

THE ENGINEERING AND MINING JOURNAL.

RICHARD P. BOWWELL, C. E., M. E. } Editors.
 ROSSITER W. RAYMOND, Ph. D.

NOTE.—Communications relative to the editorial management should be addressed to Mr. BOWWELL. The articles written by Mr. Raymond will be signed with a star.

CONTENTS.

EDITORIALS :		
The Meeting of the Institute.....	149	Lease of the Lehigh & Wilkes-Barre Coal Company.....
The Delaware & Hudson Canal Company.....	149	Report of the Union Pacific Railroad.....
Rock Drills at the Philadelphia Exhibition.....	150	Basis for Miner's Wages in Schuylkill County.....
The Future of Stars.....	151	Alluminum.....
American Institute of Mining Engineers—Official Report of the New York Meeting.....	152	Tissue Glass.....
The Delaware & Hudson Canal Company.....	153	STATISTICS OF COAL PRODUCTION.....
Report of the Lehigh Coal & Navigation Company.....	154	COAL TRADE REVIEW.....
Abstracts of Lectures on Mining—No. XXXI.....	155	IRON MARKET REVIEW.....
The Coal and Iron Ores of South-Eastern Ohio.....	156	METALS.....
MINING NOTES :		FINANCIAL :
The Comstock Mines.....	156	New York Stocks.....
		Philadelphia Stocks.....
		Copper Stocks.....
		Gold and Silver Stocks.....
		Gas Stocks.....
		Advertisements.....

"THE ENGINEERING AND MINING JOURNAL" ADVOCATES THE ADOPTION OF THE METRIC SYSTEM OF WEIGHTS AND MEASURES.

and urges all who are interested in the simplification of our present complicated and unsatisfactory systems to aid, by their active sympathy and encouragement, the early introduction of this much-needed reform.

THE MEETING OF THE INSTITUTE.

The February meeting of the Institute of Mining Engineers will be remembered as one of the most important, as well as enjoyable, in its history. The attendance was large—unusually so for a winter meeting; the papers were numerous and valuable; the debates were interesting, even to the point of excitement; the excursions were pleasant, profitable, and, if we may count among the number the visits to the laboratories and collections of two great schools, quite up to the average in point of number; and finally, the social features of the meeting were in the highest degree delightful.

The two most important events of the sessions, in our opinion, were the enforcement of the rules and policy of the Institute on the subject of resolutions, and the debate on the International Nomenclature of Iron and Steel. The first of these, occurring at the very first session of the meeting, exerted a controlling effect on all subsequent proceedings; and if strictly maintained, as we trust it will be, promises to produce much good and prevent much trouble in the future. The history of it is this. At the meeting of the Council, previous to that of the Institute, it was found that the Secretary had received from different members a considerable number of resolutions, proposed for the consideration of the Institute, with the purpose of eliciting the opinions and enlisting the influence of that body with regard to various subjects. Since the resolutions contained nothing objectionable, the Council felt bound to lay them before the Institute, particularly since, at former meetings, resolutions had been passed by the Institute endorsing various worthy objects. But the members of the Council, as individuals, desired that the precedents of the past should be repudiated, because they had in reality gone beyond the proper functions of the Institute.

The presiding officer, after laying the resolutions before the Institute, as directed by the Council, declared them out of order, because, in his judgment, the Institute could not, under its rules or according to its nature, pass resolutions declaring opinions or taking or recommending action on any subject outside of the conduct of its own proceedings and publications. The grounds of this ruling, substantially as stated to the Institute, will be found in the report of the proceedings. We need not say that they appear to us conclusive. The organization and rules of the Institute as now formulated do, in our judgment, positively exclude declarations of opinion on questions of science, practice or policy put forward on the authority of the whole body. If our view of the rules were other than this, we should certainly favor an amendment establishing this wholesome restriction.

It cannot be denied that the centennial year conferred upon the Institute a sudden and great reputation. It rose from a comparatively obscure position to the recognition of foreign governments, of technical societies, and of professional authorities in all civilized countries. It is natural that persons enthusiastically interested in schemes directly or indirectly connected with mining and metallurgy should desire to enlist the influence of such a body in behalf of their views. But it is equally clear that if the Institute should go on endorsing "good things," there would be no end to the applications which might be made, and it would be very disagreeable business to refuse any application, since the only ground of refusal would be the inappropriateness or otherwise objectionable character of the thing asked. Conflicts, heart-burnings, much waste of time, and finally a loss of real dignity and influence by reason of a series of empty fulminations of opinion, would be the consequence.

