00
Stove,	"	5.20
No. 4,	"	5.45
Chestnut,	"	5.20
No. 2,	"	4.00

Very many years ago, the firm of G. R. Wilson & Co. was established in this city for the sale of coal. After a long and honorable career, the firm discontinued business yesterday. It would be interesting to have an account of its history, dating from almost the introduction of coal at this port, and continuing until it has become one of the most important in the world.

The Union Steamboat Company and the Western Transit Company, of this port, the former running in connection with the Erie and the latter with the Central railroads, began the loading of two of their propellers this morning for upper lake ports, employing Italians and non unionists as longshoremen.

Expectations are raised that the coal traffic on the Erie Canal will be large this season. The following is a summary of charters made during the past week at this and other ports for coal : Buffalo to Milwaukee and Chicago, 75c. ; Toledo to Ludington, 75c. ; Cleveland to Port St. Ignace and Owen Sound, 70c. ; Oswego to Toledo, 70c. ; Detroit to Marquette, 75c. ; and Sandusky to Sheboygan, 60c. per net ton.

The steam barge William Edwards arrived at Chicago from Buffalo last Sunday night ; the first cargo of coal received there this season. She had no trouble in passing the Straits of Mackinaw.

Notwithstanding the large quantities of ice, extending many miles from our port, on Lake Erie, several vessels (some sail) arrived and departed yesterday and to-day.

Eleven vessels have been chartered at Oswego, Lake Ontario, to carry coal to Chicago ; some of them are now *en route*.

The latest report from Duluth states that the indications are, that the ice will be gone by May 10th, so that navigation can be resumed without difficulty. Heavy rains and southwest winds rotting ice fast.

A private dispatch from L'Anse, Lake Superior, states that there is more solid ice in that vicinity than has been known for nine years.

The Welland Canal (Canada) opened last Monday, the 28th ult.

The New York State canals open next Tuesday, May 6th. Condition reported good.

Coal receipts at Buffalo by the Lake Shore & Michigan Southern Railroad for the week ended last Saturday were 948 tons; 528 tons for Buffalo and 420 tons for other ports not stated, all bituminous. In the month of April, 2784 tons; 1800 tons for Buffalo and 984 tons for other points. From January 1st to April 30th, 23,321 tons; 7981 tons for Buffalo and 15,340 tons for other points.

The presidents of the Rochester & Pittsburg, the New York, Lake Erie & Western, and the Buffalo, New York & Philadelphia railroads have practically agreed, it is said, to submit their triangular dispute over coal rates to arbitration.

Boston. May 1.

[From our Special Correspondent.]

There has been no noticeable change in the condition of the market this week. There has been a continuance of light buying in cargo lots to provide against needs, and no more. While as much confidence is expressed in the stability of the wholesale market as could well be asked for, yet there is equal confidence that the prices of a month later will not be higher. This is particularly the case with the Boston dealers. As a general thing, country trade is willing to take on coal earlier, although no one is particularly desirous of having much of a stock on hand for the assessor's inspection. The arrivals have been few this week, owing to the lack of vessels to move coal that has been ordered for some time, more especially from Philadelphia. We still quote without change : New York f. o. b. prices : Stove, $4.25 ; Broken and Egg, $3.85. Philadelphia Stove, $4.15 ; Egg, $3.70 ; Broken, $3.50@$3.60 ; Chestnut, $4.

A moderate business is quietly done in Nova Scotia culm coal. The low prices of bituminous do not altogether keep this coal out of the market, although notwithstanding that it can be laid down here at $2.90 a ton, the amount brought forward will probably fall several thousand tons below that of last year. About 15,000 tons have thus far been contracted for, and a few shipments are making from Bay of Fundy at a freight of $1.50. Cape Breton will ship at $1.90@$2 freight as soon as navigation is open at that point.

It is doubtless partly owing to the water-gas controversy now going on in our State Legislature that the trade in gas-coals is slow and unsatisfactory. A very strong fight is waging, and it now looks as if the coal-gas men must finally be defeated. Still the outcome of the struggle can have no effect upon this year's demand for coal-gas. The chief element in unsettling the market is, however, the cutting of rates that a sharp competition has brought about. Contract sales are reported at delivered prices of $4.50 a ton, which is 25 cents below nominal opening quotations. Only a few companies have bought their stock.

