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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. Articles written by Mr. RAYMOND will be signed thus \*  
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AMERICAN INSTITUTE OF MINING ENGINEERS.

[OFFICIAL BULLETIN.]

The members and associates of the Institute are hereby informed, in accordance with a recent decision of the Council, that the ENGINEERING AND MINING JOURNAL will not be sent to those in arrears for the current year after July 1. The JOURNAL will be resumed when the annual dues are received, but the Institute cannot guarantee that back numbers will be supplied.

EASTON, PA., June 1, 1877.

THOMAS M. DROWN, Secretary.

WORK REQUIRED BY LAW TO BE DONE ON MINING CLAIMS.

The following points, in reference to the annual work required by the United States Law to be done on mining claims, are worth while preserving. They are decisions of Land Commissioner WILLIAMSON, and have never been questioned. By carefully observing all the points referred to, litigation and expense will be avoided. After rendering a decision on a special case, the Commissioner says:

"First.—The date of the beginning and origin of the title to a new lode-claim will be the exact day on which it shall be first discovered by the uncovering and disclosing of the same.

"Second.—The recorded location notice (or certificate) should, in all cases, state the date on which the discovery was made.

"Third.—The time in which the annual expenditures must be made will begin and end yearly on the date of discovery, not on the date of record.

"Fourth.—The work of sinking the discovery shaft ten feet deep, or such proportion of said work as shall be performed after the date of discovery, may be accounted as a part or a whole, as the case may be, of the first annual expenditure.

"Fifth.—Claims located prior to January 1, 1872, are not affected by this ruling. The law of Congress requiring annual expenditures not having gone into operation until that date, claims located prior thereto were given a full year to do their assessment work; that is to say, that these old titles may be represented at any time in the year between the first day of January and the last day of the succeeding December."

SILVER DOLLARS.—I.

It seems to be fancied—at least it is pretended—that the restoration of the silver dollar would be a great benefit to the producers of that metal in this country. Even if this were true, the overwhelming force of the arguments against the measure would not be thereby counterbalanced. But, in fact, the re-establishment of a silver standard by this country without the co-operation of other nations would confer little or no benefit upon our mining industry. Our purchases of silver for the fractional coinage have simply helped Germany to unload herself of surplus silver—a process which could go on with accelerated speed if we entered the market for still larger sums. Indeed, there is no security that the Latin Union and India might not seize the opportunity to get rid of the silver which afflicts them, and cleverly take their places in the ranks of the gold monometallic standard-bearers. Being large producers of silver, shall we help ourselves by becoming purchasers of the same commodity from abroad? While these purchases continued, the price might be maintained or advanced; but chiefly, as we think, to the advantage of the foreign holders, whose stock on hand exceeds the product of our mines for several years.

If it were an advantage—as we hold it is not—to maintain a bimetallic standard, this would only be feasible by means of a general international agreement, and we deem it impracticable to obtain, and visionary to expect any, such agreement. There is no objection to a monetary conference called by the United States. We wish such a conference had been initiated by legislation at the last

Congress. The House would have done better by such a step than it did with its hasty and abortive Silver Bill. But we think the result of a conference would be to demonstrate that the European nations which have adopted the single gold standard are not willing to make a retrograde movement. At all events, until that point has been ascertained, it is folly to talk of a policy which would practically give us an exclusive silver standard, a depreciated and fluctuating dollar and the position which India now occupies as the receptacle of the redundant silver of the world.

M. CERNUSCHI, an ingenious advocate of the double standard, who came to this country to testify before Senator JONES's Commission, greatly disappointed the argento-maniac majority of that Commission by the firmness with which he insisted upon international co-operation as the necessary condition prerequisite to the remonetization of silver. He was expected to be their great authority, but since only half his views suited them they were obliged to repudiate him. It is the other half of M. CERNUSCHI's views which suits us. He is quite right in asserting that only an international convention can keep gold and silver afloat at a fixed ratio of value in legal tender coinage, and that the attempt of the United States to do this alone would drain us of our gold and deluge us with foreign silver. But we do not think the agreement of leading commercial nations to maintain a double standard is feasible or desirable; and we feel sure it is because they do not deem it feasible that the advocates of the silver dollar will not confess the dependence of their scheme upon it.

In this country the animating spirit of the silver movement, like that of the greenback movement, is resistance to the contraction of a redundant currency, and a secret desire to secure, on the other hand, if possible, its still further inflation. The latter end they will fail to gain. As to the former, while there will undoubtedly be suffering connected with the contraction of the currency, it is suffering that must be borne in one form or another, if we are ever going to return to a basis of solid prosperity. The debtor class made money by inflation, and the same class loses money by contraction.

The plan of Secretary SHERMAN to issue silver dollars for greenbacks, and make them legal tender to the same extent, canceling the notes as the silver is issued, is a plausible compromise, which amounts on examination to nothing more than the payment of several millions a year of additional interest by the government.

So long as the issue continues, the volume of currency is theoretically not altered; nor has the community gained anything except the substitution of depreciated silver dollars for a portion of the depreciated paper ones—a change which, in the case of the one and two dollar bills, would be a positive annoyance. And to effect this really insignificant change, the government will have to purchase, say, fifty million dollars' worth of silver, and pay for it in four per cent. bonds. The expense of substituting silver for the fractional currency was compensated by the great convenience of the change. But the proposed substitution of silver for greenbacks has no such redeeming feature.

So far as a real return to specie payments is concerned, this step accomplishes nothing whatever. The government will not redeem with gold, dollar for dollar, the silver coinage it thus issues; and the new legal-tender will not even be, like the old one, the unredeemed promise of a dollar. Moreover, the bonds issued to buy silver will be just so much extra burden, hindering the advance to gold payments. The same amount, expended in the purchase of gold, would be directly effective towards the really desirable and ultimately inevitable end.

But who would send greenbacks to the Treasury, and receive silver dollars for them, unless silver was worth more for exportation? The total volume of currency is, as we have said, not theoretically altered; but practically the result might prove a contraction of the currency by the cancellation of greenbacks, on the one hand, and the exportation of the silver issued in their place, on the other hand.

This we should not lament; but what would happen in the more probable case of a fall in silver? Theoretically, the value of silver could not fall below that of the greenback, so long as the former could be obtained at the Treasury for the latter. The practical result, therefore, of causes tending to depress the gold-value of silver would be to carry down the greenback also. That is to say, the fluctuations in the premium on gold would be measured by the fluctuations of silver instead of greenbacks only, as heretofore. That this would be a change for the worse, no one can deny who has watched the silver market for the last three years. That it would hinder the resumption of specie payments, we are forced to conclude.

AN INTERESTING COPPER MINE.

Staff Correspondence of the Engineering and Mining Journal.

The Powers Lode in Gilpin County, Colorado, is at present producing an unusually large quantity of that rather rare mineral enargite (sulphide of copper and arsenic). There are only a few localities in the world productive to any extent of that ore, and the richness of the Powers vein reminds one forcibly of the remarkable variety of the ores of this State, and especially of that belt in which Central City is located. The mineral has been elsewhere found in four localities in South America, at Cosihuirachi in Mexico, at the Brewster gold mine in South Carolina, and in the Morning Star Mine, Alpine County, California. When in a comparatively pure state it is a very fine ore of copper, yielding from 25 per cent. upwards according as it is dressed closely or otherwise from its accompanying gangue.

The Powers Lode is an old discovery in Willis Gulch, a branch of Russell

Gulch. Like all the mines of the vicinity it was first opened on account of its top quartz, which yielded well in gold. As soon as depth was gained the quartz disappeared, and was replaced by a black, shiny mineral wholly unknown to the miners and very poor in the precious metals. This caused its abandonment, and for some years it has been idle. Although when left considerable of this new ore had been extracted, yet it was not till last fall that any attention was drawn to the dark unknown mineral. This year, however, the mine was put out on lease to Mr. R. F. Gaggin, of Denver, who had ascertained that there was considerable copper in the vein. To Mr. Pierce, of Black Hawk, belongs the honor of having first recognized the mineral, though at the time it was first brought to his notice a sample was also being examined by Mr. W. A. Hooker in Denver, who determined its character and name almost at the same time.

The vein is now opened by three shafts, two of which are 50 feet deep, and the third 76 feet. About 70 feet of levels have been driven on the vein, and as greater depth from the surface is secured the body of mineral has so far increased considerably in size and is now almost two feet in width. Above the ore yielded from two to five per cent. of copper, while below the mill returns show from 15 to 22 per cent. It is noticed that as the quantity of copper increases the gold and silver decrease. Ore now being mined and assaying 15 per cent. is almost wholly barren of gold, and contains only 15 to 20 ounces of silver.

From an examination of the croppings of this vein it appears that enargite occurs along its entire length, and is not confined to the small section of the lode now under work. In other words, it is not merely a pocket of mineral similar to the deposit of pitchblende found several years ago in the Wood lode in a neighboring gulch. The vein, we understand, is to be developed to some extent, and if it continues to produce as well as up to the present it will materially increase the copper production of the State. The mine is now producing some of the finest specimens of this mineral that we have ever seen.

#### THE GREAT TUNNEL.

Staff Correspondence of the Engineering and Mining Journal.

Undoubtedly the greatest mining work in progress in the West is the Sutro Tunnel. Begun under adverse circumstances, and carried on under the opposition of most of the rich and powerful companies of the Comstock, as it now approaches its completion its importance to the Washoe mines becomes more apparent, and there is much speculation in regard to the influence it will exert and the part it will fill in the future of the great vein. Owing to the tremendous depression in Comstock shares, there are now many who think that the palmy days of that mine are over; that a depth has been reached at which the expenses of hoisting and pumping are so great as to offset the possible profits of all but the hugest and most extensive bonanzas, and that the great heat existing in the lower levels will in a few years more compel the abandonment of the mine, unless new means of ventilation are secured. Under these discouraging statements the Sutro Tunnel assumes an importance second to no enterprise in the West, for the cessation of work at Washoe would result in the curtailment of American bullion production of nearly \$30,000,000 annually. It is but recently that so much interest has been felt in this enterprise. For many years few thought the work would be completed, but now all doubts on that score are removed. The header of the tunnel is advancing towards the Comstock at the rate of ten feet per day, and in a few months will enter the formation in which lies the great lode. Some facts regarding it will, therefore, not be amiss.

Its mouth is in the valley of the Carson River, a stream which washes the eastern base of the Washoe Range, in which the Comstock lies. It has been driven a total distance of 17,000 feet up to date, and is progressing at the rate of 300 feet per month. Not more than 2,800 feet now intervenes between the breast and the nearest mine on the Comstock, the Savage, so that, if the present rate of progression were maintained, about ten months more will suffice to complete the connection. The lode will be cut at a depth of about 1,800 feet perpendicularly below the surface, and very nearly the center, measuring by the extent of the surface workings. It is then proposed, either by the Sutro Company or by a combination of owners along the vein, to run a drift north and south through each claim until the ends of the vein laterally are reached. This will connect every mine on the vein with the tunnel; will drain the entire workings; and, should these lateral drifts be put under one management and made a common highway, will afford the means of working the entire vein through one opening.

It is now about eight years since work was first begun at the town of Sutro on the Carson River. The expense of prosecuting the work has averaged about \$1,000 per day, and when the Comstock is reached the total cost will have amounted to about \$3,000,000. The tunnel is double-tracked, as straight as an arrow in its course, with a rise just sufficient for drainage. Three air shafts have been sunk along its course.

At the mouth of the tunnel the Sutro Company have laid out a town, have secured magnificent water powers, and expect to realize largely on that part of their investment by the removal of most of the mining and milling operations on the vein from Virginia City to the Carson.

The fear has been expressed of late that, when the soft and yielding formation in which the lode lies is reached, great difficulties will be found in keeping open the tunnel; that the strongest of timbering, and even masonry, will be unable to withstand the enormous pressure. This trouble Mr. SUTRO confidently expects to overcome. Already several ore channels have been crossed in penetrating so far into the Washoe Range, and, though some trouble was encountered, it was overcome completely.

There are now many rumors afloat pointing to the consolidation of interests between the Tunnel Company and some of the more prominent mines. The indomitable will and energy of Mr. SUTRO have overcome, one by one, each and every obstacle placed in his way by those who opposed his enterprise; there is hardly a chance that, in the hour of his success, he will submit to anything short of a controlling interest in his work. When the vein is at last reached, and the immense benefits that it certainly will bring to all the mines shown, it is very doubtful if the belligerent owners who have all along threatened to control the rights of the tunnel will attempt to injure its usefulness or refuse to benefit by it.

#### RAILROAD ADVANCES IN THE MINING DISTRICTS.

Staff Correspondence of the Engineering and Mining Journal.

The San Juan Division of the Denver & Rio Grande Railroad was last week completed over the Veta Pass, in the Sangre de Christo Range, and has now nothing but the broad plain of the San Luis Park between its terminus and Del Norte, the gate to San Juan. The pass is 9,340 feet in height. The management of the railroad has not yet decided whether to push on to Del Norte this season or only to complete the road as far as Fort Garland. Whichever is done the San Juan mines are now about 25 miles nearer the rest of the world by rail, and the traveler towards that country has now but one range to cross on his way to Lake City or Silverton, instead of two as before.

The South Park & Pacific Railroad Company are grading in the Platte Cañon, and claim that they will have the iron on hand to be laid down as soon as the road bed is completed to Bailey's Ranch, on the edge of the Park. It has been expected that this would be done by the fall. The South Park Railroad is a very important feeder to Denver.

The Georgetown extension of the Colorado Central has been completed to Idaho Springs and is in running operation. The grade is finished also to Georgetown, and it is intended that trains shall be run to that town by July 15, if not before. The Central City extension of the same road is being surveyed. The distance from the terminus at Black Hawk to the mouth of Spring Gulch, at Central, is about one and a quarter miles by the stage road. The grade is, however, so steep that the railroad will have to make about six miles to overcome it. Having arrived at this elevation on the north fork of the road, it will not be unlikely if, by another season, an extension is planned towards Caribou.

The Valley Division of the Colorado Central is being surveyed northward from Longmont towards the Union Pacific. The line has not yet been decided upon, because it is desired to connect with the branch which that road contemplates towards the Black Hills. This question will probably be decided this summer, though there is hardly any hope that the track from Longmont to the Union Pacific will be finished within the same time.

The Black Hills road, though hardly yet a necessity, because that country is still almost unexplored and unknown, is among the possibilities of another year, and, as stated above, the route will doubtless be decided upon this summer if at all. Cheyenne and Sydney are the two places on the Union Pacific competing for the terminal point, with the balance in favor of the latter.

Nothing has recently been heard of either of the roads proposed for Montana. There is no prospect at present for the Utah Northern extension, while the look-out is equally unfavorable, so far as we have been able to judge, from the Northern Pacific. Properly, the Black Hills, the Big Horn, and Montana belong geographically to the latter road, and should it ever revive it will undoubtedly take that part of the Western trade, whether the Union Pacific has connected itself with these northern districts or not.

Nothing is being done in extending the Utah Southern, which is now controlled by the Union Pacific. There have been surveying parties from that road examining the country between its terminus and Lake City, Colo., but the route, we understand, was decided to be impracticable, owing to the deep cañons of the Colorado, Green, and Gunnison rivers.

#### PLACER MINING IN COLORADO.

Staff Correspondence of the Engineering and Mining Journal.

The placer mining interests of Colorado have never been thought of enough importance to attract a great stampede similar to that which peopled California and Montana, and is now populating the Black Hills, though in 1859, 1860, and 1861 the territory held a floating population of fully 10,000 gulch miners, and was producing very heavily in gold. Nearly all the dust washed out came, however, from narrow gorges running from the slopes of the main range, some of which, as California, Colorado, French, Tarryall, Gold Run, and Georgia gulches, were immensely rich, but to all appearances very quickly worked out. The Idaho and Montana excitement occurring just when the cream had been taken from these diggings, they were rapidly deserted for the more glowing prospects in Bannack, Salmon River, and Last Chance. As the depression in quartz took place a short time afterwards placer mining almost died out in this State, and, though the several districts known to be auriferous have never been deserted, the annual yield from that time has never exceeded a few hundred thousand dollars, a very insignificant sum as compared even with the small production of California, Idaho, and Montana at present.

Nevertheless, Colorado possesses extensive placer districts, and as very much attention is being given now to that branch of mining, a few words on the subject will be opportune. It is claimed by many—and with good reason, we think—that but a small part of the placer grounds of the State are as yet ex-

plored or known, and that vast areas of productive ground exist in the Eagle, Gunnison, Uacompahgre, and San Miguel valleys, if not still further south on the main San Juan. Whether or not this is true will be determined after a few years' more of exploration. Already there is a small excitement growing in the San Miguel, consequent upon the discovery of rich bars on that valley, and for many years past a small amount of gold dust has come into Denver from the extreme southwestern part of Colorado. The successful opening of the San Juan silver mines is inducing a very thorough system of prospecting in this part of the State, which will result, without doubt, in rich discoveries.

We have to do at present, however, with the older and well-known districts which lie in the valleys of the Blue and Arkansas rivers, and, to some extent, along the head waters of the South Platte. These valleys were first explored and opened by miners who crossed the range from the Gregory District, now known as Gilpin County, and up to 1862 and 1863 there were no livelier mining towns in the West than Placerville in Georgia Gulch, Lincoln City in French Gulch, Buckskin Joe in the gulch of the same name, Montgomery and Quartzville at the foot of Hoosier Pass, Oro City in California Gulch, and Hamilton at the mouth of Tarryall. A population of from 8,000 to 10,000 miners congregated at these camps, and made "Rome howl" as completely and thoroughly as the fraternity are ever capable of doing it. Up to 1866 the dust and nuggets washed by the rude appliances of the miners from the richest of these localities are estimated to have aggregated about \$17,000,000, distributed as follows:

Tarryall Creek.....	\$1,250,000	Gold Run.....	\$1,500,000
Montgomery Gulch.....	500,000	French Gulch.....	1,600,000
California Gulch.....	2,500,000	Illinois Gulch.....	500,000
Cache Park and tributaries..	350,000	Hoosier Gulch.....	200,000
Colorado Gulch.....	900,000	Other localities.....	3,500,000
Buckskin Joe.....	1,600,000		
Swan River and tributaries.	3,000,000	Total.....	\$17,300,000

Since 1866 the yield has not amounted to over \$300,000 annually, and until within the last few years has shown little, if any, increase. At last, however, considerable capital has become interested in the development of these placer grounds, and already the bullion yield is growing in size each season.

Mount Lincoln, whose summit is 14,200 feet above the level of the sea, is the central point of the upheaval of this part of Colorado. From its flanks four large streams flow, viz. the Platte, Arkansas, Eagle, and Blue. The Arkansas and Blue flow along the line of upheaval, the former southward for about 35 miles, and the latter northward about 30 miles. The Eagle crosses to the west and quickly emerges from the upturned strata upon which the mountain rests. The Platte bears directly along its base, and for 15 miles washes the edges of the quartzite outcrop on its eastern face. A study of the formations of which this mountain is built will do much towards revealing the origin of the placer gold found in the bed of the four rivers under consideration, and the depth to which the cañon is cut affords unusually good opportunities for observation. Commencing at the base of either Lincoln or Bross, one finds the edge of a quartzite bed whose thickness is at least 300 feet. It extends underneath the gulch, not having yet been cut through by the stream. It dips gently to the westward at an angle of about 20° from the horizon. Above it are alternate beds of sandstone, limestone, and shale, till the top is reached, upon which are the remains of a highly crystalline trachyte, existing now wholly as sharp angular blocks and chips, ranging in size from gravel to boulders weighing hundreds of tons. None of this debris on the mountain top is worn or rounded as if by water, but presents the appearance of a volcanic bed which has cracked itself to pieces while cooling.

These two deposits, the trachyte at the summit of the peak and the quartzite at its bottom, are the sources from which are derived the placer gold of the Blue, Arkansas, and Platte valleys. In the first the metal is found disseminated quite evenly and very perfectly. It is impossible to select a piece of rock from the peak which will not give a trace of gold in the furnace, and it is thought by several gentlemen who have given study to the formation that the entire mass of trachyte would yield from \$3 to \$5 per ton under stamps. On the two adjacent peaks of Lincoln and Bross alone there are hundreds of millions of tons of this material. The second contains gold in veins, some of which may possibly be true fissures, but probably the majority are gash veins, segregations, or accumulations of ore in the natural seams and fissures of the rock, which is believed by many to be coincident with the Potsdam sandstone.

If we follow southwest along the outcrop of this quartzite, we find that Buckskin Joe, and Montgomery, and Sacramento gulches cut directly through it, and at several points have eroded it to the depth of 500 feet. It is easily traceable across the Mosquito Range, and as soon as the stratum passes over into the Arkansas Valley we begin to find the gulches rich in placer gold. Above the point of its crossing the cañons are quite barren of the precious metal. Below we find the fine dust and scale gold which bears on itself the evidences of having been carried far away from its original home. Within the limits of the quartzite horizon lie all the gorges that have been and still are famous.