The Institute has hitherto been, in the main, specially careful of the interest,

of those members who cannot regularly or frequently attend the meetings. For their sake it is that the objects of the Institute are clearly defined, and its funds rigidly devoted to those objects. We can easily imagine a member residing in Colorado or California, saying: "I joined the Institute in order to maintain a pleasant relation with my professional colleagues, and to exchange information with them through the medium of the publications. I did not join it for the purpose of endorsing, directly or indirectly, any propositions, plans, opinions, processes, theories or measures whatever. In the management of its legitimate business the Institute may act through those present at any regular meeting, and I shall feel bound by their decisions; but on matters outside of those prescribed limits, I have never consented, and I do not now consent, to be thus bound."

If, to meet such a protest, the plan be suggested of sending resolutions to members and obtaining their votes by mail, we can easily imagine the reply: "I do not wish to be forced to consider, decide and vote upon questions some of which I do not understand, others of which I do not care about, while as to all of them I declare that I did not join the Institute in order to vote down the opinions of my fellow-members, or have my own voted down by them."

The good effect of this restriction was visible in the sessions of the late meeting, and particularly in the discussion of the International Nomenclature for Iron and Steel. The debate on this subject was exceedingly earnest; but the knowledge that the Institute would not in any event attempt to dictate to manufacturers or legislators or writers of books, deprived the contest of bitterness. As will be seen by the reported proceedings, the Institute merely recommends to its own members and associates the use, in its own papers and proceedings, of the new nomenclature, and adds an explanatory clause as to the significance of the terms employed. The preamble reported by the International Committee is neither endorsed nor condemned. It contains assertions as to the characteristics of steel which could not be unanimously endorsed by the members of the Institute, and which are not required, but are rather, by implication, even contradicted by the nomenclature which the committee recommended. The fact that the resolutions were finally adopted (if we are correct in our recollection) by a unanimous vote, is proof of the wisdom of limiting the action of the Institute as we have indicated.

The explanatory clause, "It being understood that ingot iron and ingot steel, taken together, constitute what is commercially known as cast steel, including the so-called low or soft cast steels," seems to have satisfied the representatives of the manufacture, while the distinction made by the committee is satisfactory to chemists, physicists and metallurgists generally.

As to the terms "weld iron" and "weld steel," they were deemed unnecessary and awkward innovations; and in this particular the report was referred again to the committee, with the suggestion that other terms should be substituted. No other terms were named in the resolution adopted; but the sense of the meeting was evidently in favor of the terms "wrought iron" and "wrought steel," as already familiar, and equally clear in meaning. It was scarcely necessary to refer the report back to the committee for so slight a change; but the extreme delicacy of feeling exhibited by some of the speakers in the debate seemed to impress the Institute with the notion that it would be disrespectful to a committee to amend its report.

Other features of the meeting deserve notice; but we have exhausted our space for the present.

THE DELAWARE AND HUDSON CANAL COMPANY.

An esteemed and well informed correspondent who has his information from high sources, objects to our criticism of the Delaware & Hudson Canal Company as unfair, and though our figures and facts are not attacked, our course in calling attention at this time to omissions in the directors' report, which are calculated to inspire distrust, is objected to as endangering the interests of numerous stockholders, and as increasing the prevailing doubts about the value of the company's securities. We need scarcely say that our criticisms are always "independent," and, so far as our knowledge goes, fair and reliable. These facts, we believe, are unquestioned by those who are acquainted with the ENGINEERING AND MINING JOURNAL, but we can readily admit that our judgment may be at fault in any particular case, for, unfortunately, we are none of us infallible. We have judged the Delaware & Hudson by a rule that applies equally well to other companies.

It is not without cause that the public demand that the directors of public companies shall make full and intelligible public reports, and when they neglect this bounden duty, it is the place of public journals—which are, in a measure, the guardians of the oppressed—to remind them of their obligation, and to criticise where the facts demand it such statements as they do make. The very fact that the stock of the Delaware & Hudson Canal Company "is held in small lots all over the country by guardians, widows and children, trusts, and people in moderate circumstances who invested all their savings in it," makes it all the more important that the actual condition of the company, and the value of its property, which is the security for these hard-earned savings, should be given with the utmost fullness. The company has not given this necessary information, and has thus concealed facts which would show that it is perfectly solvent, and thus at once re-establish confidence in it and its management; or, if these facts were unfavorable, and should show, for example, a state of things which, if continued, would land the company where New Jersey Central is to-day, then these numerous and deserving stockholders could

take measures in time to remedy the difficulty, and not have to wait for their knowledge till their money had been wasted, and they were left penniless. Where a company is conducted on the personal confidence plan, it is usually wrecked because of lack of ability or integrity on the part of those confided in too implicitly. With the innumerable examples of honest mismanagement and dishonest over-management with which all are familiar, one would have supposed it unnecessary to insist upon the necessity for full reports as a measure of safety to the stockholders and to the management itself.