But little is doing in bituminous steam coal. There is a small cargo trade at delivered prices of $3.90@$4, and we hear of a few small contracts placed.

There is a firmer feeling in freights. Vessels do not seem to be at shipping points, but there is no noticeable hauling off, and it is the general belief that a return to the lowest rates is to come. At least, there is little disposition to pay an advance. Barges have recently been brought round at $1 from New York, through seven bridges. Small vessels are reported especially strong. Hence the range in quotations. We quote :

New York, 90c.@$1.25 per ton ; Philadelphia, $1.15@$1.25 ; Baltimore, $1.35@$1.40 ; Georgetown, nominal, $1.75 ; Newport News, $1.25 ; Richmond, $1.35 ; Bay of Fundy, $1.50 ; Cape Breton, $1.90@$2.

There is a light retail demand, with sales almost wholly at lowest prices quoted. We quote :

White ash, furnace, egg and nut	$5.50@$5.75
" " stove	5.75@6.00
Red ash, egg	6.00@6.25
" " stove	6.00@6.25
Lorberry, egg and stove	6.50@6.75
Franklin, egg and stove	7.25@7.50
Lehigh, furnace, egg, and stove	5.75@6.00
" nut	6.00

Baltimore. May 1.

We have very little to report from this quarter. The prices established on April 1st, and previously reported, will run through May.

The Philadelphia & Reading Coal and Iron Company, however, has issued a new circular for May, advancing free-burning (Shamokin) egg 40 cents per ton, and stove 25 cents afloat alongside.

The Susquehanna Coal Company adheres to the April prices, and says it can meet the demand for this grade of coal. The two companies control this market, and have usually made the same prices.

Trade is very quiet at retail, but dealers will soon begin to buy freely, and stock up to meet the coming demand. Hard white ash coals are coming in freely, and prices for prepared sizes are a shade off the initial prices of last year. Shamokin is also from 15c. to 25c. lower than in May, 1883 ; while the Lykens Valley—red ash—is higher than at any time in the past eight years.

The market is now firm, and we hope to have a good year's business, under the policy of restriction when required. ANTHROS.

Cincinnati. April 30.

[Specially reported by the CONSOLIDATED COAL AND MINING COMPANY.]

Cincinnati has been favored with a month of cheap coal. With no coal exchange to regulate prices, and no concert of action among the dealers, coal has been handled ever since the flood very nearly at cost. The Ohio River has afforded almost constant barge transportation since the year began, which has kept an ample stock of coal in the river all the time, and afforded great encouragement to the small dealers. The city haulers have been able to take large or small jobs as low as the largest operators. They could cover any contract they might make so as to leave themselves good compensation for the hauling.

The elevators have felt for a good while that, so far as the retail trade goes, the little dealers have had them at a great disadvantage. The city haulers have been busy, while the elevators were putting their teams into their stables. Early in the month of April, the Consolidated Coal and Mining Company advertised Youghiogheny second pool coal delivered to consumers at 10 cents a bushel. This price being but a little above the cost of the coal, left the city haulers a narrow margin, and woke up the trade generally. People ordered their coal freely, for the whole season, and, though the margins have been small, trade has been active.

The month of May will come in with a much stronger market than we had through April, and if there should not be a rise in the river very shortly, prices will advance largely, both at wholesale and retail. If, on the other hand, the river rises and we get early shipments of coal, the market will be weak again, and lower probably than it has been for several years. The cost of mining coal on the Monongahela has been reduced twice during the spring, and producers can now mine their coal very cheaply ; and, if they can only get it to market, consumers will be happy.

The stocks of coal in first hands have been reduced to very small proportions. Sales have been made at 8 cents for second pool coal, and some holders have been asking 9 cents. The elevators have been trying to advance prices at retail, and while a few still sell at 10 cents, the general price may be quoted at from 11 to 12 cents for standard Youghiogheny lump coal.