Going northward from Mount Lincoln, we may trace this same formation across the Hoosier Pass and down into the valley of the Blue River. The Blue for ages was cutting its way through the limestones and shales lying above, as may be clearly seen in the immense bluffs of Silver Heels Mount and its neighbors to the northward, but finally the gold-veined quartz rock was reached, and the work of enriching the bed of that valley began. Across the range to the east the head of Tarryall Creek is found to be lying between solid walls of this rock, having cut its gorge through it for hundreds of feet in depth. On the west side, Hoosier, Illinois, French, Gold Run, and the Swan cut directly across it, and have all been enriched by the gold contained. The Blue River which

receives these tributaries is one broad placer mine for thirty miles of its length at least, the auriferous gravel being from 25 to 250 feet in depth, and extending in some places for two miles in width. On its west bank is found an ancient channel which is traceable without interruption from the head of the valley down to and even below the mouth of the Snake River.

These placer grounds, taken together, will equal a strip of land 85 miles in length and fully one mile in width, all of which is accessible and supplied with abundance of water. Estimating its depth at 30 feet for the entire area, and the value per cubic yard at 30 cents, which is much below that being obtained in the ground now operated, the trifle of \$17,000,000 already extracted is but a drop as compared with the wealth still lying in the ground, which would foot up under this calculation nearly \$750,000,000, a figure so large that it seems almost too much to put on paper. Yet a careful examination of the field will, we think, show that it is a low estimate.

There are now seven large companies operating in this field, viz. the Oro Company, who, having completed their long ditch which brings in water from the Upper Arkansas, will this year commence operations in Iowa and California gulches; the Fairplay Gold Mining Company, on the extensive bar at the mouth of Montgomery Gulch; Mills & Hodges, who are working the banks opposite Alma; Bemrose, at the head of Hoosier Gulch, whose mine is nearly all over 10,000 feet above the sea; Jebb & Ballou, at the mouth of French Gulch; the Fuller Company, who control Georgia and most of the valuable tributaries of the Swan; and Izzard, who has taken up an immense section of the ancient river channel, twelve miles down the river below Breckinridge. Besides these, there are a number of other operators, among whom are Riland on the Swan, Mimford in Gold Run, Cobb, Fuller & Krome and the Badger Company in French Gulch, McNarsac in McNulty, McLeod at the mouth of Illinois, and Barrett at Hamilton, and a number in Buckskin, Montgomery, and tributaries of the Arkansas. From these sources it may now be expected that a rapid and steady production will be derived, increasing each year till the placer districts of Colorado assume as much importance as they did in the early day, if not more. This branch of our State's industry depends no longer on the whims and notions of the prospector. The rocker and long tom is being superseded by the most improved hydraulic machinery, capital has become interested in the work, and intelligent labor has taken the place of untrained muscle. The geology of the district is becoming known, and as a consequence but little money will in the future be thrown away in experimenting on ground which is not productive, while the rapid segregation of small claims into properties embracing thousands of acres, and the working of these upon a large scale, will result in the profitable washing of many thousand yards of ground heretofore considered as too poor to be operated.

THE LATE CORNELIUS SLACK, ESQ.

The Maryland coal interests have lost in the death of Mr. SLACK one of the most efficient and popular officers that they have ever possessed.

For many years Mr. SLACK was the Superintendent of the Mount Savage Iron Works, and its railroad from Frostburg to Cumberland. While in this position he collected, with much labor and largely at his personal expense, the statistics of the Cumberland coal production from its commencement, and for this work alone, to say nothing of his good service as superintendent of an important industry, he deserves our grateful remembrance. The remarkable popularity which Mr. SLACK enjoyed, and which has been gracefully recognized by the Consolidation Coal Co. in putting its locomotives in mourning, was fully justified by his high personal worth. We, who had not the pleasure of his personal acquaintance, desire to put upon record our high appreciation of his services as an engineer and statistician.

THE MOLLY MAGUIRES.

On the 21st inst. no less than eleven members of this infamous band of thugs paid the penalty of their crimes on the scaffold, in Pennsylvania. Doubtless the example will be beneficial, but we doubt if it will produce the change which some seem to expect of it. The class to which these men belong are not to be taught by a single lesson, though this most shocking one will surely remain long in their memories to keep them from following their murderous instincts. The power of the gang is effectually broken for the present, and there is no possibility of its being revived in times as "hard" as those now ruling in the coal regions. The permanent cure or preventive of such a condition of things as that which enabled a small number of lawless men to govern absolutely a whole community lies in education, for it would give a better understanding of the true relations of capital and labor, and of their mutual rights and duties, and thus prevent those strikes which have always fostered a spirit of violence. Education and arbitration for difficulties between labor and capital would remove the occasions that bring these hideous passions into force, and so render Molly-Maguireism impossible.

A NEW THING IN WROUGHT IRON PIPE.

The Globe Rock Drill and Motor Company, whose advertisement appears in another column, offers an article that will be highly appreciated in our Western mining regions, in foreign countries, and, in fact, wherever freight forms an important element in the cost of iron piping. Great advantages have been claimed for wrought iron spiral piping, especially on account of its strength and lightness; but if the sheet iron can be converted into pipe on the ground where it is to be used, the advantages will be still greater, for the ease with which sheets can be carried is much greater than that of carrying pipes of any kind. Those requiring piping or tubing of any kind will do well to look into the claims made by the Globe Rock Drill and Motor Company for this new and promising innovation on the old style tubing.

THE KIND-CHAUDRON PROCESS FOR SINKING AND TUBING MINING SHAFTS.\*

By Julien Deby, C. E., of Brussels, Belgium.

(Concluded from page 416.)

APPENDIX I.

The principal tools used in boring mining shafts by the Kind-Chaudron process are the following: The trepans, the object of which is to disintegrate the rock by concussion. These are attached to the extremity of a series of wooden rods with iron armatures and screw ends, fastened to the extremity of a balance or striking beam, put into motion by means of a single-acting or bull-engine worked by hand.

Sand buckets, which are large plate iron cylinders with valve bottoms and handles, which allow of the dumping of their contents, are made use of to dredge the dirt and slush from the bottom of the shaft as the work progresses.

Shafts are bored by the Chaudron process in two and occasionally in three successive operations. The first bore is made by the small trepan, generally about 4½ feet in diameter, through which the debris is extracted until the final completion of the shaft. This first bore is then widened by the use of the large trepan.

keyed permanently to the stem, replacing the male portion of the older model. The large trepan, employed for widening the bore made by the small trepan, consists also of a ponderous forged iron blade, carrying teeth at its two extremities, and a V-shaped guide, of the diameter of the small bore, situated in the central or toothless portion. This blade is united to the central stem by three arms strongly keyed. The weight of this tool as made at present is about 25 tons.

The whole apparatus employed in sinking and tubing a mining shaft by the Chaudron process is operated by means of two engines, the one destined to raise the trepans during the act of striking, the second to work a capstan which is used in the lifting and lowering of the various tools and of the tubing.

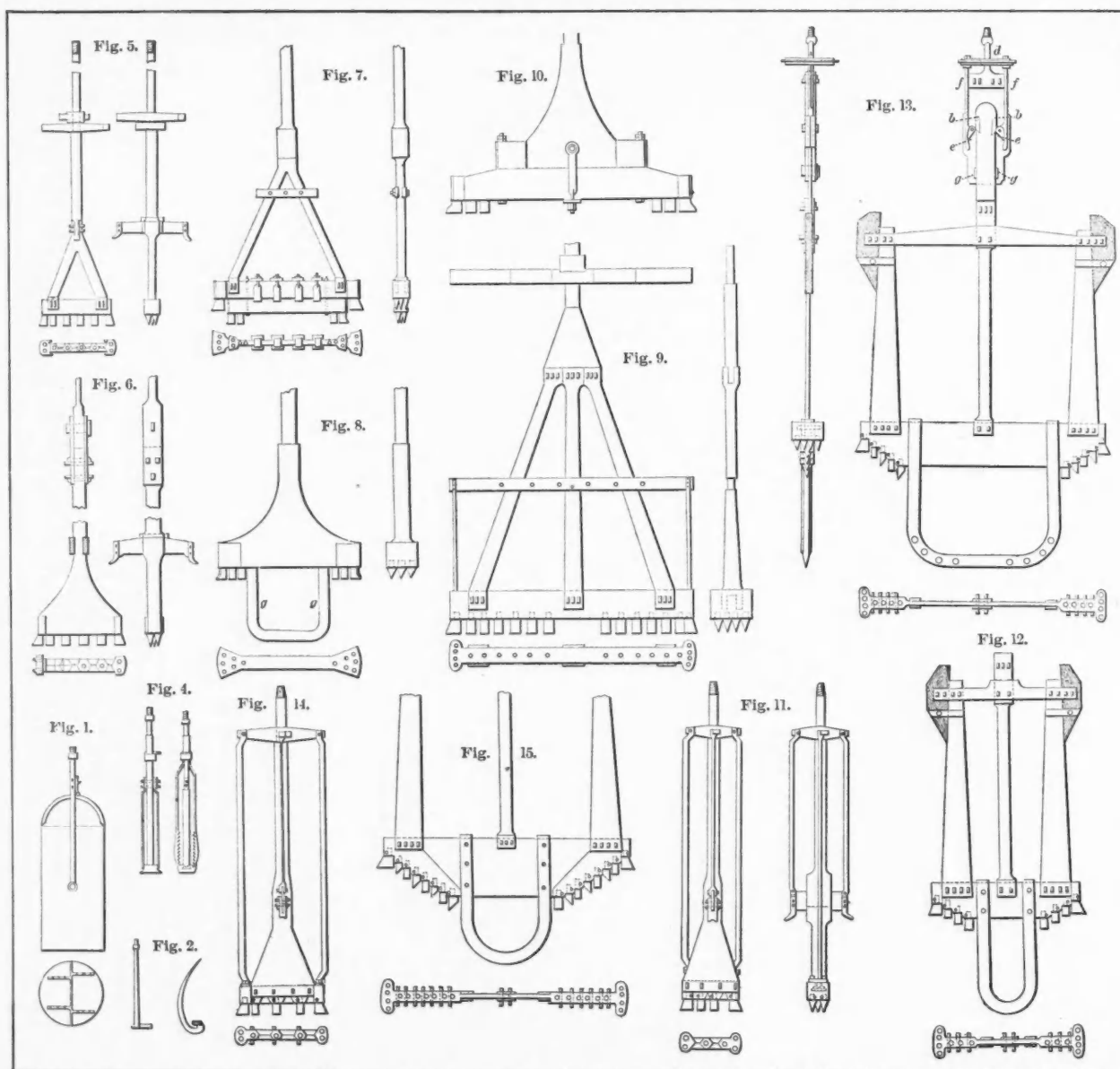
We refer practical engineers for minuter details to M. Chaudron's able papers entitled "*Fouage des puits a niveau plein*," published in the Annals of Public Works of Belgium, and limit ourselves to the reproduction of drawings of the apparatus used:

Fig. 1. Sand-bucket or dredging apparatus.

Fig. 2. Safety-hook for lifting the trepans and their connecting rods in case of rupture of these last.

Fig. 3. Grappling-hook for extracting blocks of rock, detached teeth from the trepans, etc., from the bottom of the shaft.

Fig. 4. Fanchere, replacing the safety-hook in the event of a rupture of



The apparatus employed in case of accidents or of special emergencies comprise a safety-hook, a grappling forceps of very ingenious construction, and the fanchere (fangsheere) or holding nippers.

The small trepan is formed of two distinct portions—the blade and its stem. The first is made of a solid block of forged iron, into the lower portion of which are inserted a number of steel or of chilled teeth of a wedge-like shape, held in place by conical keys. The stem is attached to the blade by another set of strong keys, and to the suspension appliances by means of a sliding box. This last is a very important part of the apparatus, as without it the violent vibrations transmitted by the concussions of the trepan on hard rock would inevitably rupture the connecting rods at every blow. The weight of the small trepan varies according to the work to be done; that on exhibition at Philadelphia this year weighs 15 tons. In trepans as first constructed by M. Kind the upper portion of the central stem was threaded to receive a screw which united to the slide, but this arrangement gave much trouble and soon got out of repair, and has subsequently been replaced by an adaptation consisting of two plates

\* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, June, 1876.

the main stem, or of that of one of the rods below the prominent collar at its head.

Fig. 5. Small trepan used at L'Hopital for a first bore of 1.37 meter diameter.

Fig. 6. Small massive trepan for the same purpose, but in hard rock.

Fig. 7. Widening trepan with a double blade, used in the air shaft for a diameter of 2½ meters.

Fig. 8. Large trepan for hard ground.

Fig. 9. Large trepan for boring diameters of from 4.10 to 4.25 meters, and maintaining the apparatus in a central position.

Fig. 10. Large trepan, made by adding a blade to trepan No. 7.

Fig. 11. New form of trepan proposed by M. Kind for diameters of 0.70 to 1 meter through hard rock.

Fig. 12. Trepan for a first widening of the shaft to 2½ meters in diameter.

Fig. 13. Large trepan shafts of 4.20 meters in diameter, with teeth arranged on an incline so as to direct the debris of rock to the center.

Fig. 14. Small trepan for bores of 1½ meter in soft ground.

Fig. 15. Large trepan for widening the above in soft ground.

Fig. 16. Kibble for receiving debris, proposed to be suspended in the shaft during the work of widening.

Fig. 17. Vertical section of the moss-box as fitted to the tubing of shaft No. 2 of L'Hopital.

a. a. Internal cylinder, carrying a flange at the bottom, forming the wall of the moss-box. This cylinder is suspended by means of six screw bolts, which allow of its gliding on them as guides during compression.

b. b. First section of the tubing, which carries an outer flange and forms the other wall of the moss-box.

s. s. Iron (sheet) segments, which press on the moss and prevent exclusive vertical compression of the same.

m. Moss contained in the joint before compression.

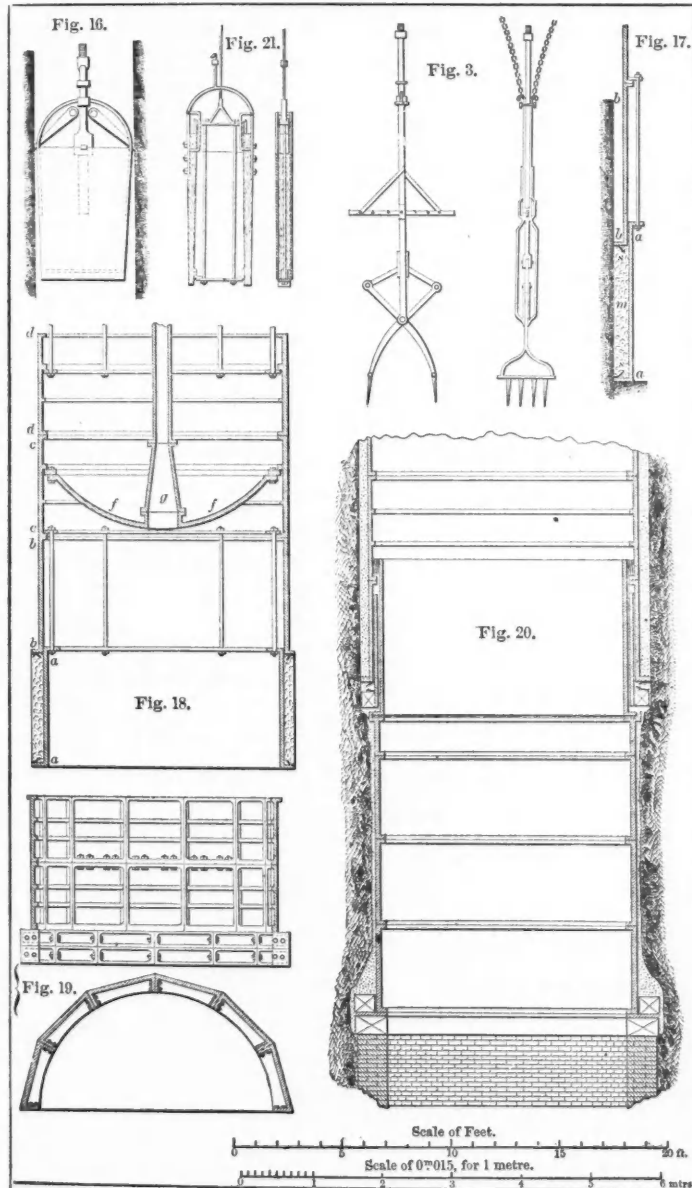
Fig. 18. Assemblage of the parts which constitute the lower end of the tubing. This portion alone is lowered to the surface of the water before the series of rings of the tubing are adapted successively to it.

a. a. Internal wall of the moss-box.

b. b. First section of the tubing, forming the outer wall of the moss-box.

c. c. Second section of the tubing, which carries the false bottom and eventually floats the whole column.

d. d. Third section of tubing, with the suspension flanges which attach to the guide rods for the maintenance of the system in a vertical position while sinking.



f. f. Central pipe, adapted by its lower end to the center of the false bottom, and which is carried to the top in successive lengths along with the outer tubing; water being allowed to penetrate by means of suitable cocks inserted at various heights in this tube, permits of the gradual and simultaneous lowering of the whole casing independent of its weight. When this has reached the bottom, and the moss-box has closed by compression, the water is pumped out of the shaft, and the false bottom and central tube extracted, after which the permanent foundations are established. Before, however, the water is taken out of the shaft, a coating of concrete is introduced between the tubing and the outer walls of the shaft, and permitted to harden there. The shaft is now found to be perfectly tight in all its parts, if the work has been properly conducted.

Fig. 19. Foundation for the tubing as established at L'Hopital.

Fig. 20. The same for the shaft of Sainte Barbe.

Fig. 21. Special ladle for the introduction of the concrete. This tool is furnished with a movable bottom, connected to a piston rod in such a way that ressure on the latter causes the evacuation of the contents.

APPENDIX II.

COST OF SINKING SHAFTS BY THE KIND-CHAUDRON PROCESS.

The expense of sinking shafts by the system we have described is always lower than by the ordinary method of mining in all cases where the use of at least two pumps of a diameter of 0.55 meter would be needed in the latter case, but it varies according to the nature of the ground. The duration of the operation is considerably prolonged whenever the soil is of a very crumbling or running nature, or in cases where it is exceptionally hard and tenacious.

Under the best conditions, the cost of sinking and tubing a shaft by the Chaudron process may be set down as 2,500 francs (about \$500 gold) per meter on an average for a diameter of 12 feet, and has never in the worst cases exceeded 4,000 francs (about \$800 gold) as a maximum. For a width of 15 feet we may safely estimate on a minimum cost of 4,000 francs (\$800 gold) per meter, and not to exceed 6,000 francs per meter (\$1,200 gold) as a maximum.

The occurrence of shifting sand or gravel, or of loose clay or quicksand, is always a cause of supplementary expenditure, as it may render the use of a certain amount of protective or temple tubing indispensable.

We furnish here a few examples of the actual cost of sinking shafts by the Chaudron process from careful accounts kept by the contractors, and which will suffice in a general way for the appreciation of the details of such undertakings:

COST OF THE SINKING OF THE SHAFT OF SAINTE MARIE AT PERONNES.

A.—FIRST COST, COMPRISING:

1. Widening shaft to a diameter of 4 meters to a depth of 10 meters;
2. Establishment of a lateral excavation for reception of trepan;
3. Construction of a shed and erection of engines within it;
4. Erection of a boring house.

	Francs.
LABOR:	
Bricks, lime, sand.....	388'25
Lumber.....	3,957'68
Various materials.....	493'71
Cost of appropriation of machines and tools.....	5,039'64
Total.....	10,991'07

B.—SINKING OF SHAFT:

Salaries of all kinds.....	12,173'74
Coal (4632 hectoliters).....	4,325'25
Grease and oil.....	545'48
Wood.....	458'30
Steel, iron, and metal.....	474'94
Various objects.....	603'69
Total.....	6,407'66

C.—TUBING:

1. Cost of tubing: 32 rings of cast iron, including the moss box, weighing altogether 86,682 kilograms..... 18,476'06
- 750 bolts, weighing 1,020 kilos..... 612'00
- 31 rolls of sheet lead for the joints..... 546'40
- Moss box..... 466'20

	20,100'66
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2. Cost of concrete outer lining:

Cement.....	1,536'00
Trap.....	879'40
Lime.....	405'00
Sand.....	358'15
Total.....	3,178'55

3. Various expenses:

Carriage and lowering of the tubing.....	2,398'60
Cementing.....	1,516'03
Total.....	3,914'63

Consumption:

Wood.....	353'75
Coal.....	970'60
Steel, iron, and metal.....	120'92
Oil and grease.....	112'16
Rope.....	588'60
Various expenses.....	445'58
Total.....	2,591'61

The summary of the above would be:	Francs.
A. First cost of installation.....	10,991'07
B. Sinking of shaft.....	18,581'40
C. Tubing complete.....	29,785'45
D. Sinking fund for wear and tear of tools.....	6,000'00
Total.....	64,457'92

This shaft had a depth of 108 meters, and was tubed for a height of 62 meters exclusive of the moss-box.

COST OF SINKING SHAFTS NO. 1 AND NO. 2 OF L'HOPITAL.

	Shaft No. 1.	Shaft No. 2.	Shaft No. 1.	Shaft No. 2.
	Francs.	Francs.	Francs.	Francs.
<b>I. COST OF INSTALLATION.</b>				
Buildings.....	28,302'65	46,702'47	21'10	25'00
Machines and tools.....	37,326'91	57,869'30	34'80	40'00
<b>II. SINKING PROPER.</b>				
Salaries.....	55,039'81	72,738'54	345'00	1,461'05
Coal.....	12,513'71	27,524'60	3,447'82	8,456'44
Oil and grease.....	2,381'11	4,720'49	1,375'25	3,357'55
Ropes and cables worn out.....	2,987'20	3,602'35	258'03	754'40
Iron, steel, tool repairs.....	12,530'90	16,469'83	<b>Cost of transportation and others.....</b>	
Transportation and sundries.....	7,560'66	16,603'50	3,566'80	7,544'79
<b>III. TUBING.</b>				
Cost of iron tubes.....	66,426'94	138,494'34	<b>IV. CONCRETING.</b>	
Lead for joints.....	1,665'60	3,601'10	Salaries.....	4,440'43
Bolts.....	1,340'99	4,915'20	Cement, trap, and lime.....	4,311'83
Red lead.....	95'20	126'40	Coal.....	599'11
Tar.....	443'81		Oil and grease.....	178'05
			Various items and transportation.....	2,281'78
			<b>V. FOUNDATIONS.</b>	
			6,009'48	10,000'00
			<b>Total.....</b>	
			256,041'16	440,451'15

SUMMARY.

	Shaft No. 1.	Shaft No. 2.	Shaft No. 1.	Shaft No. 2.
	Francs.	Francs.	Francs.	Francs.
Buildings, machines, and tools.....	65,629'56	104,571'77	11,811'20	15,000'00
Sinking shaft.....	93,013'39	141,659'31	6,009'48	10,000'00
Tubing shaft.....	79,577'53	169,220'67	<b>Total.....</b>	
			256,041'16	440,451'15

These two shafts were bored to a depth of 492 feet, and were furnished with 440 feet of cast-iron tubing. The weight of the tubing in shaft No. 1 reached 258 tons; in shaft No. 2, 635 tons.

APPENDIX III.  
LIST OF SHAFTS SUNK AND TUBED BY THE CHAUDRON PROCESS.

Location.	Name.	Height of temple tubing in feet.	Dia- meter in feet.	Sinking.		No. of pits	Height of tubing in feet.	Total depth in feet.
				Be- gun	Ended			
France, Pas de Calais	Lievin	12	12	1872	1875	3	248	290
"	Meurchin	100	10	1872	1875	2	298	298
"	Vendin	45	12	1873	1875	1	350	305
"	Bruay	45	12	1874	1876	2	245	400
"	Marles	18	12	1873	1876	2	285	400
" Nord	Douchy	60	12	1872	1874	1	115	115
"	Aniche	120	10	1873	1875	1	291	298
"	Crespin	60	12	1874	1875	1	350	369
"	Escarpelle	60	10	1868	1870	2	310	338
"	Marly	80	12	1876	in prog	1	312	.....
" Landes	Dax	7	12	1875	in prog	1	.....	.....
Belgium	Peronnes	25	12	1862	1863	4	195	236
"	Maurage	12	12	1870	1872	2	518	626
"	Cnply	12	12	1873	1875	2	231	285
"	Ghlin	70	12	1875	in prog	2	.....	760
"	Bracquengies	13	12	1876	in prog	2	.....	721
Great Britain (Staffordshire)	Cannock	15	12	1876	in prog	2	.....	394
Germany, Alsace-Lorraine	L'Hopital	11	12	1863	1867	2	449	492
"	Dahlbusch	130	12	1875	in prog	3	.....	520
" Westphalia	"	12	12	1852	1853	1	302	302
"	"	12	12	1865	1866	2	302	302
"	"	12	12	1872	1873	2	302	302

### CAN ZINC BE SMELTED IN A BLAST FURNACE?

By F. L. Clerc, Chemist, Bethlehem, Pa.

(Concluded from page 417.)

*Third.*—Is it possible to condense the zinc vapors and collect them out of the furnace gases into a single liquid mass?

Upon this point we are without the testimony of exactly identical operations carried on successfully in other branches of the art, and are forced to rely somewhat more on theoretical reasoning; but we are not without the demonstration of analogy, and I hope to be able to prove to the satisfaction of every one that in this, as in the preceding questions, there is no room for any but an affirmative answer.

As I pointed out in my furnace article, what is generally spoken of as condensation consists in reality of two widely different operations. The first, which alone can properly be termed condensation, is the passage of the zinc from a gaseous to a liquid state, and has nothing to do with the mass of the condensed metal. It depends solely on the temperature of the metal. The minutest globule, even if composed of two atoms of zinc, at a temperature below its boiling point is as much a liquid as a mass of a ton weight can be. Cool the metal sufficiently and it will condense itself. It is quite otherwise with the second operation, namely, the collection of the liquid globules into a single mass. This is clearly a mechanical operation, and must be brought about by mechanical means, in what manner I will consider later. In the mean time, we shall gain in clearness of ideas by a preliminary study of the phenomenon of condensation in general, and the condensation of zinc vapors as it occurs in the condensers in present use. Let us take the general case of a liquid in a closed vessel, with an atmosphere of its own vapor above it, either by itself or mixed with other gases, and suppose it to part slowly and uniformly with its heat. The operation of condensation conducts itself as follows: the atoms or molecules of the vapor in contact with the surface of the liquid gradually annex themselves to the liquid mass, surrendering the latent heat which kept them in a gaseous state, and, if the cooling be slow enough, the whole of the vapor will be absorbed, as it were, back into the liquid mass.

This theoretical case probably does not correspond very closely with what takes place in the operation of condensation as it is conducted in the common zinc furnaces. Suppose, now, that the vapors in the above operations, instead of being cooled slowly and uniformly, were cooled quickly and irregularly, as by contact with the colder sides of the inclosing vessel, or were disturbed by currents within it, what would be the result? Clearly, as the temperature of any portion of the vapor fell below the point at which it could remain a gas, it would pass from the gaseous to the liquid state, but liquefaction, instead of taking place only at the surface of the liquid, would be going on in all parts of the space occupied by the vapor, and, instead of being absorbed into the liquid mass as fast as it condensed, the vapor would be scattered throughout the space it formerly filled in the form of minute liquid globules, which might either adhere to the sides of the inclosing vessel or drop into the liquid mass below, or, if there were currents of gas in the vessel, might be carried along by the force of the current. This is more nearly what occurs in the condensers of a zinc furnace, which, in addition to the vapors of zinc, have always a current of gas passing through them.

Hence we find that a considerable portion of the metal fails to be absorbed into the liquid mass, becomes cooled below the point at which zinc is liquid, and the liquid globules are transformed into solid particles, technically called blue powder, which adhere to the cooler sides of the condenser or are carried out of it and lost. Since zinc cannot be reduced except where a gas is given off, and where a gas is being constantly evolved it produces a current, what are the most favorable conditions for condensation attainable under the circumstances? That, whether the cooling be slow or rapid, the temperature at no point of the condenser should fall below the melting point of zinc; that there should be a bath of metal at the bottom of the condenser to receive and retain the liquid globules dropping into its surface, or trickling into it off from the sides of the condenser, and that the current of gas should not be sufficiently strong to carry them out of the condenser before they have had time to adhere to the sides or drop into the bath below. In the practice of the Belgian furnace this seemingly complex feature of condensation and collection is carried on with tolerable efficiency within the distance of sixteen inches (the length of a condenser). It is true that a large part of the product is blue powder, and a not insignificant portion is carried beyond the condenser and lost; still a fair proportion of the metal "condenses" and is drawn out as a liquid, which proves that the operation is not so difficult as might at first sight appear. We are now in a position to inquire in what respect the condition of things is changed if the zinc is reduced by a blast of air blown through the charge. The only change is an increase in the volume of the gases with which the zinc vapor is diluted, and the introduction of an inert gas by the blast of air; the other gases,

carbonic oxide, and presumably hydrogen, remain as before. We have seen that the condensers are always traversed at present by a current of gas, notwithstanding which the metal deposits with tolerable completeness and within very short distances. Is it possible, then, that the simple dilution of the zinc vapor with an increased volume of gas (say five times as great) can entirely prevent such a collection? Obviously it will render it somewhat more difficult; but, the conditions favorable to collection being a proper temperature and a weak force of the gas current, to overcome the disadvantage due to the greater dilution of the zinc vapor, it will suffice to regulate the temperature of the condenser more carefully, and pass the gases through it more slowly; and I believe that the control which can be secured over both these elements in a furnace such as I am treating of will more than counterbalance the effects of dilution. It will be seen that the surface of the walls of the condenser, if they be of the proper temperature, will act nearly as well to collect the drops of liquid zinc as the free surface of a liquid bath. As corroborating evidence of the truth of the foregoing conclusions, the experience communicated to me by an experienced iron master (a member of the Institute of Mining Engineers) has a direct and practical bearing. While treating in a charcoal furnace an iron ore which contained a trifling amount of zinc, which, however, has never been detected by analysis, he has repeatedly observed metallic zinc oozing out through the sides of the furnace, a short distance above the tuyeres, and running down the sides of the furnace, on occasions when the crust of the oxide of zinc which was constantly forming around the tunnel head, had become detached and fallen back into the furnace. Here is a case where zinc has actually been condensed out of the gases of a blast furnace and collected in a liquid state under circumstances much less favorable than those above supposed. Nevertheless, it is not at all probable that any system of condensation can be made so perfect that all of the zinc can be caught at once as a liquid; some means must, therefore, be found to recover that portion of it which is carried out of the condenser as solid blue powder, unless we are willing to submit to a loss of metal which would in all probability more than offset any advantage to be gained, and which would render an otherwise successful operation useless. Fortunately the blue powder so formed is a heavy metallic dust, of which the smallest particle has a nearly spherical shape and a high specific gravity, and may be thrown into water even when very hot without undergoing more than a superficial oxidation, in this condition it settles quickly out of water and does not form with it a pasty mass. Owing to these peculiar properties, it may be almost completely washed out of the escaping gases by a drenching shower of water.

*Fourth.*—Can a blast furnace process for zinc be carried on continuously?

Since the constituents of the gangue of ordinary zinc ores, silica, alumina, lime, magnesia, etc., are such as are every day melted in the various forms of blast furnaces, there can be no serious difficulty in melting them up, either by the addition of suitable fluxes or by a proper mixture of ores, and running them out of the furnace, and some such device as the feeding shaft I have proposed, or some combination of cone and hopper, can certainly be devised to renew the charge without interrupting the operation of reduction. The question of cost and comparative losses I shall not enter upon, since the advantages of a direct and continuous process are evident to even the most superficial observer. It is of the utmost importance in working out any direct process of zinc reduction to begin with the simplest and most favorable conditions, leaving the task of adapting the process to more general and difficult cases until after it is in successful operation with a given set of conditions.

I have purposely refrained from dwelling on the particular features of my own furnace, because it seems to be necessary to overcome a very strong presumption in the minds of practical metallurgists against the possibility of such a process, and to familiarize them with the idea that it is only a question of time when it will come, before they will enter upon the investigation in a spirit which is likely to produce any results. What I wish to emphasize here particularly is that a blast furnace process for zinc is entirely feasible, and the fact that considerable money has been lost in unsuccessful attempts to attain it should no longer block the way against new and more carefully devised experiments. The most serious arguments I have heard advanced against such a process have been these, "Oh! such things have been tried before and did not work," and "Considerable money has already been spent without any beneficial result." The answer to the first objection should be that, if a furnace otherwise perfect failed to fulfill any one of the more numerous than difficult conditions which I have shown to be necessary, it must fail as absolutely as the entirely defective, and a very slight change remedying this defect would make all the difference between failure and success. To the second objection the answer may be given that, if something is to be risked, very much more is to be gained, and, when the cause of previous failure is pointed out and probable success demonstrated, the presumption against the risk becomes changed to one in its favor. Whether any particular form of furnace is ultimately adopted, or whether something more perfect is devised, is comparatively of little importance to the zinc industry, but that some considerable improvement be made on its present condition is a matter of the most vital importance. I commend the subject anew to the attention of practical and scientific metallurgists, and shall rest content if I am found to have contributed, in even the humblest way, in some measure to the wished-for improvement.

### CORRESPONDENCE.

#### THE HUNT & DOUGLASS PROCESS.

TO THE EDITOR: SIR—Your paper having on numerous occasions published reports and favorable comments on the Hunt & Douglass process of leaching copper ores, I write to know whether the reports now generally going the rounds of copper merchants as to its failure are correct? It is currently reported that at Ore Knob the process has been the cause of heavy financial loss, necessitating its abandonment, and that at Phoenixville sulphuric acid is now used for leaching. An authoritative denial or explanation of the above-mentioned reports would oblige

NEW YORK, June 9, 1877.

A COPPER MERCHANT.

We have received the following information upon the point referred to by our correspondent:

"As regards the Hunt & Douglass process and its reported failure at Ore Knob, the facts are these: When first applied there, the ores were free from lime, but below the water-level they were found to contain 30 or 40 per cent. of carbonate of lime, the presence of which is incompatible with any moist process, and smelting was necessarily had recourse to. Previous to this, however, the entire cost of the copper made by the Hunt & Douglass process, as shown by the manager's published report, was below eight cents the pound. The monthly

production by smelting has for the last few months been from 70,000 to 80,000 pounds of ingot copper, and the supply of ore is so abundant that two new furnaces have been built which will be ready in July, and will, it is estimated, raise the monthly production to 120,000 or 140,000 pounds. In addition to this dressing works have been erected to separate the carbonate of lime from the lower grade ores preliminary to their treatment by the Hunt & Douglas process. A letter from the manager at Ore Knob, dated June 12, says: 'By the fall I am sure we can again work the Hunt & Douglas process successfully. Our plant for this would enable us to treat 40 tons additional of ores of 4 to 4½ per cent. daily, and we have now 25,000 or 30,000 tons of these second grade ores, for the humid process, lying at the surface.'

"As to the works at Phoenixville, the sulphureted copper ores from the Jones Mine also contained much carbonate of lime in depth, while the clay ores, as they were called, holding the copper as silicate, yielded after calcination only suboxide of copper. The solution of this necessarily involved a certain loss of iron chloride in the leaching, which had to be replaced by sulphate of iron, or, what was cheaper in that locality, sulphuric acid. The supply of these ores has lately become inadequate, and the works at Phoenixville now treat Western mattes carrying arsenic and antimony. These, and in fact any sulphureted ores free from lime, yield by proper calcination much more sulphate than is required to supply the loss of iron chloride, and consequently the bath for their continuous treatment does not require the addition either of sulphate of iron or of sulphuric acid.

"BOSTON, June 18, 1877."

ONTARIO SILVER MINING COMPANY.

STATEMENT OF OPERATIONS FOR THE MONTH OF MAY, 1877 :

Disbursements.	
MINE ACCOUNT.	
Coal	\$124 18
Expense	105 00
Boarding-house	866 30
Powder and fuse	93 99
Wood	290 50
Oils	15 07
Charcoal	\$68 20
Pay-roll, 1,647½ days	5,899 86
Hauling bullion to S. L. City	38 14
	\$7,501 24
MILL ACCOUNT.	
Wood	\$2,516 02
Expense	12 98
Salt	4,315 13
Coal	2,745 28
Quicksilver	6,770 34
Construction	5,212 51
Boarding-house	794 25
Assay office	401 82
Teams	533 30
	\$29,583 00
Oils	\$263 09
Charcoal	204 00
Pay roll	5,156 74
Hauling ore from mine to mill	77 12
Supplies	39 26
Tools	104 50
Chemicals	84 63

MINE CONSTRUCTION ACCOUNT.	
Supplies	\$366 67
Tools	52 42
Pump machinery	5,554 00
Boilers and machinery	69 60
	\$6,446 69
Pay-roll, 79½ days	\$404 00

GENERAL EXPENSE ACCOUNT.	
General	\$64 50
Office	440 56
	505 06

HOSPITAL FUND.	
St. Mark's Hospital	92 00

INTEREST AND DISCOUNT.	
Wells, Fargo & Co.	64 75

Total	\$44,192 74
Less construction account mill	(currency) \$5,212 51
" mine new pump	6,446 66
	11,659 20

	\$32,533 54
--	-------------

Receipts.	
MINE ACCOUNT.	
Board of men and hospital tax	\$1,560 50
Board of men at mill and hospital	1,086 50
	2,647 00
Working expenses (currency)	\$29,886 54

PRODUCT.	
70 bars bullion, No. 720 to 789 inclusive, gold value	\$136,691 29

Report of operations for the 10 days ending May 31, 1877.

MINE REPORT.	
No. of men employed	105
Total compensation, 974 labor days	\$3,529 64
No. of tons of ore on the dump	100
No. of tons of ore extracted	984
No. of tons of ore sent to mill	849
Balance tons of ore at mine	325

MILL REPORT.	
No. of men employed	43
Total compensation, 407 days labor	\$1,657
No. of tons of ore on hand last report	2,046
No. of tons of ore received	849
No. of tons of ore worked, net 352 tons gross	628
Balance tons of ore on hand	2,837
No. bars of bullion produced, 764 to 789 inclusive	26
Assay value bullion produced	\$53,701 13
No. pounds quicksilver used	1,255
No. pounds of quicksilver on hand	47,943
No. cords of wood received	126
" " " consumed	70
" " " on hand	1,224
" tons of coal received	179
" " " consumed	125
" " " on hand	303

No material change has occurred in the ore bodies of this mine since last report, as each portion of the mine shows about the same amount in sight, less the amount stoped out.

The above is correct, except as to quicksilver. We cannot properly estimate our loss, which was large the first month after mill started.

(Signed) R. C. CHAMBERS, Superintendent.  
The shipments of this company from the 1st to the 14th inst. was 44 bars of bullion, the assay value of which was \$30,441.20. This product is at the rate of \$175,000 per month, or over \$2,000,000 per year.

VETO OF THE ILLINOIS SILVER LEGAL STANDARD BILL.

Governor Cullom, in vetting the bill to make silver coin a legal tender in Illinois which bill was passed by the General Assembly, makes some remarks which apply equally to the case of the United States making silver a legal tender, or, as it is often called, adopting a double standard. "If a double standard" would be injurious to a single State, as Governor Cullom shows, it would have precisely similar effects on the whole country.

"If the United States should again adopt the double standard, silver would soon become the general currency of the country, and in that case, if the bill were permitted to become a law, and there should be, as is liable to occur at any time, an issue of the subsidiary silver coin in excess of the amount needed for small change in the commercial transactions of the country, it would be at a discount more or less below the standard silver currency. Under these circumstances it would flow into this State, for we, by making it a legal tender for all debts here, would have given it a currency and value which it would not have in any other State. Illinois would assume the burden and inconvenience of a debased currency, over the manufacture and coinage of which it has no control, and out of which it derives no profit. It would not make money more plentiful, because it would expel an equivalent amount of better currency. It would not lighten the load of taxation, because the cost of everything used by the State, and the expense of maintaining its public institutions, would be increased in direct proportion to the decline in value of the currency in which the taxes were paid. It would not help the debtor, because, in my judgment, the Constitution of the United States and of this State would forbid its application to existing contracts. It seems to me that the strongest advocates of the remonetization of silver, by act of Congress, must admit that individual State action, such as is here proposed, is calculated to do the people injury, and is not one of sound policy, even if there were no constitutional objections in the way. Those of us whose business experience dates prior to 1861 have too vivid a recollection of the disadvantages of a local currency, at a discount below that used by adjoining States, to be willing to see it reimposed upon this State. If silver should be remonetized, and the standard silver dollar restored to the people, the injurious effect of such legislation as is proposed by this bill would be felt more than it would otherwise. If the currency of the country should continue to be legal-tender notes, and the laws regulating the value, and limiting the issue of the subsidiary silver coinage should continue in force, such coinage would probably remain at about par, and the bill, if it became a law, would have no particular effect. But what assurance have we that an overabundance of subsidiary silver coin will not be issued by Congress? What guarantee have we, if we declare by statute that all silver coin shall be a legal-tender in the payment of debts, that such legislation may not be enacted in Congress as will result in Illinois becoming the receptacle of all the token currency, while the States around us will receive only standard gold, and silver, and legal-tender notes as current and valuable? It is easy to talk about the good times to follow upon the passage of such a law, but it is absurd to say that the people of a State can be benefited by a scheme that compels them to take at par a currency that goes at a discount as soon as a State line is reached, and the immediate and earliest effect of which would be to enhance the cost to every citizen of the necessities of life."

QUANTITY OF COAL REQUIRED TO PUDDLE A TON OF IRON.