The spring anthracite trade has hardly opened yet, but the price at retail will probably follow the price made by the Western Anthracite Association, on the 24th of April, at New York. This will make a reduction of about 50 cents a ton on retail coal. The cost of anthracite for heating purposes is now greatly above that of soft coal, and the difference is great enough, probably, to largely diminish consumption.

We quote the general market as follows :

Youghiogheny in the river, 8 cents per bushel, delivered to consumers	10 to 12c.
Kanawha River in the river, 7 cents per bushel, delivered to consumers	10c.
Ohio River in the river, 6 cents per bushel, delivered to consumers	8½c.
Anthracite $7 per ton for Wilkes-Barre.	
" $7.50 " " Linderman's Sugar Loaf.	

Chicago. April 30.

[Reported by RENO & LITTLE.]

Both receipts and shipments of anthracite coal have been greater this month than for the same month in 1883. The stocks of coal now on hand are very light, not exceeding sixty thousand tons, by some estimated as low as forty thousand tons. Navigation is now open, and already vessels are beginning to arrive, coal-laden, from Buffalo, and the stocks of coal upon the docks will increase rapidly from this on. Prices have been quite irregular for the year past ; but it is given out that the prices (established within a few days past in New York) will be certainly maintained in Chicago. These prices are as follows, on cars at Chicago :

Grate	$5.93
Egg	6.02
Stove	6.75
Nut	6.25

The retail are, for coal delivered, net tons :

Grate	$6.75
Egg	6.75
Range	7.00
Nut	7.00

Bituminous coal is abundant, and prices favor buyers. As usual at this season of the year, the sales of coal are very light. We are hoping for a year of better business than the last year.

Louisville. April 30.

[Reported by BYRNE & SPEED.]

As usual at this season of the year, there is very little coal going out ; the supply is good.

The prices are as follows:

Wholesale.

	Per bushel.		Per bushel.
Pittsburg	7½c.	Kanawha	7c.
Laurel	7c.	Kentucky	5½c.

Retail.

	Per bushel.		Per bushel.
Pittsburg	12c.	Kanawha	11c.
Laurel	10c.	Kentucky	9c.

If we do not have Pittsburg water soon, the wholesale prices of all river coal will be advanced a little.