Location of furnace.	Year when results were ascertained.	Turn.	Pounds of coal consumed to each ton of coal puddled.	Location of furnace.	Year when results were ascertained.	Turn.	Pounds of coal consumed to each ton of coal puddled.
(1) Pittsburg, Pa	1877	Double.	2,584	(5) 100 miles east of Pittsburg, Pa	1876	Double.	2,100
(2) " " "	1877	Single.	2,935	(6) Pittsburg, Pa	1876	Double.	2,497½
(3) " " "	1876	Double.	2,850	(7) Chattanooga, Tenn.	1876	.....	2,880
(4) " " "	1876	Double.	2,736	(8) Pittsburg, Pa	1876	Single.	2,698
East St. Louis	1875	Double.	1,824	(9) Furnace on Ohio River.	1875-6	Single.	2,660
(5) 100 miles east of Pittsburg	1874	Double.	2,730				
	1876	Single.	2,994				
			2,625				

- (1) The coal for this furnace came from the Keeling Mine.
- (2) Six heats were made, using 3,800 lb. of coal to 2,000 lb. of iron, equivalent to the amount given for puddling one ton of hot fix and Waverley coal were used.
- (3) South side (Pittsburg) coal.
- (4) Heating furnaces at this mill required 1,216 lb. of coal to the ton. Average per ton, for puddling, heating, scraping, steam, etc., of finished iron, 5,320 lb. of coal.
- (5) These figures refer to the same furnace. It will be noticed that the double furnace shows an economy in the use of coal over the single furnace of 20 per cent.
- (6) 448 pounds of ore were used to the ton. The figures taken were for the month of April.
- (7) 150 pounds of ore allowed for fix.
- (8) These results extended over a period of three months. This includes lighting up, but not steam coal, which is estimated at 228 pounds per ton of puddled bars.
- (9) Time of work from July 5, 1875, to April 15, 1876. Ton of iron of 2,000 lb.

In the English furnaces it is not unusual to turn out a ton of puddled bars with 21 cwt. of pig iron and 14 cwt. (1,568 lb.) of coal. Careful experiments recently made at the Woolwich Arsenal, England, showed that over 50 per cent. could be saved in fuel by simply making the grates short and wide instead of square.—American Manufacturer.

MINING NEWS.

Staff Correspondence of the Engineering and Mining Journal.

CALIFORNIA.

The Guadalupe Quicksilver Mine is located in the Santa Cruz Range, on Guadalupe Creek, about 12 miles from San Jose, California. This mine was discovered in 1846. The title of the property has always been more or less in dispute, until recently, when the ownership was proven, and extensive work toward the development of it was undertaken. Over \$1,000,000 has been expended within the last two and a half years on the improvements and developments in this mine. The main shaft is down 600 feet, from which levels are run into valuable deposits of ore. The present product of the mine equals 1,000 flasks of quicksilver per month, which, it is anticipated, will soon be increased to 2,000 flasks. The furnaces are of the most approved construction; about 250 men are employed in and about the mine works. Three members of the bonanza firm of San Francisco have recently made several visits to the Guadalupe, and since then the product of that mine has been regularly shipped from our depot, consigned to Colonel Fair, the bonanza mine superintendent, at Virginia City, Nev.—San Jose Mercury.

COLORADO.

Northern Colorado.—The Helmick tunnel at Georgetown, which is being pushed ahead after several years of idleness, has cut a fine vein of ore six feet in width, from which the mineral assays between \$300 and \$400 per ton.

Matthews & Co., who were burned out in Georgetown this last winter, are expecting to rebuild.

The Emma lode on Democrat Mountain shipped two tons of ore the other day, which brought them \$2,200.

For the 20 months from its discovery ending February 24, 1877, the Melina Mine, in Boulder County, produced ore to the value of \$100,000. The total expenses have been \$25,000. The mine is now 250 feet deep and yielding as well as at any previous time in its history.

The Veto Mine, in Gilson Gulch, is being worked to a considerable extent at present, and is yielding very well. A depth of 250 feet has been gained upon

the vein, and levels run so that it is opened quite through for a length of about 400 feet.

The Clarissa Mine at the head of Virginia Cañon is still producing largely of the rich ore which called attention to it several months ago.

The Briggs Mine is down 850 feet, and has a vein 19 feet in width of mill ore which averages better than heretofore. The smelting ore is also reported to be doing better. The mill is crushing from 75 to 100 tons daily.

**Empire.**—This once famous gold district is at present showing more signs of life and activity than for years. In fact ever since the exhaustion of the decomposed surface ores the camp has been almost wholly abandoned. The following extracts from the *Courier* show what is being done, and what are the prospects for the future: "Each succeeding visit to that great belt of lodes on Silver Mountain, long neglected for the silver mines, their splendid record half forgotten and only remembered as if in another country or another world, adds strength to our formerly expressed opinion that the day is coming when those great bonanzas of medium grade gold ore will give employment to thousands of miners, and more than her former prosperity will return to the town of Empire. We cannot call attention to the Upper Empire mines as a field for men without means. They are so situated as to demand consolidation, the erection of machinery or the extension of tunnels, and are of a size and character calling for extensive reduction works. Those of Lower Empire, on Covode Mountain, are of recent discovery, are less developed, and contain smaller amounts of very rich ore.

"Covode Mountain and that opposite have been prospected but little, and judging from the result of small developments made since last winter, these mountains furnish a promising yield for the prospector and the miner of small means.

"The Empire City lode, the first mine in operation above the town, is one of the late discoveries. Its discovery created a decided sensation. Upon one wall was a streak of quartz an inch in width that was literally half gold, worth \$170 per pound. This mine, although not now carrying the same solid gold filling, is in good ore, and is being worked through two drifts upon the lode where it outcrops on the mountain side. The owners are just completing two arastras with iron bottoms and heavy gear, to be driven by a 24-foot overshot wheel, which is completed and is a model. This is situated on Lion Gulch not more than 100 feet from the lower tunnel.

"The Lewis lode, discovered last February, and owned by Guibor and Herrington, is situated upon the same mountain 200 yards up the gulch. This also has a northeast and southwest course, the direction being across the Gulch, giving a very favorable opportunity for development by that cheapest of all plans, drifts on the vein. A tunnel or drift started in the valley of Lion Gulch would, in a distance of 500 feet, develop the lode 300 feet deep. The discovery was made well up the mountain. The shaft is 20 feet deep, and has been so wet that a drift has been run which drains the shaft. The quartz and dirt on the very surface prospected four dollars to the pan. The pay vein has ranged from four to sixteen inches in width, most of the quartz having been run in arastras and some of it yielding \$400 per ton. A recent run of 1500 lb. gave \$194 50. This was partly iron and copper pyrites. The concentrated mineral found in the bottom on flowing and cleaning up assayed 87.3 oz. in gold. Over \$125 worth of clean gold has been panned out by the windlassman between times. The bottom now shows four inches in width of the same looking mineral as that found in the arastra. While at the mine we saw four pannings. One piece of quartz as big as an egg; about one pound of clay; the same quantity from the fine dust of the second-class pile; and the same from the sacked ore and dirt. Each prospect was a big one, and combined produced what was estimated at \$1.25. This mountain has been passed by for years because the looks of the quartz did not suit, as it contained hematite. It is not uncommon in the Lewis and other adjacent lodes to find free gold embodied with hematite.

"Mr. James Peck, the veteran hotel keeper of the town and owner of a mill and several mines in Upper Empire, has discovered two lodes, one near his house and one south of the Empire City on Covode Mountain. He has put up a 16-foot water wheel and has two arastras ready to run.

"A true silver lode has just been found and worked, about a mile and a quarter up the main creek at the north foot of Lincoln Mountain. It is called the Washington, and is owned by William Van Eps and others. It is full eight feet in width, and is opened 68 feet from the surface by a drift and shaft. There is one mineral vein nine inches in width, and several smaller ones. Assays as high as 1,621 oz. have been obtained, and one run of 600 lb. assayed 137 oz. The bottom of the shaft is 40 feet below the bed of the creek, and further sinking cannot be done without a pump. Mr. Van Eps owns a ranch at that point, including the water powers, furnishing every facility for running a pump by water. Here is an opening for a moderate investment.

"Passing by Lion Gulch, leaving a score of mines on the west fork for some future examination, we come to the once productive mines of Upper Empire.

"The first prominent enterprise noticed is the Aorta tunnel, now in 950 feet. It is owned by two companies, one wishing to push it ahead and the other refusing; so it is stopped within 225 feet of the great Livingston County lode, which it will strike 454 feet deep. Driven 600 feet further it would cut the Pittsburg, and in about 200 feet more the Tenth Legion, both at great depths. The tunnel is supplied with T-rail and good ventilating apparatus.

"The Bay State tunnel is in to the Pittsburg a distance of 500 feet, cutting the Boston and Good Hope lodes—two veins that unite below the tunnel forming a good lode—at 250 feet from the mouth. The tunnel extended 200 feet will cut the famous Tenth Legion at 325 feet depth.

"The Pittsburg is owned by D. J. Ball and Samuel Allen, who have a patent for 1,300 feet. A level has been driven east 120 feet and west 30 feet. Three hundred feet west of the tunnel is leased for two years to Brewster & Co., who have in the breast and back full 6 feet of paying ore. Of this 1 foot is smelting mineral that assays 3 to 7 ounces gold, and 5 feet in width is "mill dirt" that yields 3 ounces per cord at the Knickerbocker mill. The east line shows a fine vein of nearly solid iron and copper pyrites and a mass of second class ore. In this end of the level the mill dirt is 10 feet wide and runs \$60 per cord. Worked by owners. It is expected before the summer is over to have a 24-stamp mill and concentration works at the mouth of the tunnel. In this vein are found bismuth ore and native copper in quantity, the chief characteristics being copper and iron pyrites.

"The Pioneer lode, cut by a tunnel 137 feet long and at a depth of 75 feet, belongs to D. J. Ball, who owns 1,000 feet, and Frank Andre, who owns 500 feet on the east end. The tunnel level is drifted 100 feet west and stopped up 15 feet, and drifted east 15 feet. Only 3 or 4 feet of the width of the lode has been worked, the harder and probably better part of the vein is still standing 3 or 4 feet wide. The ore is very high in copper. A grade could be selected that would run 20 per cent. copper, and abundant specimens containing pure copper glance can be selected from the piles. The latter assays 64 ounces silver and 20 ounces gold, while rich copper pyrites specimens have assayed from 16 to 20

ounces in gold. This tunnel will, when extended, cut the American Eagle, the Grant, Rosecrans, and others of high reputation.

"The Gold Dirt and the Equator are two lodes that run together near their intersection by the Gold Dirt tunnel. They are owned by James Peck & Co., who have a patent for 1,400 feet on the Equator. This has been worked to a depth of 100 feet, the surface quartz running from \$50 to \$100. Like all the others it is a big lode. A short piece of ground at the junction turned out \$5,000 worth of ore. The clean pyrites runs about 3½ ounces gold per ton.

"There are no narrow gauge lodes in this locality. The fissures were made on a liberal scale, and the vein filling was so abundant that several million tons were left scattered on the surface. Here it was in this complicated system of lodes that Martin & Co. in the early days sluiced out a great amphitheatre in the mountain side as big as the New York Hippodrome, taking out \$200,000 of the nicest gold ever seen. A company has been formed to finish the job by sluicing away the mountain side below the old workings. Bringing in the water on the old ditch line, part of the way in iron pipes, will cost something, but may pay. Speaking of the Benton, it is worked down to the pyrites for 300 feet in length, the surface quartz running \$105 \$130 per cord. No mineral has been milled. It is owned by Ball, Hodgkinson, Freeman & Thomas. Just below the Benton is the California, owned by the same parties. This has an inch streak of dirt that pans \$8 to the pan.

"The Rising Sun, situated a little further up the slope, is owned by Ed. Freeman. It is opened 40 feet deep, and down to pyrites. Recent assays from the bottom gave a result of 10 ounces gold and 14 ounces silver.

"The above are not one-fourth of the big lodes on this slope of the mountain within a half mile square. Nearly all the lodes are patented. There is room for three or four heavy companies. There is an uncommonly good chance to buy at first hands and moderate figures some of the largest gold lodes in Colorado. Rich specimen assays may be obtained and wonderful pockets found, but the wealth of the district is in the strong veins of solid ore of medium grade, worth from \$50 to \$140 per ton, and especially in the great ore bodies that require for best treatment concentration before working. The south fork of Clear Creek, a mile distant, furnishes abundant water power, fuel is abundant, and the railroad coming within three miles inside of two months is bound to bring some capitalists who will see the immense value of the mines of the district. The railroad can be brought up this fork of the creek without any difficulty whenever there is a prospect of business."

**Northern Mines.**—Water is being hoisted from the Coldspring, and the mine in a short time will be once more in good condition and producing. Its neighbor, the Red Cloud, is under lease.

The Gray Eagle, on Left Hand, is yielding some fine ore. A strike of elegant free gold quartz is reported from the Golden Age at Springdale.

As showing the great richness of ores from the tellurium belt in Boulder County, we quote the following memoranda of sales at the Boyd Smelting Works: 10 sacks Keystone (about 600 pounds), 49 ounces of gold. Slide ore mill run, 85 ounces gold, and 807 ounces silver. 200 pounds Grand View ore sold for \$900.

**San Juan.**—The Geo. Greene & Co. Smelting Works started up on the 7th. This is a lead smelting works, deriving its supply of ore from the heavy galena lodes in Cunningham and Eureka gulches and other points around Baker Park. The plant consists of two roasting furnaces and a blast cupola. The capacity is 10 tons per day.

The Evening Star lode on Hazleton Mountain is being opened by an adit, which will be pushed ahead steadily during the summer. The mine so far shows well.

A cross-cut tunnel has been commenced to cut the Dives lode on Sultan Mountain. It will open the vein at a depth of 300 feet from the surface. A similar work is shortly to be begun for the bonanza vein in Poughkeepsie Fork.

The following notes we cull from the *Miner*:

"The Hotchkiss lode, which has been lying idle for several months, is being worked under a lease to John Long, who has two shifts employed. It is believed that this rich property can be made to produce larger than ever before.

"The Belle of the West is opening out wide again. In No. 1 drift the pay-streak has widened out to two feet; No. 2 shows fully eighteen inches of the very high grade ore which created such a stir a few weeks ago. The mine is being put in fine shape.

"The Crooke Concentration Works, which started up two weeks ago, are running night and day with a full force. Garland took out a train loaded with concentrated ores this week, shipped to Crooke's Smelting and Refining Works, New York City. The stamps for the new works are in place and covered, the building being erected over them adjoining the concentration works. The buildings for the smelter are inclosed and roofed, and work is being energetically pushed.

"The Animas Forks Mining Company, incorporated under the laws of Wisconsin, formerly the Dakota and San Juan Mining Company, represented in town this week by Mr. Greenleaf, expect to set their mill in motion within a few days. They have a considerable supply of ores on hand, and will purchase all that may be offered of a grade suitable for their operations. The works (concentration) have a capacity of thirty tons per day. Auxiliary works will be added as soon as the company are satisfied that the mineral supply in that section will warrant and determine the process best adapted for the class of ore furnished. The change of name and incorporation was made in order that a majority of the directors should reside at Milwaukee, the principal office of the company. The officers are Angus Smith, President; E. B. Greenleaf, Vice-President and Superintendent; William Young, Treasurer; and David Vance, Secretary. These officers, with Judge J. R. Hanson and C. H. McIntyre, constitute the Board of Directors.

"The principal work at Mineral Point during the season has been done upon the Boston lode. The main shaft is down 92 feet; the tunnel is in 100 feet; 700 tons of mineral are on the dump; the vein shows three feet, rich in gray copper, running 100 ounces and upwards. The company will probably put up machinery of some kind during the season, but will not decide as to its character until a report is made by Mr. Pratt, who will investigate the subject while here. Arrangements have been made for a diamond drill to be used in prospecting."

**Central Colorado.**—A late clean up in the Fairplay Gold Mine realized 96 ounces from 16 boxes.

There is a report of a good strike in the Hiawatha, which sounds somewhat like old times. The mineral is said to be 6 feet in width. This property has been doing rather poorly for some time past. It used to be reckoned as among the finest in the State, and no doubt will regain its old standing in a few months more.

It is stated that a large stock company has been formed on the Malchite Copper Mine, in Bear Cañon, and that the mine will be energetically developed this year. If the results of this development are satisfactory, large copper reduction works are to be built at Morrison or Golden.



**SILVERTON SMELTING WORKS, SILVERTON, SAN JUAN COUNTY, COLORADO.**

An excellent map recently given to the public by the Hayden Survey includes that portion of Southwestern Colorado termed the San Juan country. This mining region comprises most of Rio Grande, La Plata, Hinsdale, and San Juan counties. Having for the past two years been in charge of works at Silverton, San Juan County, I shall briefly refer to that district. It is situated on the Animas River at an altitude of over nine thousand feet, and but a few miles west of the main divide of the Rocky Mountains. The Rio Grande River rises a few miles north on eastern slope of same divide. The nearest point of supply is Del Norte, on this river, one hundred and ten miles distant.

La Veta, the terminus of the Rio Grande Railroad, is two hundred miles distant. All freight is transported from the latter place via Del Norte by wagon eighty miles up the Rio Grande, and then carried by pack-trains over a pass twelve thousand feet high to Silverton, a distance of thirty miles.

The average cost of freight was, during the summer of 1876, about four cents per pound from La Veta to Silverton. An excellent wagon road is at present being built down the Animas River, which will be completed during the summer of 1877, and will eventually be the outlet for all that portion of the San Juan country situated on the western slope of the Rocky Mountains. This road, after passing through a narrow gorge from fifteen to twenty miles, reaches a comparatively level country, which extends to the San Juan River, the projected route of the Southern Pacific Railroad. The Silverton Smelting Works, situated at Silverton, San Juan County, derive their ore supply entirely from purchased ore. The principal source has thus far been Hazelton Mountain, three miles distant. The mines are about fifteen hundred feet higher than the works, and at present accessible only by pack-trains.

On the northern side of this mountain several parallel veins occur in greenstone. They are extremely regular, having a uniform strike northwest and southeast, with slight dip toward the south.

The gangue is exclusively quartz, containing galena and tetrahedrite. The latter mineral is finely disseminated throughout the galena, which occurs in places nearly free from gangue. Beautiful specimens of leaf silver are frequently found associated with galena. The tetrahedrite is of very light color, and frequently when pure contains over eight per cent. silver. Many other localities within a radius of thirty miles furnish a limited amount of ore. The gangue, with few exceptions, is, however, quartz, and the prevailing silver minerals galena and tetrahedrite. From one locality a few tons of very high grade ore were purchased where brittle silver ore (probably stephanite) occurs in barytes.

In addition to minerals of very general occurrence, the following have been determined: Anglesite, cerussite, pyromorphite, argenteite, prustite (finely crystallized), pyrrargyrite.

The argenteite occurs at Uray intimately associated with galena. The ruby silver in quartz gangue with black antimonial silver ore (undetermined). Gold occurs in a small quartz vein at the Little Giant Mine.

The quartz from this vein is saved or rejected, entirely in accordance with amount of ripidolite (chlorite) present in gangue. In the vein where this mineral occurs in large quantities the gold is plainly visible. Ore is delivered at smelting works almost entirely by pack-trains. The cost of transportation from the nearest mine is six dollars per ton.

The average assay value for all ores treated at works during 1875 and 1876 was respectively \$225 and \$175 per ton. The cost of marketing lead amounting to nearly its value, no exact record of same was obtained. No premium for high grade lead ores was paid, as the percentage in ore delivered at works being amply sufficient for smelting purposes. The reduction works contained, in 1876, two roasting furnaces, each capable of treating five tons of ore per day, and blast furnace of fifteen tons capacity. Two small Dodge crushers and Sturtevant blower were driven by a twenty-inch American turbine wheel with ten feet fall.

The roasting furnaces, covered with a substantial building, are built upon a hillside with sufficient grade to conveniently deliver roasted ore to main building, which contains feed floor and blast furnace. The ore receiving house, containing crusher, is fifteen feet above roasting floor. Assay office and coal house are built near main building. The latter is necessarily covered, as frequent and copious rains occurring during the summer would greatly deteriorate the coal, which even when carefully burned and stored is of exceptionally bad quality. The ore as received at works, having been closely sorted and sacked at mines, is in small pieces. This is passed through a Dodge rock breaker, set to crush pea size. Stamps or rollers should be substituted for this very expensive and imperfect means of pulverizing ore. Through chutes from crushing floor, ten charges of 1,000 lb. are passed into roasting furnace. The charges are made to contain from thirty-five to forty per cent. lead, which is about the average of all ore purchased. The gangue, as already mentioned, is exclusively quartz.

The roasting furnaces are reverberatory, of usual construction, with six working doors on each side. The hearth is built with slight inclination from first bed to smelting or draw hearth, which materially aids in turning down charges. The hearth, from fire-bridge to end of furnace, is thirty-two feet in length and eleven feet in width. This furnace was entirely constructed with common brick (\$15 per 1,000), except fire arch and slagging hearth, the former being fire-brick and the latter sandstone. The product of roasting was a perfectly fused lead silicate, containing some particles of quartz and occasionally a little undecomposed lead sulphide.

In roasting five tons, three and one-half cords of wood at \$3.50 per cord were consumed, and six men at \$3.50 per day were employed.

From roasting furnaces the fused ore is wheeled to main charging floor, and broken into pieces not exceeding four inches in diameter. A charge is then made for blast furnace by adding a sufficient quantity of limestone and iron ore to produce a rather silicious slag. A good crystalline limestone is obtained from quarry two miles distant, costing at works \$6 per ton. The iron ore used for flux is limonite (bog iron ore), containing less than one per cent. insoluble residue. Fine petrifications of cones and twigs frequently occur in the ore. A large deposit is found within two hundred yards of smelting works, can be mined, roasted, and delivered at furnace at a cost not exceeding \$2 per ton. Several beds of this ore are found in same locality. Their existence is of vital importance to the smelting interest of the district. There are no ferruginous silver ores in the neighborhood, and, although iron pyrites occur containing traces of gold, they would require roasting at no small expense, producing a far inferior flux. The blast furnace, of fifteen tons capacity, was originally built similar to those now in use at Eureka, and was slightly changed to receive water jacket during past years; the distance from feed hole to tuyere line being twelve feet; space between tuyeres, two feet; depth of sump, two feet; length including open hearth, three and one-half feet. The best furnace lining available in 1875 was an extremely dense sandstone, which cracked badly when slightly heated. No water tuyeres could be procured without delay, and consequently smelting with a "nose" was resorted to. After first run, which took place without slag or lead, for starting furnace a packing of ground sandstone and clay was substituted for

sandstone. Smelting with a "nose" gave great trouble as sufficient quantity of ore was seldom on hand to prepare a uniform charge.

In 1876, circular water jackets were used in same furnace, and no further difficulty was experienced, the length of campaign only being limited by amount of ore on hand.

The water jacket was made by Frazer, Chalmers & Co., of Chicago, being wrought iron, with water space of four inches at top and six at bottom. Space between tuyeres, thirty-three inches; height, thirty-six inches. Both inflow and discharge pipe are at top of jacket. Ten tons of ore are smelted daily, producing a soft work lead. A very small quantity of iron "matte," assaying from \$50 to \$60 per ton, is made. The resulting slag is very poor, seldom containing over \$1.50 in silver per ton.

The quantity of coal consumed per ton of ore is extremely large, exceeding sixty bushels, including waste. The inferior quality of charcoal has been the greatest obstacle to profitable smelting in San Juan.

Good roads, at present being built, will not only make a fair coke (Trinidad) available, but also reduce cost of general transportation.

With these additional facilities, San Juan County promises to become an ore producing district of importance.

EUREKA, May 31, 1877.

**NOTE UPON THE COST OF SIX REGENERATIVE FURNACES, BUILT IN 1875 AT THE EDGAR THOMSON STEEL WORKS, NEAR PITTSBURG, FOR HEATING STEEL INGOTS AND BLOOMS.\***

By P. Barnes, New York.

These furnaces are of the ordinary Siemens type, and present no special peculiarities of construction. The bed of each is 8 feet by 20 feet clear inside of the walls and ports. The producers are placed at a distance of about 200 feet from the furnaces, and the gas is collected in an iron tube and led across the yard overhead. It then drops underground into the gas flue, and is distributed to the furnaces. A considerable weight of floor plates over the valve pits is included in account 39, but none of the general stock of floor plates for the mill were charged to the furnaces.

In Table No. 1 is shown the money cost of the furnaces as distributed to the several accounts named.

In Table No. 2 is shown the proportion of each account due to each of the several items or classes of expenditure named.

It is thus rendered possible, almost at a glance, to determine the money value in this particular case of each of the items named. The regular work of three of these furnaces in heating steel blooms for the months of January and February, 1877, was 77 rounds per week of 60 blooms each, or 4,620 30-foot rails per week. Each furnace will heat 8 14-inch ingots for three rails each at one time.

TABLE NO. I.

Account.	Class.	Money.	Per cent.
35	Producer, brick work.	\$8,087	112
36	" castings.	9,986	133
37	Gas flue	4,777	66
38	Furnace, brick work.	29,705	414
39	" castings.	19,472	270
		\$72,037	1,000

TABLE NO. II.

Item.	Class.	Accounts.				
		35	36	37	38	39
1	Lime	026			034	
2	Sand	026		048	055	
3	Cement	030		149	034	
4	Concrete	106		084	1006	
5	Red brick	123	005	254	0452	
6	Fire-brick and clay	370			4085	
7	Brick laying	213		166	1532	
8	Skilled labor	041	037	043	0734	0261
9	Common labor	037	047	048	0422	0627
10	Teams	028		077	0400	
11	Bar iron		069			0239
12	Castings		312	094		0684
13	Plate iron		007	036		1177
14	Cooling tubes		430			
15	Iron beams		046			0103
16	Reversing valves					1866
17	Charging hoppers		025			
18	Lumber		013	001	0006	
19	Hardware					0073
		1,000	1,000	1,000	1,0000	1,0000

**IRON IN FRANCE.**—The production of cast iron in France last year was 1,449,537 tons, as compared with 1,416,228 tons in 1875. The production of wrought iron in France last year was 733,271 tons, of which 77,420 tons were rails; the corresponding production of 1875 was 755,442 tons, 118,958 tons being rails. Sheet iron was made to the extent of 115,136 tons in 1876, as compared with 114,931 tons in 1875.—*Engineering.*

**RECENT DECISION OF THE COMMISSIONER OF THE GENERAL LAND OFFICE.**—J. A. Williamson, Commissioner of the General Land Office, in reply to an inquiry made by C. A. Fisk of Denver, Colo., has rendered a decision of the highest concern to all who are engaged in mining upon the public domain. "In the case presented by Mr. Fisk, where a party discovered a mine on the 1st of July, sunk a discovery shaft ten feet in depth, and made record of his claim on the 28th of August, 1876, the first annual expenditures should be made prior to July 1, 1877." The above decision is important, and the following requirements and conditions result therefrom. 1.—The date of the beginning and origin of the title to a new lode-claim will be the exact day on which it shall be first discovered by the uncovering and disclosing of the same. 2.—The recorded location notice (or certificate) should, in all cases, state the date on which the discovery was made. 3.—The time in which annual expenditures must be made will begin and end yearly on the date of discovery, not on the date of record. 4.—The work of sinking the discovery shaft ten feet deep, or such portion of said work as shall be performed after the date of discovery, may be accounted as a part or a whole, as the case may be, of the first annual expenditure. 5.—Claims located prior to January 1, 1872, are not affected by this ruling. The law of Congress requiring annual expenditures not having gone into operation until that date, claims located prior thereto were given a full year to do their assessment work; that is to say, that these old titles may be represented at any time in the year between the first day of January and the last day of the succeeding December.

\* A paper read before the American Institute of Mining Engineers, at the Wilkes-Barre meeting, May, 1877.

It is highly probable that the Boston & Colorado Smelting Works will be removed from Black Hawk to Denver this summer. The company have had such a move in mind for some time, and are now only delaying until it is ascertained whether Colorado lignites can be used in the furnaces in place of wood. Fuel (wood) is rapidly becoming scarce in Black Hawk, and advancing in price. In view of this fact a move of some kind is necessary. Probably the company conclude it is cheaper to move their furnaces towards the coal than to carry coal up the cañon to Black Hawk. This move will be an important one.

## NOTES.

A COAL exhibition will be held next month at Hamburg, Germany, at which more than two hundred varieties of coal will be shown.

CONVICT LABOR IN THE TENNESSEE COAL MINES.—The convicts of Tennessee have been leased to the Sewanee coal mines for six years for \$70,500.

AMERICAN STEAM TUGS.—The government of the United States of Colombia has contracted with Messrs. Pusey, Jones & Co., of Wilmington, for the construction of two iron steam tugs, each 75 feet in length.

MERCURY POISONING.—The Montyon prize for combating the evils of the insalubrious arts was given by the French Academy to Prof. Melsens for his successful introduction of the iodide of potassium as a remedy for saturnine and mercurial poisoning.

NICKELIZATION AND COBALIZATION OF IRON AND STEEL.—M. F. Stolba.—Nickel may be deposited upon iron or steel without the aid of the battery, by immersing the objects in a solution of zinc chloride and a salt of nickel, raising to a boil, and bringing the metal to be coated in contact with metallic zinc. A deposit of cobalt may be obtained by an analogous procedure.

FUSION OF NICKEL AND COBALT.—M. C. Winkler (*Dingler's Journal*, cccxii., p. 175).—The author has obtained both these metals in ingots of from two to five kilos. The conditions required are a sufficiently high temperature, the use of refractory crucibles, the absence of carbon and silicon in contact with the melted metal, and protection from atmospheric oxygen during casting.

RESUMPTION OF WORK ON THE ST. GOTHARD TUNNEL.—ROME, June 14, 1877.—The international conference upon the question of resuming work on the St. Gothard Tunnel announces that \$8,000,000 are still required to complete the undertaking. Of this amount they propose that Germany contribute \$2,000,000; Italy, \$2,000,000; Switzerland, \$1,000,000, and the company, \$2,400,000.

MINING DISASTER IN PENNSYLVANIA.—Part of the Harleigh coal mine, near Hazleton, Pa., caved in on the 20th inst., imprisoning two of the miners and fifteen mules. A number of other miners were in the pit at the time, but fortunately escaped. Black Creek, a stream flowing close by, is pouring its water into the mine, and the imprisoned men, if alive, are in great danger of being suffocated or drowned.

IMPORTS OF TIN PLATES FOR MAY, 1877.—The exports of tin plates from Liverpool to the following ports for the month of May, 1876 and 1877, were:

	1877.	1876.		1877.	1876.
	Boxes.	Boxes.		Boxes.	Boxes.
New York.....	69,716	59,136	Baltimore.....	18,110	8,126
Boston.....	19,584	11,485			
Philadelphia.....	32,372	17,648	Total.....	139,782	96,395

SINGULAR CASE OF THE PRODUCTION OF HEAT.—M. J. Olivier.—A square rod of steel, 80 centimeters in length and 15 millimeters square, is grasped firmly by both the hands of the operator, one of the hands being placed in the middle of the rod, and the other at one end. The free extremity is strongly placed against an emery wheel revolving very rapidly. After a few minutes the extremity thus rubbed becomes strongly heated; the hand placed in the middle of the bar does not experience any feeling of heat, but the one at the other extremity is heated to such an extent that the operator is compelled to let go.

PREMIUM FOR A PROCESS FOR THE SUCCESSFUL UTILIZATION OF ANTHRACITE COAL DUST.—The American Philosophical Society of Philadelphia, in the year 1866, offered a premium of \$500 for a process for the successful utilization of anthracite coal dust, to be competed for under the direction of the officers of the society. A committee is now considering an application for the premium, where the process is burning the material on a perforated grate, with closed ash pit, and a steam jet blast, the coal stack being spread thin on the grate, the latter portion of this process being secured to Mr. J. E. Wooten, of the Reading Railroad, by a patent. Those desiring to compete for this premium can communicate with Robert Briggs, Esq., 220 S. 4th Street, who will be pleased to give all necessary information on the subject and lay their application before the society for its action.

ELECTRIC PLANT.—The *Gazette horticole de Nicaragua* publishes some information respecting a plant of the family of *phytolaccas*, which grows in that country and which possesses electro-magnetic properties. When a branch is cut off the hand holding it experiences an electric sensation similar to that from a Runkorff battery, and the electrical influence of the plant has been observed several paces from the plant by the deviation of the needle of a small compass. When the compass was placed by the experimenter close to the plants, the needle turned completely round. The soil is said by the *Moniteur Industriel* to contain no trace of iron or other magnetic metals, so that the property is inherent in the plant itself. The intensity of the phenomenon varies with the hour of the day—at night it is almost nil, and most intense during the two midday hours or in a wind; during rain it was weak. No birds or insects have been seen to rest upon the *phytolacca electrica*.

PREPARATION OF A NEW WHITE COLOR, CALLED THE LITHOPHON OR ZINCOLITE WHITE.—Charles Sondau Boulez, of Courtrai Belgium, has patented the following process for preparing his so-called lithophon or zincolite white paint: Heavy spar is mixed with coal dust and tar, and subjected to great heat in order to reduce the sulphate of barium to the sulphide. To a clear solution of the latter a solution of chloride of zinc is added, which precipitates sulphide of zinc, but leaves the chloride of barium in solution. To this solution sulphate of zinc is added, when a precipitate of barium sulphate and a solution of zinc chloride is formed. The zinc chloride can again be used for another precipitation of barium sulphate. The precipitates are washed, dried, subjected to a cherry red heat, and then thrown in cold water; afterwards ground and dried. The white color thus obtained has great covering power, and is especially adapted for oil paint.—*Belg. Indus. & Gew. Blatt.*, 1877.

THE DIVINING ROD—WONDERFUL SUCCESS.—For a supply of water for the Mount Hope Cemetery, in the City of Lambertville, N. J., it was determined to have a well dug within the inclosure. A person that could use the forked stick was employed to determine the place to sink for water, and was most successful. One of the parties interested took hold of the "fork" and found it to be "just so." Upon the evidence furnished, a party offered "to dig a well and wall it up, at the rate of \$2 per foot, until they found a full supply of water, if they had to go 70 feet deep." This well worded agreement was accepted, and work actively progressed. Upon reaching a depth of 28½ feet (18 being in hard, compact, altered slate) without the least sign of water, the contractors intimated that they could go no further at the prices. They being entirely irresponsible as well as the person using the "fork," further sinking was abandoned. The hole in the rock can be utilized as a cistern or reservoir for securing and storing surface drainage, and in all probability will answer the purposes intended, after being filled by the "fall rains" and thus supplied. M. C.

STOCKHOLDERS' RIGHTS TO SEE COMPANIES' BOOKS.—In the suit of the people on the relation of Rufus Hatch against the Lake Shore and Michigan Southern Railroad Company, the Supreme Court General Term has affirmed the decision at Chambers refusing the relator an inspection of the stock and transfer books of the company. He applied under the act of 1842 compelling transfer agents of companies to furnish a list of stockholders. The court holds, Chief-Justice Davis giving the opinion, that that act applies only to foreign corporations and their transfer agents. In this view the proceeding should have been against the Farmers' Loan and Trust Company, if the Lake Shore and Michigan Southern Railroad Company is a foreign company. But it is clear that it is a domestic corporation, subject to New York law. As to domestic corporations, the law provides that the stockholders' books shall be open to inspection for 30 days before election. This, the court holds, does not cut off the right of a stockholder on good reasons shown to see the books at other times, but these reasons should be clear and cogent, and in this case the General Term agrees with the court below that no such reasons are shown, and the ordinary processes of the court afford ample remedy for the wrongs alleged by Mr. Hatch.

EXPERIMENTAL RESEARCHES ON THE NATURAL SULPHIDES.—M. Stan. Meunier, in *Comptes Rendus*.—Numerous experiments, the results of which were submitted to the Academy, prove that the native sulphides, if brought in contact with metallic solutions, suitably selected, effect the reduction of the dissolved metal. Thus galena, if placed in a solution of auric chloride, is immediately gilded over; in nitrate of silver it is quickly covered with very elegant metallic vegetation, resembling the 'Arbor Dianæ'; mercury is also precipitated under the same conditions. The reaction in the first case is expressed by  $-3PbS + AuCl_3 = 3PbCl + 2Au + 3S$ . In the second case by  $-PbS + AgO,NO_3 = PbO,NO_3 + Ag + S$ . All the sulphides examined—iron pyrites, copper pyrites, blende, cinnabar, stibene, and even sodium monosulphide (so commonly met with in mineral waters)—give rise to analogous precipitations. Certain selenides, antimonides, arsenides, and tellurides also behave in an analogous manner. The facts point to certain geological consequences, especially as regards the "mineralogical associations" so often remarked in metallic veins. If a vein of galena receives infiltration of sea-water, always argentiferous, all the silver present will be seized and concentrated by the galena. Native silver is present in certain galenas, and we have thus an explanation of its origin. Further, the free silver, being very finely subdivided, will be exceedingly susceptible of combining with sulphur, which shows us the possible formation of argentiferous galenas. Simultaneously with the reduction of the silver a certain proportion of sulphur is set free. This is found in certain super-sulphureted galenas, sometimes so rich with sulphur as to burn on contact with a flame. The sulphur liberated will rarely remain long in the free state; often it must combine with the silver.—*Chem. News*.

INCOMBUSTIBLE MINERAL WOOL, MANUFACTURED BY R. D. A. PARROTT, GREENWOOD IRON WORKS, ORANGE COUNTY, N. Y.—Mineral wool is made by blowing steam or air through molten scoriaceous substances, such as the slag of blast furnaces, which are thereby converted into fine fibres intermixed with globules or shot formed by the rapid cooling of the particles. The "extra" wool is blown off from this product by currents of air, and is nearly free from shot. The "ordinary" wool is sifted from shot as far as practicable. The unconverted shot and the fibres are of the same composition: silica, lime, magnesia, and alumina. The percentage of iron in the slag seldom reaches one-half of one per cent. The whole composition, therefore, consists practically of the best non-conducting mineral substances worked into a woolly or fibrous mass, which has the essential requisite of a good non-conductor or insulator of heat, cold, and sound, viz. air confined in a finely subdivided state. Mineral wool shares this last-named characteristic with the well-known organic non-conductors, such as felt, hair, charcoal, sawdust, shavings, etc., but has the advantage that it can neither rot nor burn, and that it is indifferent to atmospheric influences. At the Franklin Institute, Philadelphia, mineral wool was tested by the Committee on Science and the Arts (see Report No. 864, Philadelphia, April 15th, 1872), and found to be over 10 per cent. better than felt as a non-conductor of heat. These tests were made on the first experimental productions, and the mineral wool—as now made—is much superior in quality. The mineral wool manufactured at Greenwood was awarded the silver medal on its first exhibition at the American Institute Fair, November, 1875, the diploma for maintained superiority November, 1876, and the award at the Centennial Exhibition, Philadelphia. Mineral wool is used to prevent freezing, to prevent cooling and condensation, to arrest the spread of fire, to deafen walls and floors in dwelling houses, and to line ice-boxes, refrigerators, cold storage-houses, fire-proof safes and vaults. A stuffing one inch thick of ordinary costs about 5 cents, and of "extra" 8 cents per square foot. Hot-blast pipes should be covered with a three-inch layer. Steam pipes with 80 pounds steam or less require a covering from 2 inches to 1 inch in thickness. Ice houses or brewery vaults—usually lined from 9 to 18 inches thick with sawdust, shavings or ashes—can be lined with 3 inches ordinary mineral wool. For further information address Alexander D. Elbers, agent for the patentee, 26½ Broadway, New York.

THE BETTS' COVE (NEWFOUNDLAND) COPPER MINES.—Late accounts from Betts' Cove Copper Mine are positively startling. I almost hesitate to repeat them, lest I should be accused of gross exaggeration. I have taken pains, however, to verify the statements made, and I can assure your readers that the account I now furnish of the wonderful success of this mine is strictly accurate, without a single touch of exaggeration. Last year the proprietors shipped 20,000 tons of copper ore. This was thought wonderful; but it is now certain that during this year the produce of the mine will be 60,000 tons of ore. Already half this amount has been obtained, 20,000 tons having been brought to the surface, and 10,000 tons being piled at the bottom of the shaft. A thousand miners will be at work during the summer, so that it is absolutely certain the 30,000 tons will be more than doubled. It is also ascertained now, beyond a doubt, that there is ore enough for years to come, even supposing operations were to go on upon the same gigantic scale. Miners are now operating on a bed of ore sixty feet in thickness, and of unknown extent. I doubt if such a deposit of copper ore has ever been found elsewhere. To Mr. Ellershausen must be ascribed the credit of discovering and working so successfully this great bed of ore. His partners are Messrs. Dickson and McKenzie, wealthy capitalists of Glasgow. A railway from the mine to the shipping place has just been completed, the distance not exceeding half a mile. This, of course, will greatly facilitate shipment of ore. It is difficult to form a correct idea of such a mass of ore, the produce of a single year. In the first place, it would require a fleet of sixty vessels of a thousand tons each to carry it to Swansea. Then consider its value when landed there. Taking the low average price of £8 sterling per ton, we have £480,000 sterling; or if we take £9, which is more likely to be correct, we get as the value of the product of this mine, in 1877, £540,000 sterling. To avoid the great expense and labor of freight and shipping, Mr. Ellershausen is about to erect ranges of huge smelting furnaces, which will enable him to reduce even the poorest ores, which are not now worth shipping. In a region which for many miles shows indications of ore in all directions, there must be more deposits, perhaps some to equal that at Betts' Cove. So think many speculators, for the whole coast, for many miles, is covered by mining licenses, taken, of course, in most instances, at hap-hazard. One speculator—an American, I believe—has covered some fifty square miles with his licenses. Tilt Cove mine is left entirely in the shade, not being worked on the same gigantic scale; but it is a very valuable property, and its product might easily be trebled. The benefit of such a mine as this to the country is very great. Where half a dozen fishermen's huts lately stood there is now a thriving village, containing 2,000 persons.—*From correspondence in Toronto Globe*.

STATISTICS OF COAL PRODUCTION.

This is the only report published that gives full and accurate returns of the production of our Anthracite mines. Comparative Statement for the week ending June 16, and years from Jan 1st.

Table with columns for Tons of 2,240 lb., 1877 (Week, Year), 1876 (Week, Year). Rows include Wyoming Region (D. & H. Canal Co., D. L. & W. RR. Co., etc.), Lehigh Region (L. V. RR. Co., C. RR. of N. J., etc.), Schuylkill Region (P. & R. R. RR. Co., etc.), and Sullivan Region (Sul. & Erie RR. Co.). Total production for 1877 is 481,622 tons and for 1876 is 406,888 tons.

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

Receipts and shipments of coal at Chicago, Ill., for the week ending June 16, and year from January 1:

Table showing Receipts and Shipments in Tons for Week and Year. Receipts: 34,586 tons (Week), 607,324 tons (Year). Shipments: 4,577 tons (Week), 85,516 tons (Year).