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAM AND LOCATION COMPANY.	Highest and Lowest Prices per Share at which Sales were Made.												SALES.
	April 26.		April 28.		April 29.		April 30.		May 1.		May 2.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon			3.05	3.00	3.05	3.00	2.50				3.00		1,300
Amie Con., Co	.07										.08	.07	6,100
Argenta, Ne													
Bar. & Walker, Ut													
Bassick, Co							7.50				7.50		600
Belle Isle, Ne	.38				.36	.35			.10		.35		2,200
Bodie Cons., Ca	4.50	4.25	4.50		4.50				4.50	4.45	4.25		1,130
Bonanza King													
Breece, Co	.29	.25	.28	.26	.29		.29		.28		.30		9,575
Bulwer, Ca	.85	.82	.85	.82			.69	.61	.62		.50	.40	2,250
California, Ne									.22				1,000
Cal. & Hecla, Mich													
Carbonate Hill													
Caribou Con., Co													
Castle Creek			.25										600
Chrysolite, Co	.98										.97	.95	3,700
Cons. Va., Ne	.17	.16	.20	.17			.30	.29	.33	.29	.29	.25	13,500
Copper Queen													
Dunkin, Co													
Eureka Cons., Ne	4.10		4.25	4.00	4.20	4.00	3.90		4.00				1,060
Excelsior, Ca													
Father de Smet, Dk	2.95												100
Findley, Ga													
Gold Stripe, Ca			.10										300
Gould & Curry, Ne													
Grand Prize, Ne	.26												300
Great Eastern, Dk													
Green Mountain, Ca													
Hale & Norcross, Ne					1.60				3.00		3.25		350
Hall-Anderson, N. S	1.40	1.35			1.35								2,000
Hibernia, Co													
Homestake, Dk					8.50								50
Horn-Silver, Ut	7.00		7.00		7.00	6.88	7.00	6.75	6.88	6.75	6.75	6.63	3,200
Hukill, Co													
Independence, Ne													
Iron Silver, Co	.87	.85					.86	.85	.87				2,800
La Plata, Co													
Leadville C., Co													
Little Chief, Co									.45		.42		600
Little Pittsburg, Co													
Martin White, Ne													
Moose, Co													
Navajo, Ne	2.55	2.45	2.55	2.50	2.55	2.35	2.40		2.50	2.40	2.55		4,050
Northern Belle, Ne													
North Belle Isle, Ne													
Ontario, Ut					22.00								100
Ophir, Ne	1.30				1.55		1.75						850
Plumas, Ca													
Prussian, Colo													
Quicksilver Pref., Ca													
" Com., Ca													
Rising Sun, Ca													
Robinson Cons., Co	.20				.20	.19			.19		.20		8,700
Saint Joseph's Lead													
Savage, Ne													
Sierra Grande, N. M													
Sierra Nevada, Ne	1.45	1.35	1.45		1.85		2.50		2.45	2.20	2.30	2.25	3,010
Silver King, Ar	5.75												200
Spring Valley, Ca							.80						100
Standard, Ca	1.70		1.70		1.60		1.50		1.75	1.50	1.30		1,265
Stormont, Ut					.11								700
Tip Top, Ar													
Tombstone, A													
Vizina, Ar													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Highest and Lowest Prices per Share at which Sales were Made.												SALES
	April 26.		April 28.		April 29.		April 30.		May 1.		May 2.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Albion													
American Flag													
Barcelona, G							.16	.15			.15	.14	3,100
Bear Creek													
Bechtel Con., G													
Belvidere													
Best & B'lcher, G. S													
Big Pittsburg, S. L													
Bradshaw, S													
Buckeye													
" pref													
Bull-Domingo, S. L													
Bye and Bye													
Calaveras, G													
C'lav'r's W.&M.Co													
Cal., B. H., G	.50												500
Central Ariz'na, S											.20		100
Cherokee, G													
Climax, Co													
Colorado Central													
Cons. Imperial							.02				.02		1,500
Crowell, G													
Dahlonega, G													
Decatur													
Dunderberg													
Durango, G					.03						.04		2,100
Eastern Oregon													
Elko Cons													
Enterprise													
Fannie Barret													
Globe Copper													
Gold Placer, G													
Goodshaw, G													
Granville, G													
Harlem M.& M.Co			.05						.05				6,000
Hortense, S													
Imperial													
Lacrosse, G	.13		.13		.14		.14				.14	.13	8,600
Lucerne													
Mariposa Pref., G													
" Com., G													
Mexican, G. S	.90		.85		1.15	1.10	1.40	1.20	1.35	1.30			1,850
Miner Boy													
Mono													
North Mexican													
North Standard, G													
N. Horn-Silv'r, S L													
Ori'nt'l & Miller, S	.12				.11		.12	.11			.13		2,400
Parnell													
Rappahannock, G	.17	.16	.17		.17	.16			.17		.19	.16	20,300
Red Elephant, S													
Ruby, of Arizona													
Silver Cliff, S	.07	.05	.05										2,100
Sonora Con	.06				.07	.06	.06				.06		7,200
South Bodie, G													
South Bulwer, G													
South Hite													
South Pacific									.06				2,500
State Line, 1 & 4, S													
" Nos. 2 & 3, S													
Sutro Tunnel	.13	.12	.13	.12	.13		.15	.13	.15	.14			23,800
Tioga													
Taylor Plumas													
Unadilla, S													
Union Cons., G. S	1.85	1.60	1.75		2.00		2.50	2.40	2.60		2.65		1,280

Full tables giving the total amount of dividends, capital, etc., will be printed the first week of each month. Dividend shares sold, 71,690. Non-dividend shares sold, 83,330.

BOSTON MINING STOCKS.