The receipts by canal and shipments of coal at Cleveland, Ohio, for the week ending June 16 were as follows: Receipts by canal, 4,204 tons; shipped coastwise, 12,447 tons; total for year, 74,759 tons; foreign shipments, 5,049 tons; total for year, 25,239. Total of coastwise and foreign shipments for week, 18,396; for year, 99,998.

Receipts of Coal at Boston, for the week ending June 15, and years from Jan. 1.

Table showing Receipts of Coal at Boston from various regions (Alexandria and Georgetown, Philadelphia, Baltimore, etc.) for 1877 and 1876. Total receipts for 1877 are 412,375 tons and for 1876 are 396,036 tons.

Shipments of coal at Pictou, N.S., for the week ending June 16, and year from January 1:

Table showing Shipments of Coal at Pictou to various destinations (Canada, United States, Other Provinces) for Week and Year. Total shipments for 1877 are 3,336 tons and for 1876 are 20,844 tons.

The Exports of Coal from Baltimore for the week ending June 15 were 1,242 tons, and since January 1st, 19,490 tons as against 16,921 tons for the corresponding period of 1876.

Perth Amboy business: Received for the week 24,186 tons; Shipped for the week 27,427 tons; On hand June 16, 121,236 tons.

The Receipts of Coal at Rondout, N.Y., by the Delaware & Hudson Canal for the week ending June 20 were 345 boats, carrying 44,403 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 28,228 tons, as compared with the corresponding period in 1876.

Table showing Belvidere Delaware RR. report for week ending June 16, comparing 1877 and 1876 production and distribution for various routes (South Trenton, South Amboy, etc.).

The shipments of coal over the Erie Canal for the week ending June 21, 1877, was 8,968 tons, and since the opening of navigation 97,710 tons. For the corresponding time last year, 2,393 tons.

The production of Bituminous Coal for the week ending June 16, was as follows:

Table detailing the production of Bituminous Coal by region (Cumberland, Barclay, Broad Top, Clearfield, Allegheny, Pittsburgh) for Week, 1877, Year, 1876, and Year, 1877. Total production for 1877 is 43,203 tons and for 1876 is 614,978 tons.

The Production of Coke for week ending June 7.

Table showing Tons of 2,000 lb. and Year production for West Penn. RR., Southwest Penn. RR., Penn. & Westmoreland Region, and Pittsburgh, Penn. RR. Total production is 16,370 tons.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, June 22, 1877.

Anthracite.

On Wednesday the Delaware, Lackawanna & Western Railroad Company announced that it will sell at public auction, on the 27th inst., 125,000 tons of coal. As this company is supposed to sell all of its coal in this manner, this quantity is considered as very small, and is much less than was generally anticipated would be offered. At the company's present rate of production, its output for July would not be far from 250,000 tons, considerable of which, however, would be taken for local consumption and by the Northern trade, while it also has a very large stock of coal at or near Hoboken. There is considerable surmising as to the prices that will be realized at the sale, the estimates ranging from \$2.25 to \$2.50, but the general impression prevails that the latter figure will be more nearly correct. The market is very well supplied, stocks are large, and with the present rate of production it is only a matter of a short time before we must see lower prices, unless the mining companies adopt some new policy. The price of coal is already far too low, and less than any of the companies can afford to supply it at; but when buyers have all they can carry, this will not prevent a decline. As has been customary, the announcement of an auction sale has greatly checked business; that which is doing being mostly on prices predicated on the average that will be secured at the sale next Wednesday.

The Delaware, Lackawanna & Western Railroad Company's sale, like that of the Pennsylvania Coal Company last week, does not show an aggressive policy at its back; but we have, nevertheless, indications of war in the East. On the 19th inst. there appeared in the Springfield Republican an advertisement inserted by Mr. J. M. Cowan, offering for ten days 2,000 tons of coal at retail at \$4 per ton at yard. The same paper says that "this is a fall of \$2 per ton in the retail price. The coal is Delaware & Hudson and Pittston, and is carried from Hudson over the Boston & Albany Railroad." This is supposed to be a blow at the Reading Company, which was offering its coal there at the time under the market price.

It is very probable that those who now hold the field will not have things all their own way. These efforts to reach the consumer direct after crowding the yards of dealers must soon react upon the mining companies by protested notes, etc.

The indications that the "pooling" scheme will be the next subject for the consideration of the producers are increasing. Outside of the officers of the companies and those who would be adversely affected by it, it is received with more favor than any plan heretofore proposed, but nothing definite can be effected before Mr. Gowen's return from Europe. The effect it would have on middlemen and the large force now engaged in selling coal must necessarily bring a vast amount of opposition.

During June and July of last year production was mostly suspended during alternate weeks. The week in 1876 corresponding with the one ending this year with June 16 was a full working week, yet the output was 74,734 tons less than for last week. The production was as follows: Last week, 481,622 tons; previous week, 463,305 tons; corresponding week of 1876, 406,888 tons. The total production from January 1 to June 16 was 8,652,191 tons, as against 6,452,293 tons for the like period of last year, showing an increase this year of 2,199,898 tons.

Bituminous.

We note a contract for 8,000 tons of Clearfield Coal for shipment from Philadelphia to Cuba. This coal has been quite energetically pushed in outside markets. Cumberland is very quiet. The output is greater at present than during the corresponding time of last year, although the shipments from January 1 are slightly behind. Some trouble is being experienced in this region by a strike of the boatmen on the Chesapeake & Ohio Canal for an advance in the rate of freight. It is not generally anticipated that the strike will be a success. The canal authorities are using every means to prevent the canal being obstructed.

New York and Philadelphia. Wholesale Prices of Anthracite Coal f. o. b. at the Tide Water Shipping Ports per ton of 2240 lb.

Table showing Wholesale Prices of Anthracite Coal for various regions (Wyoming, Lehigh, Schuylkill, etc.) and ports (New York, Philadelphia) per ton of 2240 lb. Columns include Lump, Steamer, Grate, Pig, Stove, and Chestnut.

Boats towed by the D. & H. Co. at its expense to and from New York Harbor.

\* These quotations represent the average prices of the last auction sale

Per ton. Freight from Hoboken and Weehawken to New York 35c. Freight from Elizabethport & Port Johnston to N. Y. 35c. Freight by the boats of the companies from Hoboken, Rondout, Port Johnston, Weehawken, South Amboy and Perth Amboy to New York City and vicinity 50c.

Pittston coal at New York delivered by Penn. Coal Co.'s boats 6c. per ton additional. Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Table showing Wholesale Prices of Bituminous Coal for Domestic Gas Coals and per ton of 2240 lb. at shipping ports in New York.

Manufacturing and Steam Coals. Cumberland at Georgetown and Alexandria, Va. 2 85@3 00. Cumberland at Baltimore 3 15@3 25. Clearfield f. o. b. Canton, Baltimore 3 25@. Clearfield "Eureka" at mines per ton 2,000 lb., 75c.; f.o.b. Baltimore and Philadelphia per ton of 2,240 lb., \$3.25; f.o.b. South Amboy, \$4.25; alongside at New York, \$4.50.

Table showing Foreign Gas Coals. Newcastle at Newcastle-on-Tyne 8/6@10/6. Liverpool House Orrel, at Liverpool 25/. Ince Hall Cannel " " 35/6. Gas Cannel " " 25/6. Scotch Gas Cannel, at Glasgow, nominal, 25/.

Table showing Block House, at Cow Bay, N. S. 1 75. Caledonia, at Port Caledonia 1 50. Glace Bay, at Glace Bay 1 50. Lingan, at Lingan Bay 1 75. International mines at Sydney 1 75. Pictou, Vale mines, at Pictou 2 25.

Retail Prices in New York.

Table showing Anthracite retail prices. Per 2000 lbs. Grate and Egg Stove Chestnut. Pittston coal, in yard \$3 90. Lackawanna coal, in yard 3 25. Wilkes-Barre, delivered 4 30. Lehigh and Locust Mountain, del'd. 4 55. Schuylkill Red Ash, del'd. 5 25.

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to \$1.10 per ton, according to distance from the yard.

Table showing Bituminous retail prices. Liverpool House Orrel, delivered, per ton of 2000 lb. \$18 00. Liverpool House Cannel " " 18 00. American " " 11 00. Cannelton Block, or splint, " " 10 14. American Orrel " " 11@00. Red Bank Cannel " " 9 50. Cumberland " " 7 00.

Baltimore, June 20, 1877. Specially reported by Messrs. E. STABLER, Jr., & Co.

Wholesale Prices.

Table showing AFLOAT BY CARBO PER TON OF 2,240 LB. Lump and Steamboat \$3 40. Broken 3 25. Egg 3 30. Stove 3 50. Chestnut 3 40.

**Lykens Valley Red Ash.**  
**Afloat by cargo.** Broken . . . \$3 98  
 Egg . . . 4 13  
 Stove . . . 4 13  
 Chestnut . . . 3 36

**BY RAIL IN CARS.** Broken . . . \$4 15  
 Egg . . . 4 30  
 Stove . . . 4 30  
 Chestnut . . . 3 80

From wharf or yard to the trade, 50c. per ton additional.

**Bituminous.**  
 George's Creek, f. o. b. at Locust Point . . . \$3 50 to \$3 60  
 Clearfield, " Canton . . . 3 30 to 3 40

**Boston.** June 16, 1877.  
 Freights this way are lower, quoting \$25@30 from Philadelphia, \$1.50@1.65 from Baltimore, \$1.65@1.75 from Alexandria and Georgetown, and \$1.20@1.25 from New York. Gas coals continue to rule low, but are in fair demand. The price of Ligan coal, free on board at the mines, is \$1.75 gold.

We quote Boston wholesale prices as follows:  
 Anthracite, broken \$3 85@4 00  
 do. egg . . . 3 85@4 00  
 do. stove . . . 4 10  
 Camberland . . . 4 25  
 Clearfield . . . 4 00  
 Westmoreland . . . 5 50  
 Caledonia . . . 4 00

Cannel, English . . . \$1 60  
 do. Buckeye . . . 10 00  
 Ligan . . . 4 00  
 Pictou . . . 5 00  
 Penn . . . 5 50  
 Youghiogheny . . . 4 50@5 50

**Buffalo.** June 15, 1877.  
 Specially reported by LEE & LOOMIS.

The Scranton, Wilkes-Barre, Plymouth, Shamokin, and Delaware and Hudson (Lackawanna) are offered for the present at the following prices per ton of 2,000 lb.:

Delivered at	Elmira.	Ithaca.	Syracuse.	Rochester.
	Afloat.	Afloat.	Afloat.	Ret. Del.
Lump				
Grate	\$3 50	\$2 85	\$2 85	\$3 10
Egg	3 50	2 95	2 95	3 20
Stove	3 75	3 20	3 20	3 45
Nut	3 75	3 10	3 00	3 25

Delivered at	Oswego.	Erie.	Buffalo.
	F. O. B.	F. O. B.	Afloat. F. O. B.
Lump			Ret. Del.
Grate	\$3 25	\$3 75	\$3 35
Egg	3 35	3 85	3 45
Stove	3 60	4 10	3 70
Nut	3 40	3 90	3 50

Cost of coal from Erie, Oswego, Sodus Point, or Charlotte for Western market, same as if shipped from Buffalo. Terms cash. All payments to be made in New York city funds:

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville Coke	\$5 00			
Brookfield Coal	4 15			
Beier Hill	4 00		2 85	
Youghiogheny	4 00			
Monterey	3 25	3 00		2 25
Catskill	3 25	3 00		2 25
Stoneboro'		broken	2 75	2 25
Sterling Cannel	5 00	4 75	4 50	
Reynoldsville	3 25	3 00	2 65	2 25
Buffalo Coal Company	3 00	3 00	2 25	2 25

**Chicago, Ill.** June 19, 1877.  
 Specially reported by Messrs. RENO & LITTLE.  
 The following are the prices to-day for coal:

Lackawanna Stove	\$5 00	Erie and Brier Hill	\$5 50
" Chestnut	6 00	Wilmington and Ill.	5 00@4 00
" Grate and Egg	5 75	Blossburgh	6 50

**Hamilton, Ont.** June 19, 1877.  
 Specially reported by H. BARNARD.  
 The present state of our market is as follows:

Grate	\$5 00	Lehigh Lump	\$6 25
Egg	5 00	Brier Hill	5 00
Stove	5 50	Massillon	5 50
Nut	5 50	Smithburg	6 00

**Milwaukee, Wis.** June 15, 1877.  
 Specially reported by Messrs. R. P. ELMORE & Co.  
 The coal trade is totally demoralized. Quotations as follows:

Retail price per ton of 2,000 lb.

Lehigh Lump	\$7 00	Brier Hill, select	\$5 50
Lehigh Prepared	6 50	Blossburgh	5 00
Lackawanna (all sizes)	5 50	Pittsburgh	6 00
Pittston	5 50	Straitsville	4 00
Scranton	5 50		

**Montreal.** June 19, 1877.  
 Specially reported by Messrs. ROBERT C. ADAMS & Co.

Scotch Steam	\$4 00	Cape Breton Steam	\$3 75
Pictou	4 00	Newcastle Smiths	5 75
Anthracite at retail, per 2,000 lb. delivered.			
Egg	\$4 75	Chestnut	\$5 00
Stove	5 15		

**New Orleans, La.** June 15, 1877.  
 Specially reported by Messrs. C. A. MILTENBERGER & Co.

**PITTSBURG COAL.**  
 At wholesale (by boat load) . . . 35c. per bbl.  
 To steamboats . . . 45c. "  
 " manufactories . . . 50c. "  
 " families . . . 75c. "  
 In hhds. (for shipment) . . . \$6 50 per hhd.

**ANTHRACITE COAL.**  
 At wholesale (per ton) . . . \$6 00 to 7 00 per ton.  
 " retail . . . 11 00 "

**VIRGINIA CANNEL COAL.**  
 At retail . . . \$1 25 per bbl.

**ST. BERNARD (KY.) COAL.**  
 To steamboats . . . 40c. "  
 " families . . . 70c. "

**Pittston, Pa.** June 19, 1877.  
 Pennsylvania Coal Company's Coal in yard, ton of 2000 lb. Retail.  
 Lump, Egg and Stove . . . \$2 25  
 Chestnut . . . 2 00  
 Pes. . . 1 00

Delivered, fifty cents per ton additional.  
**Richmond, Va.** June 19, 1877.  
 Specially reported by S. H. HAWES, Dealer in Coal.  
 Per ton of 2,240 lb., f. o. b.

Kanawha Cannel	\$9 00	New River Bituminous	\$3 60
Coalburg Splint	5 70	Clover Hill Coal	3 00
Lewiston	5 70	James River Bitum.	3 50
Kanawha Gas Coal	4 90	" Carbonite	5 25

**Sandusky, O.** June 19, 1877.  
 Specially reported by C. E. BLACK, Agt. Con. Coal & Mg. Co.  
 We quote coal on cars at Sandusky, as follows:  
 Per ton of 2,000 lbs.

**Anthracite.**  
 Grate. Egg. Stove. Chestnut.

Wilkes-Barre	\$6 00	\$6 10	\$6 60	\$6 60
Lackawanna	6 00	6 10	6 60	6 60
Lehigh	6 75	6 85	7 35	7 35

**Bituminous.**  
 Massillon . . . \$2 90  
 Del Carbo . . . 2 05  
 Hocking Valley . . . 2 05

Straitsville	\$2 65
Shawnee	2 65
Blossburg	5 25

**San Francisco Cal.**  
 From the Commercial Herald of June 14, 1877.  
**COAL**—Imports from January 1 to June 1:

Tons.	Tons.
Anthracite . . . 8,996	Mt. Diablo . . . 31,753
Australian . . . 22,476	Vancouver Island . . . 36,118
Coos Bay . . . 14,260	Rocky Mountain . . . 43
Cumberland . . . 7,845	Seattle . . . 50,090
English . . . 34,676	Bellingham Bay . . . 4,300
Chili . . . 3,951	Ione, Cal. . . 139

The telegraph reports a serious loss to the Seattle Company. On the morning of June 10 the large coal bunkers belonging to the Seattle Coal and Transportation Company fell at that place. The wharf had a large number of bunkers, capable of containing 8,000 tons of coal. Owing to the piles being inadequate to support this immense weight, the whole structure suddenly gave way and went down with a terrific crash, which alarmed the whole town. An immense quantity of coal was precipitated into the bay and the whole wharf reduced to a total wreck. At the time of the accident the *Western Shore* and *Washington Libby* were both lying alongside the dock, loading with coal. The former vessel fortunately parted her spring line and escaped without damage. The latter vessel was caught by the falling timbers and had her bulkheads on the port side crushed in. The vessel received other damages aggregating some two thousand dollars in amount. The loss of coal is estimated at about \$26,000; damage to the wharf at \$10,000, besides damages arising by reason of the suspension of the business of the company. No one happened to be on the dock at the time of the disaster, and no loss of life resulted. This serious mishap will cut off our supplies temporarily, but will not affect prices materially, as stocks of all kinds are very heavy. Low prices seem to rule at the East as well as here and elsewhere. Egg size Pacific Coast bituminous is selling by the cargo at \$5 @ \$5.50 per ton, while coarse kinds of Seattle, Nanaimo, Wellington, Coos Bay, and Bellingham Bay screened may be quoted at \$7.50@8 per ton, according to quantity. Black Diamond and other California Mt. Diablo coals sell at \$5.75@7.75 for fine and coarse respectively. Prices of Scotch and English steam to arrive may now be quoted at \$8.25@8.90; West Hartley, \$9@8.50. We note sales to arrive of five cargoes Australian at full rates.

**St. Louis, Mo.** June 20, 1877.  
 Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb.

**ANTHRACITE.**  
 per ton.  
 Lackawanna . . . \$8 00@8 50  
 Wilkes-Barre . . . 8 00@8 50  
 Lehigh . . . 9 00@9 50

**BITUMINOUS.**  
 per ton.  
 Blossburg . . . 9 00  
 Pittsburg . . . 4 50  
 Indiana Block . . . 4 00

**Toledo, Ohio.** June 19, 1877.  
 Specially reported by Messrs. GOSLINE & BARBOUR.  
 There is no change in prices of coal at Toledo to note.

Ton of 2,000 lb.

Straitsville lump	\$2 75	Hocking Valley nut	2 35
" nut	2 35	Massillon lump	3 00
Shawnee lump	2 75	Cumberland	5 50
" nut	2 75	Blossburg	5 50
Hocking Valley lump	2 75		

**Grate. Egg. Stove. Chestnut.**  
 Pittston . . . \$6 00  
 Wilkes-Barre . . . 6 00  
 Lackawanna . . . 6 00  
 Lehigh . . . 6 75

For retail delivery, from 50c to \$1 per ton in addition to above prices is charged.  
 Prices soft coal f. o. b. vessel for Lake shipments will be from 15 to 20c. per ton more than prices on cars.

**OFFICE OF THE PA. & N. Y. R. R. Co.,**  
 Bethlehem, June 1, 1877.

On and after this date the rate on coal for Buffalo, for Watkins, Ithaca, and Weedsport, for water shipment; Auburn, for New York Central R. R.; Sterling, for Lake Ontario Shore R. R., and Fair Haven, will be 81 cts. per gross ton, between Coxtion and Waverly. On all coal transhipped at Waverly into broad gauge cars, an additional charge of 10 cts. per ton will be made to cover the expense thereof. The full rate from Coxtion to Buffalo is \$2.23; to Rochester, \$2.02.  
 ROBERT H. SAYRE, President.

**Freights**  
 Representing the latest actual charters up to June 21.  
 Per ton of 2240 lb.

PORTS.	From Philadelphia.			
	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Jonth, South, Rimby, Hoboken and Weehawken.
Augusta, Me.	1 75	1 50	1 50	1 65@1 75
Albany	1 75	1 50	1 50	1 65@1 75
Alexandria, Va.	65@70			
Annapolis, Md.	1 75	1 50	1 50	1 15
Bangor, Me.	1 75	1 50	1 50	1 15-1 25
Bath, Me.	1 75	1 50	1 50	1 15-1 25
Baltimore	65	1 50	1 50	1 10@1 20
Boston, Mass.	127@152½	1 50	1 50	1 10@1 20
Bridgeport, Ct.	1 40	1 40	1 35	80
Bristol, R. I.	1 25	1 25	1 25	80
Beverly, Mass.	1 25	1 25	1 25	1 20
Cambridgeport, Mass.	1 15	1 15	1 15	1 15½
Charleston, S. C.	1 15	1 15	1 15	1 15
Danversport, Mass.	1 15	1 15	1 15	1 15
East Greenwich, R. I.	1 40	1 40	1 40	80
Fredericksburg, Va.	1 40	1 40	1 40	80
Fall River	1 40	1 40	1 40	80
Gloucester	1 40	1 40	1 40	80
Greenport, N. Y.	1 40	1 40	1 40	80
Hartford, Conn.	1 40	1 40	1 40	80
Hoboken	1 40	1 40	1 40	35
Hudson	1 40	1 40	1 40	35
Jersey City	1 40	1 40	1 40	35
Lynn, Mass.	1 40	1 40	1 40	35
Medford, Mass.	1 40	1 40	1 40	35
Middletown	1 40	1 40	1 40	35
Marblehead, Mass.	1 40	1 40	1 40	35
Nantucket, Mass.	1 40	1 40	1 40	35
New Bedford	1 40	1 40	1 40	35
Newburyport	1 40	1 40	1 40	35
New Haven	1 40	1 40	1 40	35
New London	1 40	1 40	1 40	35
Newport	1 40	1 40	1 40	35
New York	90†	1 20	1 25	35
Norfolk	60	50	50	75
Norwalk	60	50	50	75
Norwich	60	50	50	75
Pawtucket	60	50	50	75
Philadelphia	60	50	50	75
Portland	1 10	1 50	1 50	1 00@1 20
Portsmouth, N. H.	1 10	1 50	1 50	1 00@1 20
Providence	1 10	1 50	1 50	1 00@1 20
Poughkeepsie, N. Y.	1 10	1 50	1 50	1 00@1 20
Quincy Point, Mass.	1 10	1 50	1 50	1 00@1 20
Richmond, Va.	60@65	1 40	1 40	1 25
Salem, Mass.	1 50	1 60	1 60	1 10@1 20
Saugus, Mass.	1 50	1 60	1 60	1 10@1 20
Saco, Me.	1 65	1 65	1 65	1 10@1 20
Somerset, Mass.	1 20	1 20	1 20	80
Thomastown, Mass.	1 20	1 20	1 20	80
Troy	1 20	1 20	1 20	80
Trenton, N. J.	70@75	1 20	1 20	80
Washington	70@75	1 20	1 20	80
Weymouth	70@75	1 20	1 20	80
Wareham	70@75	1 20	1 20	80

\* And discharging and towing. † And discharging. ‡ And towing. § 30c per bridge extra.

**Rates of Transportation on Anthracite Coal to Tide Ports.**

**Lehigh and Wyoming Coals.**  
 per ton of 2240 lb.

	From Penn. Haven.	From Mauch Chunk.	From Hazleton.	From Upper Lehigh.	From Ashley and Sugar Notch.
To † Newark, N. J. (117 miles) via Central Railroad of New Jersey . . .	1 36	1 22	1 80	1 11	1 92
† Mauch Chunk, Pa., via Central Railroad of N. J. . . . .	14	58	49	0	0
† Phillipsburg, N. J., 46 miles . . .	0	56	1 14	1 26	
Elizabethpt., 114 miles Pt., Johns., Hoboken & South Amboy, N. J., shipping and wharfage 15c. ad. . .	1 00	86	1 44	1 56	
High Bridge, N. J., Westfield & Elizabeth, Cranford, Westfield & Elizabethport, for consumption, . .	1 80	1 60	2 58	2 30	
Jersey City, N. J., (121 miles) and New York, via L. V. RR. . . . .	1 59	1 22	2 01	1 92	1 15

From Mauch Chunk to New York (121 miles), (towing limits); and Jersey City via Lehigh Valley RR. . . \$1 12  
 From Mauch Chunk to Philadelphia (93 m.) via L. V. and L. and S. RR. and North Penn. RR. . . 1 25  
 From Mauch Chunk to Philadelphia (92 m.) via L. V. and Perkiomen RR. . . 1 40  
 For way points between Mauch Chunk and Phillipsburg on the New Jersey Railroads . . . 1 00  
 From Phillipsburg, N. J., to Hoboken (84 m) for shipment via Delaware, Lackawanna & Western RR., Morris and Essex Division. . . 65  
 From Phillipsburg, A. J., to Newark (75 m) via Delaware, Lackawanna & Western RR. . . 66

\* Rates on line coal from Hazleton are 20c. per ton above these figures.  
 † The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be 51 c. per ton.

‡ On coal received by canal at Jersey City, a charge additional to the freight, of twenty cents per ton, will be made for transferring it from boat to boat, and thirty cents per ton for placing the same on the wharves and reshipping.

The distances in the above table are computed from Mauch Chunk. From Ashley to Mauch Chunk the distance is 51 miles, and from Upper Lehigh, 33 miles. From Hazleton 24 miles, and from Penn. Haven 8 miles.

From Wilkes-Barre to Perth Amboy via the Lehigh Valley Railroad Company, the distance is 161 miles, and from Mauch Chunk it amounts to 106 miles.

For rates of transportation on coal via the Erie Canal we refer to our issue of June 9.

For freights from Newbury and Rondout we refer to our issue of June 2.

For freights on Schuykill Coal we refer to our issue of June 16.

For freights on coal via Geneva, Ithaca and Sayre Railroad we refer to our issue of June 16.

Rates of Toll

For the above rates we refer to our issue of June 9.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, June 22, 1877.

American Pig.—The market wears a weaker appearance. We note a sale of an outside lot of 100 tons of No. 1 foundry iron at \$17.50 prompt cash.

Scotch Pig.—We note sale of 150 tons of Coltness, and 100 tons of Glengarnick on private terms; although it is intimated that the latter was sold at \$25.50.

Rails.—We only note a sale of 200 tons of iron rails on private terms for shipment from Amboy.

Old Rails.—Without business, we quote nominally at \$19.

Scrap.—No. 1 wrought scrap is very quiet at \$23 @24.

Baltimore, Md. June 22, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The iron market remains dull with no change worthy of note, and we continue last quotations as follows.

Baltimore Charcoal... \$29@31 Mottled and White... \$15@16 00

Boston. June 16, 1877.

Pig is very dull, and further concessions would have to be made to effect any sales of magnitude.

Bar is dull, quoting \$46@47 for refined, and \$37@38 for common. Nails are in light demand at unchanged prices.

Chattanooga, Tenn. June 19, 1877.

Specially reported by J. F. JAMES, dealer in pig iron, ores, etc.

The general tone of this market remains in the same unsatisfactory condition as last reported.

Tenn., Ala. and Ga. Charcoal, No. 1 Foundry... \$18 00@19 00

Cleveland, O. June 16, 1877.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

No. 1, L. S. Charcoal... \$25 00 Am. S., No. 1, Ch. Val. \$24 00

CAR WHEEL AND MALLEABLE IRON. No. 3 L. S. Charcoal... \$26 00

RESSEMER IRON. Nos. 1 & 2, L. S. Char. \$25 00

FOUR IRON. No. 1, Gray... \$20 00

Cincinnati, O. June 19, 1877.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

The following are the closing quotations of our pig iron market:

CHARCOAL. Hanging Rock No. 1 Foundry... \$25 00@25 50-4 mos

STONE COAL. Ohio, No. 1 Foundry... 22 50@23 00-4 mos

OHIO & W. VA. No. 1 Foundry... 24 00@-4 mos

COKE. Hanging Rock, C. B. Hecla, Vesuvius, Jefferson... 38 00@40 00-4 mos

LOUISVILLE, Ky. June 19, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co.

A heavy feeling still pervades the market, but there is more inquiry for foundry irons.

FOUNDRY IRONS. No. 1 Hanging Rock, Charcoal... \$24 00@24 50

MISSOURI, Mo. June 19, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of iron.

Our market is still very dull. Our standard brands are held firm at quotations and no disposition is manifested to make lower prices.

COLD BLAST CHARCOAL—ALL NUMBERS. Hanging Rock... 25@40

MISSOURI STONE COAL... \$23 00

MISSOURI CHARCOAL... 23 00

TENNESSEE CHARCOAL... 25 00

TENN. COKE VERY SOFT AND STRONG... 23 00

HANGING ROCK CHARCOAL... 26 00

ALICE HANGING ROCK COKE... \$25 50

QUINIMOUNT, W. VA., COKE... 25 00

Richmond, Va. June 18, 1877.

Specially reported by ASA SNYDER, Esq.

Virginia Cold Blast Charcoal Pig Iron, cold blast... \$21 to \$25

WARM " " " " neutral... 30 to 32

ANTHRACITE X... 21 to 22

COKE QUINIMONT X... 23 to 24

San Francisco, Cal.

From the Commercial Herald of June 14, 1877.

Recent imports of pig iron, tinplate, Sydney block tin, etc., have been large, and causing continued depression to the general market.

Our market is still very dull. No standard brands are held firm at quotations and no disposition is manifested to make lower prices.

ST. LOUIS, Mo. June 19, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of iron.

Our market is still very dull. Our standard brands are held firm at quotations and no disposition is manifested to make lower prices.

COLD BLAST CHARCOAL—ALL NUMBERS. Hanging Rock... 25@40

TENNESSEE... 28@30

KENTUCKY... 28@30

MISSOURI... 28@30

ALABAMA... 28@30

MISSOURI STONE COAL... \$23 00

TENNESSEE CHARCOAL... 23 00

TENN. COKE VERY SOFT AND STRONG... 23 00

HANGING ROCK CHARCOAL... 26 00

ALICE HANGING ROCK COKE... \$25 50

QUINIMOUNT, W. VA., COKE... 25 00

METALS.

NEW YORK, FRIDAY EVENING, June 22, 1877.

The market all through has been very quiet, most of the articles being very dull, and none showing a particular amount of activity.

GOLD COIN.—During the week under review the price of gold has ranged from 105 to 105 1/4, and closed at 105 1/4.

BULLION.—This market abroad has varied only about 1/2 d. this week, and seems to be awaiting the result of the proposed new India Loan.

PHILADELPHIA, Pa. Weekly Report of the Philadelphia Iron Market, furnished for THE ENGINEERING AND MINING JOURNAL, by JUSTICE COX, JR. & Co., Iron Merchants, 333 Walnut Street, Philadelphia, Week ending June 21, 1877.

PHILADELPHIA, Pa. June 12, 1877.

We quote: Pig Iron, Gartsherrie, \$20 to \$20.50; Summerlee, \$19 to \$19.50; Eglinton and Clyde, \$18.50 to \$19; Langloan \$19.25 to \$19.75; Coltness, \$20.25 to \$21; Hematite, \$23 to \$24; American, \$20 to \$21.

PHILADELPHIA, Pa. June 19, 1877.

Specially reported by A. H. CHILDS.

Any report of the metal market for this week must be simply a repetition of the last. But few of the mills are running, and the inquiry for pig iron is extremely limited.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK PER OZ.

Table with columns: Date, London Pence, New York Pence, Date, London Pence, New York Pence. Rows for June 16, 18, 19.

BULLION PRODUCTS FOR MAY.

We take, from various sources, the following, showing the bullion output of different mines for the month of May:

Table with columns: Mine, Location, Amount. Rows for California, Con. Virginia, Chollar Potosi, Justice, Tybo. Cons., Grand Prize, Empire, Hite, Minnetta, Modoc, New Coso, Bobtail, Leopard, Northern Belle, Standard, Ontario.

\*Returns to the 24th ult. †Approximate estimate.

**San Francisco Mint Coinage.**—The coinage at the San Francisco Mint, for the fiscal year ending with this month, was the largest for any one year since its establishment, amounting to \$46,101,500, of which \$32,552,500 was in gold, and \$13,549,000 in silver. To produce this amount it required 60 tons of gold and 323 tons of silver.

**Issue of Silver Coins in Russia.**—A St. Petersburg dispatch says an imperial ukase has been issued ordering the issue of 6,000,000 roubles in silver token currency. This is equal to about \$4,500,000.

**Tin.**—There is but very little business doing in this article, and under the influence of the late large arrivals, and others to follow, the market is weaker. The following are the quotations, in gold, per lb.: Straits 16¼c. @ 16½c., and to arrive 16c.; L. & F. 16c. @ 15¾c.; Refined, 16¼c.; Banca, 18¼c. @ 18½c.; and Australian, 16c. Straits in London is quoted at £68 10/, while at Singapore the price is \$19.40, with exchange at 4/ 13½. The shipments from the Straits for the first fortnight of this month were 150 tons to this country, and 50 tons to England.

Messrs. Von Dadelszen & North, of London, under date June 6, say: "Tin has been drooping during the past month; a temporary effort to advance prices proving but short lived. The position of the article, as far as statistics go, gets worse and worse. The short shipment from the Straits is more than made up by the large export from Australia, while deliveries continue moderate. The shipments of Straits and Australian to London during the first five months of this year have been 5,426 tons, against 5,409 tons last year, but the delivery has been only 4,090 tons, against 5,334 last year, while our stock here has increased from 7,475 tons in 1876 to 9,522 tons this year, and the quantity of tin afloat is now estimated at 3,000 tons, against 2,000 tons last year. Certainly the prices are lower: Straits £59 against £74; and Australian £68 against £74. These facts, coupled with the contemplated closing of tin plate works one week in three out of the next six months, does not make the future prospect a pleasant one for the holders of tin. The delivery of tin from Holland during May was of Banca 198 tons, Billiton 194 tons, while from warehouses here our delivery was 1,102 tons, exclusive of 573 tons which went through this port in transit to America. Our present quotation is Straits £69, Australian £68. In Holland the Trading Company's sale of 22,400 slabs Banca realized an average of 42½ fr. = £72 in London. The present quotation is 42 fr. for Banca and 41 fr. for Billiton. English tin is quoted £73 to £74 for ingots, £74 to £75 for bars. The following are the statistics of foreign tin, here and in Holland, compared with the preceding month, and the two preceding years:

	May 1, 1877.	June 1, 1877.	June 1, 1876.	June 1, 1875.
Banka on Warrants, Holland	950	1,468	1,408	985
Billiton, do., do.	1,154	1,166	923	722
Australian, do., do.	720	720	700	484
Foreign tin in warehouse, London	9,139	9,522	7,475	5,325
<b>Total available stock.</b>	<b>11,963</b>	<b>12,876</b>	<b>10,506</b>	<b>7,516</b>
Billiton afloat for Holland.	1,020	900	960	640
Straits afloat for London.	520	528	500	600
Australian afloat for London	2,000	2,558	1,500	1,000
<b>Total afloat.</b>	<b>3,540</b>	<b>3,786</b>	<b>2,960</b>	<b>2,240</b>
Banka arrived for coming sales.	850	214	1,426	2,406
Banka afloat per sailing vessels.	74	575		
			384	735
Price of Straits.	£69 10s.	£69	£74	£83

**Copper.**—We are reported sales of about 300,000 lb. of spot copper at 19½c., and 150,000 to 200,000 lb. next month's delivery, at 19¾c. There appears to be a little better feeling in this article. Chili bars in London are quoted at £67, and Wallaroo at £81.

Messrs. Von Dadelszen & North, of London, under date of June 6, say: "Copper has been quiet. Chili bars have fluctuated between £69 10/ and £68 10/, closing steady at £69. The arrival of Chili in Swansea and Liverpool during the month was 3,758, and the delivery, 3,536 tons. The charters for second half of April were 2,600 tons (of which 300 to the Continent). For first half of May, 1,500 tons (of which 50 to the Continent), and for second half of May, 1,500 tons to United Kingdom. In Australian, business has been limited, owing to the uncertainty as to what course the Wallaroo Company would take with the public sale of their copper. Holders have been very cautious, and transactions difficult to arrange; quotations almost nominal, £77 to £78. It is now almost impossible to get spot parcels. A sale was made on the 4th at £77 for delivery in three months' time, since which higher prices have been talked of. Burra sold at £74 10/, and is now quoted at £75 10/. English has been steady at about £75 to £76 for tough; £77 to £78 for select; and £81 to £82 for sheets. At the Swansea ticketing yesterday, Cape ore realized 13/9½d., the average of the sale being 13/4d. The following are the stocks:

	May 1, 1877.	June 1, 1877.	June 1, 1876.	June 1, 1875.
Stock, Liverpool & Swansea	15,305	15,527	10,806	12,756
" Have	9,382	6,735	3,955	1,555
" London	4,634	4,702	6,030	7,837
Chili produce afloat and chartered by mail & cable	29,321	28,962	20,791	22,148
"	11,500	11,000	12,150	10,200
<b>Total</b>	<b>40,821</b>	<b>39,962</b>	<b>32,941</b>	<b>32,348</b>
Australian afloat	2,418	1,081	1,700	2,900

**Tin Plates.**—A very good jobbing demand continues to be done in these. We quote, in gold, per box, as follows: Charcoal tins, \$6.50 @ \$6.75, and ternes \$6 @ \$6.12½; Coke tins, \$5.75 @ \$6, and ternes, \$5.50 @ \$5.62½.

Messrs. Robt. Crooks & Co., of Liverpool, under date of June 7, say of tin plates: "Makers on the strength of their reduction of make, have all round put up their prices, but this advance buyers are not paying, and at date almost no business is being done. There is little doubt that the majority of the works have orders sufficient to last through this and part of next month, while some are booked even further ahead. This being so, rates will likely be maintained for a month or so, and the course of the market after that will depend on buyers' power or want of power to keep back purchases."

**Lead.**—Without business we quote at 5/65c. @ 5/70 c., although it would be impossible to sell a large lot at these figures. The San Francisco Commercial Herald of the 14th inst. reports the departure of the Dauntless for this port with 614,361 lb. of pig lead. This vessel is not expected to arrive until October.

**Spelter and Zinc.**—Considerable business is reported to have taken place in spelter in the West, which has resulted in a firmer market here, although no business is doing. We quote nominally at 6c. Sheet zinc is higher, being quoted at about 7c. Some of the Western rollers have found a price equal to 6/30c., delivered here, was ruinous. The Lancaster, Pa., Zinc Company, has closed its works for the present.

**Antimony.**—With a moderate business is quoted at 11½c. @ 11¾c. gold, although sales have been made during the week at a lower figure.

**Quicksilver.**—The San Francisco Commercial Herald, of June 14, says of this article: "The spot supply in the market last week was well nigh exhausted by the heavy shipment to Hongkong, per the Gaelic, 3,786 flasks having been forwarded by that steamer; the closing price for same, 42c. Since then very little business has been transacted, the heat being too oppressive for any active out-door operations."

**SALT LAKE ORE AND METAL MARKET.**

SALT LAKE CITY, UTAH, June 22, 1877. (Argentiferous Lead Base Bullion).—\$60 to \$65 per ton for lead. \$1.18½ per ounce for silver. \$20 per ounce for gold. The quotations for silver are based upon the silver contents in the head of 70 ounces per ton of 2,000 lb.

Mr. J. B. Meader, under date of the 16th inst., reports the following shipments:

	Pounds
Shipments of Base Bullion for May	3,332,362
Shipments of Base Bullion for four months	16,761,236
Total for five months	20,093,598
Ore shipments for May reduced to Lead	622,300
Ore shipments for four months reduced to Lead	3,113,161

Total shipments of Lead for five months ..... 23,829,059

The Inter-Ocean's correspondent, under date of the 14th inst., says: "A sale of ten cars of bullion is reported to-day, but the terms are not made public. It averages ninety ounces in silver. An offer was made to-day for ten cars of fifty-ounce bullion at \$60 per ton for lead, and \$1.17 per ounce for the silver. Beyond this nothing has been done in bullion in way of sales for thirty days.

"The shipments of lead ore from Bingham Canon via B. C. R. R. Co., for the week ending June 7, was 1,134,945 pounds. This very small business is owing to the depressed state of the ore and bullion market. "The shipments of ore and bullion for the week ending June 9 are as follows: To Omaha, 5 cars bullion; Pittsburg, 5 cars; New York, 26 cars; Philadelphia, 4 cars; lead ore to Chicago, 6 cars; Pittsburg, 9 cars; total bullion, 861,640 pounds; lead ore, 310,920 pounds; grand total, 1,172,560 pounds. The 26 cars of bullion to New York went by the way of San Francisco at a saving of \$4 per ton. The mining men and smelters regard the rates of Eastern freights on ore and bullion as altogether too high, and they have decided to make an effort for a reduction in tariff rates. The actual freight via San Francisco is about \$6 less than present rates direct, and it is said a lower rate than this can be had if we agree to ship all that way. Insurance and extra interest on the money amounts

to about \$2 per ton. We sincerely hope the railroads will see the justice of our demands, and meet us fairly in the matter. The present low price for lead we cannot meet, and are compelled to ask some consideration.

"Shipments to New York via San Francisco are being made on smelters' account. It is to be hoped that our railroad friends will appreciate our position and make a compromise of some kind whereby we can meet the New York lead market. If they don't do it we shall, in self-defense, be obliged to do our business with New York, Philadelphia, Newark, and Baltimore via San Francisco. Last year we imported from the East 7,500 tons of Pittsburg coke; cost laid down here about \$30 per ton on the average. One of our largest smelters has ordered 1,000 tons English coke, soon to arrive in San Francisco by sailing ships, that will only cost \$21 per ton laid down at the furnace.

"The margin for profits on all business is small, and in lead it is particularly so, and a careful curtailment of expenses most imperative."

**Mineral Point, Wis., Zinc and Lead Shipments.**—Fifty-one car loads of ore were shipped from this place over the Mineral Point Railroad during the first week in June, and 14,960 tons during the year 1876. The shipments of lead last year were over 3,000,000 pounds. The Mineral Point Road, thirty-two miles long, is doing finely for a short road with no northern outlet.

An immense quantity of lead in the pig is piled up here, awaiting an advance in the price. Unlike the several branches of the Peconic, lead is "clear down."

**Miscellaneous Sales and Quotations.**

Sales and quotations of the stocks and bonds dealt in here and at Philadelphia, for the week ending the 22d inst., are given in the following tables. The Philadelphia quotations will have a \* affixed.