	April 25.		April 26.		April 28.		April 29.		April 30.		May 1.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez					1.00		1.00						500
Amie									.06				300
Atlantic			7.38										50
Aztec													
Bodie Con							4.38						10
Bonanza D.	1.25				1.25		1.25				1.13	1.00	425
Bowman Sil	.16	.15	.17	.15	.17	.16	.17	.16	.18	.17	.17	.15	18,350
Breece	.30	.27	.30		.29		.29		.28		.28		800
Bruns. Ant													
Bulwer					.80								100
Bull-Dom'go													
California													
Cal. & Hec.	174	173	174		172½	171	172		173	172	175	172½	258
Catalpa	.37½		.37½		.37½				.37½		.37½		800
Climax													
Co. Virginia									.17				200
Contentm't													
Crescent													
"Cusi"							1.00						100
Decatur													
Deer Isle													
Denver City													
Duncan													
Dunkin													
Durango													
Empire	.12½				.12½				.09		.10		1,400
Eureka Con.	4.00										4.00		40
Franklin	8.75								8.75				20
Gila County													
Hancock G.													
Harshaw											.40		100
Horn-Silver											7.50		20
Hukill													
Huron													
Ind'n Queen													
Little Chief							.44						500
Mart. White													
Mass.& N.M.													
Napa													
National													
North Belle													
Ontario													
Osceola			14.50								12.50		23
Penn-Breck.													
Pewabic	1.38								1.38				100
Plymouth													
Pontiac													
Quincy	87.25	36.50	36.75		36.50		36.00		36.50		36.50		197
Red Eleph't													
Ridge													
Robinson							.19				.18		200
San Pedro													
S'ra Grande											.75		100
Silver Islet													
Simpson Gd													
Sonora Con													
Standard							1.55						20
Sullivan	.12	.10	.11	.10	.10				.10		.10		2,600
Sutro Tun.					.12		.12		.14	.13	.13		900
Sycamore													
Twin Lead													
Vizina													

PHILADELPHIA MINING STOCKS.

	April 25.		April 26.		April 28.		April 29.		April 30.		May 1.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Amer. Cons.													
Argent													
Arizona So.													
Battle Mt													
Buena													
California													
Calista													
Chrysolite													
Cincinnati													
Comprom'e.									.15				1,500
Contention													
Con. Virg													
Dauntless													
Del Monte													
Denver City	.11										.12		600
Eureka													
Girard													
Governor													
Grand Uni'n													
Green Mt													
Gunnison													
Homestake													
Horn Silver													
Iowa Gulch													
Iron Silver													
King Bul'on													
Ledger Con.													
Little Chief													
Little Dia'd													
Little Maud									.02				1,500
L'g & D'y H													
Montana													
Mt. Sheridan													
Navajo													
North'n B'l.													
Orion													
Orion Pref													
Palmetto E.													
Pembina													
Penn-Breck.			.02				.02		.02				4,000
Permanent													
Pizarro	.01												4,000
Pizarro Ex													
Potosi													
Rara Avis					.09								1,000
Rara Avis E.	.05						.05						2,700
Record													
Rico Pion'r													
Sierra Apac.													
Sierra Bella			.80		.80				.85		.87½	.85	4,700
Sierra G'nde	.65		.65						.67½		.67½		2,500
Sierra Nev													
Silver Cord.	1.15		1.10		1.10	1.00			.97½				3,100
Silver King													
Silv'r Plume													
Sonora Con.													
Standard													
Sultana													
Sutro Tun'l.											.15		100
Tombstone	.45												1,000
Victor													
Yale Mt													

Toledo. April 30.

[Reported by GOSLINE & BARBOUR.]

The trade in anthracite coals is very quiet at present, and in bituminous coal business is somewhat demoralized, which may be attriouted to an overproduction. Lake shipments have been light so far this season. Messrs. Gosline & Barbour have recently purchased coal lands at Shawnee, Ohio. Their mines already opened have a capacity of 50 cars a day, which will be increased as trade demands. They expect to begin shipments about May 5th, and wil have one of the best regulated mines in the State.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended April 26th, and year from January 1st:

TONS OF 2240 LBS.	1884.		1883.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co..	112,504	1,003,059	94,231	1,102,341
D. L. & W. RR. Co.	131,917	1,395,186	126,472	1,386,248
Penna. Coal Co.....	38,744	320,978	36,461	380,149
L. V. RR. Co.....	46,874	398,771	21,380	325,818
P. & N. Y. RR. Co..	6,289	58,934	4,119	60,726
C. RR. of N. J.....	*	*	89,451	772,212
Penn. Canal Co....	11,598	30,601	6,625	164,818
North & West Br. RR.....	14,454	257,899	4,417	30,872
	362,380	3,445,428	383,156	4,223,184
Lehigh Region.				
L. V. RR. Co.....	141,421	1,271,954	111,103	1,448,258
C. RR. of N. J.....	*	*	88,191	691,251
S. H. & W. B. RR..	2,027	62,795	908	11,647
	143,448	1,334,749	200,202	2,151,156
Schuylkill Region.				
P. & R. RR. Co	318,204	2,948,283	172,171	2,000,802
Shamokin & Lykens Val.....	*	*	26,677	399,869
	318,204	2,948,283	198,848	2,400,671
Sullivan Region.				
St Line & Sul. RR. Co.	2,779	24,715	1,545	19,060
Total.....	826,811	7,753,175	783,751	8,794,071
Increase.....	.....	.....	.....	.....
Decrease.....	.....	1,040,896	.....	.....

* Included in tonnage of the Philadelphia & Reading Railroad.

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

Total same time in 1879..... 7,021,164 tons.
" " " " 1880..... 6,753,492 "
" " " " 1881..... 7,853,940 "
" " " " 1882..... 7,656,160 "

The increase in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 39,035 tons, as compared with the corresponding period in 1883.

Belvidere-Delaware Railroad Report for the week ended April 26th:

	Week.	Year. 1884	Year 1883.
Coal for shipment at Coal Port (Trenton)	3,118	9,732	16,930
Coal for shipment at South Amboy.....	20 937	193,925	274,651
Coal for distribution.....	21,373	255,521	266,371
Coal for company's use	3,021	59,200	49,335
Total.....	48,449	518,378	607,287
Increase...	.....	.....	.....
Decrease.....	.....	88,909	.....

Comparative Statement of the Transportation of Coke over the Pennsylvania Railroad for the week ended April 26th, and year from January 1st:

Tons of 2000 pounds.

	1884.		1883.	
	Week.	Year.	Week.	Year.
Gallitzin & Mountain (Alleghany Region).....	2,373	42,714	2,011	40,025
West Penn. RR...	122	23,964	2,040	33,999
Southwest Penn. RR.....	45,340	705,147	39,711	633,852
Penn. & Westmoreland Region, Pa. RR...	2,956	63,443	5,197	79,854
Monongahela, Penn. RR.....	1,753	24,361	.....	.....
Pittsburg Region, Pa. RR.	.....	136	.....	274
Snow Shoe (Clearfield Region)....	233	8,061	762	6,134
Total	52,777	867,826	49,721	794,138
Increase.....	.....	73,688	.....	.....

Comparative Statement of the Production of Bituminous Coal for the week ended April 26th and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

	1884.		1883.	
	Week.	Year.	Week.	Year.
Cumberland Region, Md.				
Tons of 2240 lbs....	60,443	693,545	43,902	631,656
Barclay Region, Pa.				
Barclay RR., tons of 2240 lbs.....	7,740	112,363	4,498	111,768
Broad Top Region, Pa.				
Huntington & Broad Top RR., of 2240 lbs....	3,927	62,261	.....	63,386
East Broad Top....	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe.....	17	74,910	4,103	82,790
Tyrone & Clearfield.	67,342	920,733	54,751	904,484
Alleghany Region, Pa				
Gallitzen & Mountain	3,896	126,353	4,751	165,412
Pittsburg Region, Pa.				
West Penn RR.....	3,999	100,146	6,990	160,082
SouthwestPenn.RR.	3,104	50,729	1,098	40,459
Pennsylvania RR ..	6,875	92,901	10,695	176,053
Westmoreland Region, Pa.				
Pennsylvania RR...	9,110	346,362	23,710	451,230
Monongahela Region, Pa.				
Pennsylvania RR...	3,281	53,585	.....	.....
Total.....	161,734	2,633,888	154,501	2,787,320
Decrease	...	153,432	.....	...