STOCKS.		QUOTATIONS.			
	High-est.	Low-est.	Clo-sing.	Sales Shares.	
American Coal Co.	—	—	25	—	
*Cambria Iron Co.	—	—	50	—	
*Pennsylvania Salt Manf'g Co.	—	—	64	—	
*Westmoreland Coal Co.	—	—	60*	—	
*Buck Mountain Coal Co.	—	—	40	—	
*Schuylkill Nav. Co.	—	—	—	—	
St. Louis, I. M. & S. RR. Co.	5½	5	5	400	
Spring Mountain Coal Co.	—	—	75*	—	
BONDS.		—	—	101	—
D., L. & W. 7s. Conv., 1892 J. & D.	—	—	—	—	
" " 2d mtge., 1881 F. & A.	—	—	—	—	
N. J. C., 1st mtge., new F. & A.	110	109	108	\$48,000	
" " 1st mt., cons. 1893 Q.	59½	—	58	2,000	
" " Conv., 1880 M. & N.	—	—	53	—	
L. & W. B. Coal Co., cons. Q.	23	22½	22¾	10,000	
Am. Dock & Imp. 7s. J. & J.	—	—	41	—	
D. & H. C. Co., 1st mt., 1884 J. & J.	92	—	—	3,000	
" " " 1801 J. & J.	—	—	—	—	
" " " 1877 J. & J.	—	—	—	—	
" " " reg., 1894 A. & O.	84¾	—	—	12,000	
" " " coup., 1894 A. & O.	—	—	—	—	
St. L. I. M. & S., 1st mt., 1892 F. & A.	—	—	99	—	
Che. & Ohio, 1st mt., 1890 Q.	—	—	21	—	
*L. Y. RR., con. m. 6s, 1893 J. & D.	90	—	—	6,000	
" " 2d m., 7s, 1890 M. & S.	109½	109	109¾	3,000	
" " reg., 1898 J. & D.	—	—	10 ½	—	
" " coup., 1889 J. & D.	106¾	—	106	3,000	
*P. RR., 1st mtge., 1880 J. & J.	—	—	—	—	
" Gen. mtge., reg., 1890 A. & O.	106½	106	106	3,000	
" Con. m. 6s. con., 1905 J. & D.	—	—	93	—	
" " reg., 1895 Q.	93½	—	93½	6,000	
" gen M. Coup., 1890 J. & J.	107¾	—	107¼	2,000	
" New Loan 5s ..... J. & J.	107¾	107	—	7,000	
*P. & R. RR., 7s, 1893 A. & O.	106¾	—	106	4,000	
" " con. m. 7s. con., 1911 J. & D.	91½	—	92	6,000	
" " Deb. 6s, 1893 J. & J.	—	—	—	—	
" " New convt. 7s, 1893 J. & J.	—	—	40	—	
" " Con. mtge. 7s, reg. J. & D.	91½	—	91½	6,000	
" " 6s, 1880 J. & D.	—	—	104	—	
*P. & R. C. & I. Co. Deb. 7s M. & S.	—	—	—	—	
*P. & R. C. & I. Co. .... M. & S.	—	—	50	—	
*L. C. & N. Co. 6s, 1884 F. & Q.	102	—	109	3,250	
" " RR. loan 1897 F. & Q.	—	—	99½	—	
" " Con. mtge. 7s, J. & D.	—	—	—	—	
" " Cvt. gold, 1894 M. & S.	—	—	—	—	
" " Gold Loan, 1897 J. & D.	84¾	—	85½	500	
*Schuylkill Nav., 6s, 1897 M. & Q.	—	—	—	—	
*Pa. and N. Y. Canal, 7s. J. & D.	107¾	—	107	3,000	
*Pa. Canal Co. .... J. & J.	—	—	—	—	
*Susquehanna Coal Co. 6s. J. & D.	—	—	—	—	

Total transactions for the week ..... \$133,050

**FINANCIAL.**

**New York Stocks.**

New York, Friday evening, June 22, 1877.

The business in the coal stocks during the week under review have not been near as large as during the previous one. The sales of Delaware & Hudson Canal have amounted to 33,950 shares at prices ranging from 26½ to 31½, and closing at 30½. This stock has been very firm during the past two days under anticipations of a favorable report from the committee now examining the condition of this company. Delaware & Lackawanna & Western Railroad has ranged from 34½ to 32, closing at 33½, with total sales for the week of 209,825 shares. The announcement of an auction sale of coal by this company, to take place next Wednesday, had a temporary effect of depressing the stock. New Jersey Central Railroad has been very quiet at 6½ to 7. We note an extraordinary decline in Pennsylvania Coal Company stock, 168 shares selling at \$125 per share to-day, as against \$180 per share on the 17th ult. The beginning of the year this stock was worth about \$250. When the coal war can reduce the value of this stock to one-half in a few months, what may be expected for those companies which have no surplus fund and are loaded down with debt?

Baltimore & Ohio R. R.—The decline in the shares of this stock in Baltimore on the 20th inst. to \$80 per share, or 20% below its par value, has been the princi-

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

Table with columns: Name and Location of Company, Feet on Vein, Capital Stock, Shares (No., Par Val.), Assessments (Total levied to date, Date and amount per share of last), Dividends (Total paid to date, Last Dividend, Rate per Ann., Fr. ct.), Highest and Lowest Quo. per Share in Currency (June 16-22), and Sales. Includes sub-sections for Coal Stocks, General Mining Stocks, and Boston Stocks.

Gold. s. Silver. L. Lead. c. Copper. \*\* Non-Assessable. Total Assessments levied to date \$41,134,610 Total Sales of Coal Stocks for the week 350,266 shares. Total Dividends disbursed to date 155,443,320 Total Sales of Mining Shares for the week 73,570. We are without our quotations of the Boston Copper Stock Market. \*Ex. Dividend.

ment feature of the week. It has since recovered, and is quoted at 95. The Philadelphia Ledger of to-day says: "A year ago Baltimore and Ohio Railroad shares were quoted at from 190 to 195, with free bidders and few sellers. Such has been the confidence felt in the stability and prosperity of the company that the break in the market has taken the local holders by surprise. Competition in railroading is fast driving the companies of the country into bankruptcy,

and in the absence of a better spirit the next and only result will be consolidation. The "pooling" of the trunk lines is a step in that direction, and may be followed by a common ownership of one and all of them." A special dispatch from Baltimore, to the New York Times, dated the 20th inst., says: "President Garrett is reported to be bearing the stock, and is said to be the purchaser of nearly all the 300 shares which

were sold out to-day. There is great alarm, however, among the many in the city who hold the stock for investment, and are frightened at the prospect of losing their income. The revenues of the Johns Hopkins University, which was endowed with these securities, depend entirely upon such endowment, and there is much anxious questioning as to whether or not the road will pass the dividend due in November. The chief officials of the Baltimore and

Ohio absolutely refuse to say a word concerning the situation. They have been curtailing expenses lately by cutting down salaries and reducing the number of employes. The great workshop at Mt. Clare, on the verge of the city, cut down the force employed yesterday."

The Evening Post of to-day says: "Baltimore and Ohio stock is up to 95, according to despatches this afternoon. We are told that the entire transactions in Baltimore and Ohio stock at the Baltimore Stock Exchange since June 1st have not amounted to 2,000 shares. We knew that the Baltimore market was a small one, but did not suppose that there was any market which boasts of a Stock Exchange where 2,000 shares of a trunk line stock could be used so effectively in changing prices."

Central Railroad of New Jersey.—It is said that the present instalment of the back pay was not paid with the current wages for May, as expected, and a committee of the employes was appointed to confer with the receiver, in consequence.

The wages of the employes on the Lehigh & Susquehanna Division are to be reduced 10 per cent. It is not stated whether the enginemen and firemen are included in the reduction.

St. Louis, Iron Mountain & Southern Railroad.—In the matter of the application of the United Trust Company for the appointment of a receiver, the United States Circuit Court has decided to refuse the order asked for, on the grounds that the evidence is not sufficient to justify the court in appointing a receiver or in interfering with the present management.

Philadelphia Stocks.

PHILADELPHIA, FRIDAY EVENING, June 22, 1877.

A steadier feeling is manifested in the range of quotations of the coal shares during the business of the week on the Philadelphia market. The prices to-day are at nearly the same figures as reported at the close in our last. The sales of Pennsylvania Railroad stock amount to 85,953 shares, 28 1/2 and 30 3/4 being the extreme prices and 29 1/4 the closing quotation to-day. Philadelphia & Reading stock has been very sparingly dealt in, the total sales amounting to only 1,781 shares. But little change is noticeable in the price of this stock, 1/2 per cent. representing the extreme range for the week. Lehigh Valley Railroad stock closes at 30, equal to an advance of 3 per cent. for the week. The sales amount to about 7,000 shares.

River Oil Co.—The Directors of this company have declared a dividend of balance in hands of Treasurer. Holders of certificates of stock of this company will receive the same on presentation of their certificates.

Auction sales of Bonds during the week have been as follows:

Lehigh Coal and Navigation Co., \$6,444.55 of the 6 per cent. loan of 1884 @ 101 1/4 per cent.

Lehigh Valley Railroad Co., \$10,000 first mortgage 6 per cent. @ 106 1/4 per cent.

Philadelphia & Reading Coal and Iron Co., \$7,500 purchase money 6 per cent. mortgage bonds @ 30 per cent.

Shamokin Valley & Pottsville Railroad Co., \$1,000 first mortgage 7 per cent. bonds @ 90 per cent.

United N. J. Railroad and Canal Co.—This company has declared a quarterly dividend of 2 1/2 per cent., payable July 10.

Copper Stocks.

Reported by Wilson W. Fay & Co., Bankers and Brokers, Room 7, Traveler Building, 31 State Street, BOSTON, THURSDAY EVENING, June 21, 1877.

The market closes this evening with no apparent change in the state of affairs from last week. There has been some trade in a few of the stocks, but in the others there has been very little doing. Calumet and Hecla has had a little fluctuation, but the price of the stock has not materially changed, it closing this evening at 168 1/4 bid, and 170 asked.

Copper Falls has had an assessment levied of \$2.00 per share, payable June 30th, 1877, by stockholders of record of June 20th. The announcement of the assessment does not seem to affect the stock a great deal, there being a steady bid of \$3.00 per share and 3 1-16 asked. The assessment was felt sometime before it was announced, and for that reason the stock run down to the present figures. On Franklin there has been scarcely a trade since last week, and it closes at \$7.00 bid and \$8.00 asked. Quincy has been more quiet than usual, it closing at \$35.50 bid, and \$36.00 asked. There has been some Central selling at 39, and it closes at 38 1/4 bid and 39 1/4 asked.

Most of the mines cannot afford to get out copper at the present price, viz.: 19 1/4 cents per pound, and therefore are making nothing and unable to pay a dividend. The market taken all together has a weak tendency.

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, June 22, 1877.

The transactions on the American Mining Board continue in amount about as they have been for several weeks. Confidence was considerably upset early in the week, by those who had been maintaining the Memphis withdrawing their support and letting it decline to 75c. per share on a 100 share lot. The previous sale was on Saturday, 100 shares at \$2 per share. The sales of Moose aggregated 16,700 shares, at 3 3/4 @ 4 1/4, closing at 4 1/4. Until Wednesday the Leopard ranged from 2 3/4 to 3 1/4, with no transactions on Thursday, and but 100 shares, seller 30 days, at 2 3/4 to-day. The total sales of this stock for the week were 5,800 shares. The Comstock stocks have received liberal attention and closed weak, although the San Francisco market is re-

ported, by telegraph, as being very strong, with quotations considerably above those in this market. The process of consolidating the two mining boards appears to go on satisfactorily.

NEW YORK MINING STOCK EXCHANGE.—The total sales for the week amount to 17,910 shares, a falling off as compared with last week of 16,971 shares:

Table with columns: Stock Name, Shares, Price. Includes Atlantic (1,750 shares @ \$7.00), Central (300 shares @ \$39.75), National (500 shares @ \$25.00), Franklin (100 shares @ \$5.00), Calumet Hecla (10 shares @ \$170.00).

Closing Quotations.

Table with columns: Bid, Asked, Bid, Asked. Includes Allouez (3.00 bid, 6.00 asked), Atlantic (6.75 bid, 7.00 asked), Cal't Hecla (168.00 bid, 170.00 asked), Central (38.00 bid, 39.75 asked), Franklin (5.00 bid, 10.00 asked), Madison (.. bid, .. asked), Mesnard (50 bid, 100 asked), National (20 bid, 37 1/2 asked), Osceola (16.00 bid, 20.00 asked), Quincy (1.00 bid, 2.00 asked), Pewabic (33.00 bid, 35.00 asked), Ridge (2.00 bid, 3.50 asked).

Gas Stocks.

NEW YORK, FRIDAY EVENING, June 22, 1877.

Gas stocks are very dull; we lower the quotations of the Manhattan of New York, and the Citizens of Brooklyn, otherwise there are no changes:

Nyack and Warren (N. Y.) Gas Company.—150 shares of the stock of this company, par-\$100, were sold at auction during the week for \$200.

Manhattan (N. Y.) Gas Company.—20 shares of the stock of this company were sold at auction during the week at \$195 per share.

The Alexandria (Va.) Gas Company has reduced the price of gas to \$2.25 per 1,000 feet; these works are now owned and operated by the city.

Albany and West Troy (N. Y.) Gas Works.—The station metre on the Albany road, near Menand's, is nearly completed, and Albany gas will be transmitted through it to the West Troy mains on July 1.

The Fredericton (N. B.) Gas Company held its annual meeting on the 14th inst. The company is improving its works by the erection of a new and enlarged tank and gas holder. The whole expenditure on the works up to date is over \$31,000, which is considerably in excess of the paid up capital. The directors in their report recommend the stockholders to have an inspection of the works and system of management made by a competent person, "with a view to the introduction of such improvements as will conduce to efficiency of operation and economy in management; ensure a fair return for the capital invested, and at the same time satisfy consumers that the object of the directors is to benefit their interests, as well as the interests of the stockholders."

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The St. Johns (N. B.) Gas Works were burned to the ground at the disastrous conflagration in that city on the 20th inst.

Northern Liberties Gas Company.—10 shares of the stock of this company, par-\$25, were sold at auction in Philadelphia during the week at \$40 per share.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRATTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and vicinity.	Capital Stock.	Par.	Dividends.		Quotat'ns		
			Rate per an.	Date of last.	Bid.	As'd	
Mutual, N. Y. ....	5,000,000	\$100	10%	2 1/2	Apr. '77	92	95
"  Gold Bonds	90,000	1,000	7%	3 1/2	Feb. '77	107	107
N. York " .....	4,000,000	100	10%	5	May '77	130	132 1/2
Metrop. " .....	2,500,000	100	10%	5	June '77	130	132 1/2
"  "  Certif.	1,000,000	100	7%	3 1/2	"	108	108
"  "  Bonds	500,000	1,000	7%	3 1/2	"	108	108
Harlem " .....	1,850,000	50	8%	4	Feb. '77	98	104
Manhat. " .....	4,000,000	50	10%	4	Feb. '77	190	195
Brooklyn, B'klyn.	2,000,000	50	15%	5	Feb. '77	150	160
Nassau, " .....	1,000,000	25	10%	4	Jan. '77	80	80
"  "  Certif.	700,000	1,000	7%	3 1/2	May '77	95	100
People's, " .....	1,000,000	10	10%	3 1/2	Jan. '76	—	40
"  "  Certif.	300,000	1,000	7%	3 1/2	Jan. '77	80	85
"  "  B'ds	325,000	—	7 1/2%	3	Feb. '77	90	96
Metrop. " .....	1,000,000	10	5%	2 1/2	May '77	68	73
Wmsb'rg " .....	1,000,000	50	10%	3	Apr. '77	120	126
"  "  Certif.	1,000,000	—	7%	3 1/2	Jan. '77	100	102
Citizen's " .....	1,200,000	20	10%	4	Jan. '77	70	80
"  "  Certif.	320,000	1,000	7%	3 1/2	Apr. '77	95	97
J. C., N. J. ....	750,000	20	10%	5	Jan. '77	160	—
Cent. Westch. N. Y.	466,000	50	7%	4	Jan. '77	85	90
Subur'n " .....	295,000	50	7%	3 1/2	Apr. '77	90	100

‡Paid irregularly.

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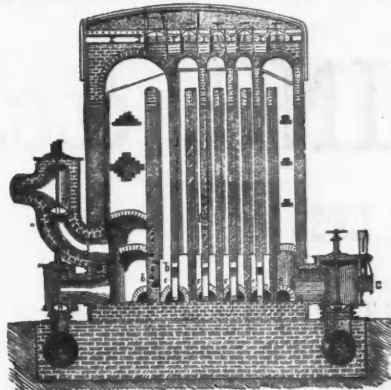
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Buena Vista Furnace, Ky., 3 stoves in blast.  
Meir Iron Co., St. Louis, Mo., 3 stoves.  
Southern States Coal, Iron, and Land Co., Tenn., 8 stoves.  
Crane Iron Co., Pa., 3 stoves.  
Penna. Steel Co., Pa., 3 stoves.  
Norton Furnace, Ky., 4 stoves.  
H. Campbell & Sons, Ohio, 3 stoves.  
Ashland Furnace, Ky., 3 stoves.  
Milton Furnace, Ohio., 3 stoves.  
Ogden Iron Co., Ohio., 3 stoves.  
Winona Iron Co. Ohio, 3 stoves.  
Moss & Marshall, Ohio, 3 stoves.  
Harford Furnace Co., Md., 2 stoves.  
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145th Auction Sale.  
125,000 TONS SCRANTON COAL.  
On WEDNESDAY, June 27, 1877.

NEW YORK, June 20, 1877.

THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD CO. will sell, by Messrs. JOHN H. DRAPER & CO., Auctioneers, at the Company's Sales-room, 26 Exchange Place, corner of William Street, New York, on Wednesday, June 27, at twelve o'clock, Noon,

125,000 TONS OF COAL,

from the Lackawanna Regions, of the usual sizes, deliverable at Hoboken, during the month of July, 1877. The sale will be positive; each lot put up will be sold to the highest bidder.

No Bids, in any form whatever, being made for account of, or on behalf of the Company.

The conditions will be fully made known at the time of sale.

TERMS—FIFTY CENTS PER TON, payable in current funds, on the day of Sale, and the balance within ten days thereafter, at the office of the Company.

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CHAS. DEERING, President  
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Company's Office,  
43 Chatham Street, Boston.

About \$120,000 of the stock already sold. Ore has been assayed at the Philadelphia mint, by the School of Technology, Boston, by E. Longman's Sons, New York, by F. L. Bartlett, State Assayer of the State of Maine, and by Prof. J. Manes Sr., of New Haven, Conn. The ore has rated by these several assays, from \$57.18 to the ton of 2000 lbs. to \$228.74.

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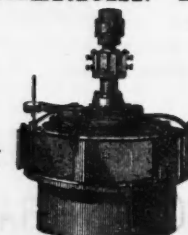
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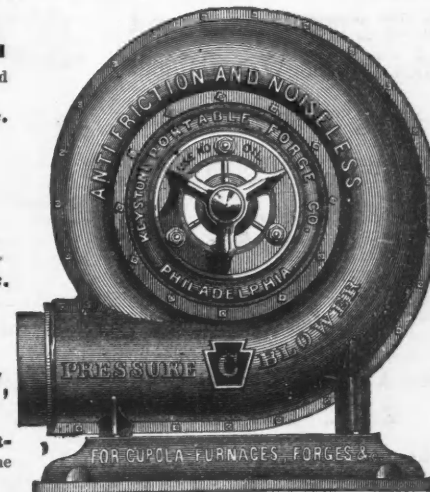
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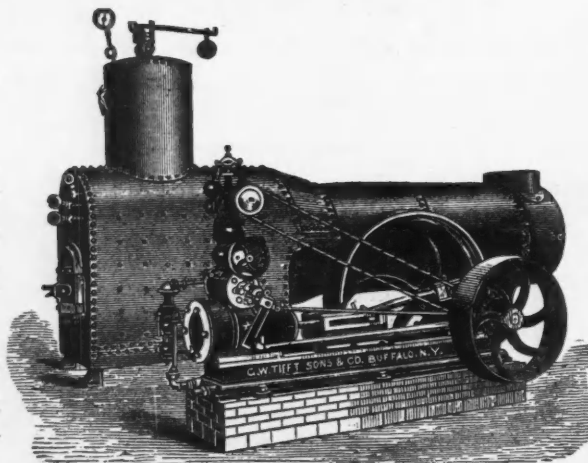
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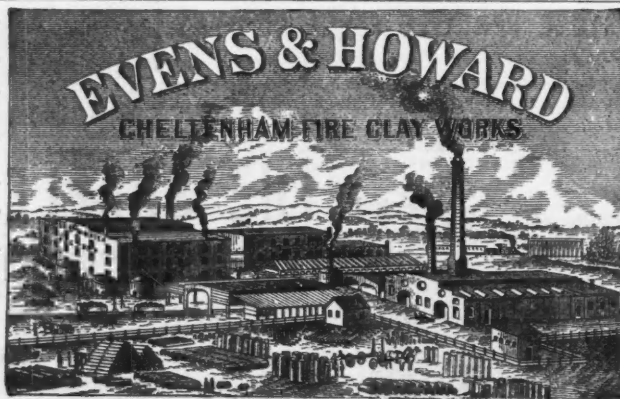


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