Our correspondent facetiously says: "Now, you know as well as I do, I presume, that this company is perfectly solvent, sound as a dollar," etc. But that is exactly what one cannot find out from the published report. Let our correspondent put himself in the place of the average stockholder, "the widows and children, the trusts, and people in small circumstances," and, taking for his sole data the report the company has published, endeavor to ascertain whether Delaware & Hudson stock is a safe investment at 75, as he suggests, or at 50, or at 40, or at any other figure. Does the report show the company to be better off than the special report issued by the New Jersey Central a few months before it went into the hands of a receiver showed that company to be? And do the officers of the Delaware and Hudson stand any higher in public estimation than did Mr. JOHN TAYLOR JOHNSON—or have they any more confidence in their company than he had in his when he invested his entire fortune in its stock? These and other reasons make it impossible for us, with no more information than this company gives in its reports, to say that it is solvent, or that its stock is a good investment at present rates.

It is true, we personally know, that the Delaware & Hudson Canal Company owns a very valuable coal estate, but the average stockholder does not know this, for there is no information given with regard to it in the company's report.

We are not quite certain whether our correspondent desires to be sarcastic or in earnest when he suggests that the company has "available assets sufficient to carry it in safety through two or three more unprofitable years such as the last without borrowing," but certainly there is nothing in the report to justify such an opinion. Whether the management of the company is "wise," is precisely what is now being determined. Almost any management can be credited with wisdom while everything is going up and money (earned or borrowed) is abundant. Then, the policy of renting roads at heavy guaranteed rentals, and of buying or leasing at high prices coal lands that cannot be wanted for many years to come, may not attract the attention it deserves. It is in concealing the details of these and other operations of the company that lies the danger to its credit, not in the criticism of public journals. Our correspondent says the Delaware & Hudson Canal Company "can put its product in market as cheaply as any," but the company does not give the data from which this conclusion can be drawn; on the contrary, as far as we can learn from the published figures, it costs it nearly 7 per cent. more for its mining than it does the Reading Company.

We are just as desirous as our correspondent can be to see the era of prosperity return, and nothing pleases us more than to be able to commend the management of our great industries; but we owe a duty also to those "guardians, widows and children, trusts, and people of moderate means," and in their interest we ask that the directors' reports shall be so full and explicit that the market value of their stock may not be depreciated by doubts of the company's solvency; or if the condition of the company should justify those doubts, then that these stockholders may be enabled to make such changes in the policy and manner of conducting the company's business in time, as may prevent the total wreck of their hard-earned savings.

We have suggested, as very desirable items, an expert statement of the amount of coal land held in fee and in lease; the actual workable thickness of coal on this land; the cost of the land; the cost of mining and marketing coal, etc. It would also be of interest to know what amount of money has been expended in endeavoring to extinguish the fire in the Baltimore mines, and what amount has been sunk in such unproductive works as the sinking of the Conyng-ham shaft near Wilkes-Barre, and whether either or both of these expenditures, which rumor places considerably above half a million dollars, might have been avoided by better management.

The chief bears and bulls who make a business of gambling in stocks are not ignorant of such things as these, and the withholding of the information from the general public is simply placing the majority of the stockholders at the mercy of the gamblers.

The remarks here made with regard to the Delaware & Hudson Canal Company are quite as applicable to the Delaware, Lackawanna & Western Company, and we would commend the subject to the consideration of their stockholders, lest, peradventure, the fate of the New Jersey Central may overtake them. Neither of these stands as high to-day as did New Jersey Central a year ago.

DISCHARGE OF MINERS IN PENNSYLVANIA.—About two hundred miners have been discharged by the Westmoreland & Penn Gas Coal Companies at Irwin, near Pittsburgh.

THE JOPLIN AND GIBBARD RAILROAD is now graded its entire length, 38 miles. This road runs through a magnificent coal region. The coal bed is proven to extend over a territory 20 miles long, by 2 to 3 miles broad, with a vein two to four feet in thickness. Pittsburg (Ks.) is the centre of the basin. This road has been built by the owners of these coal lands, and by Moffett & Sargeant, miners and smelters at Joplin. It will unquestionably prove of great benefit to the mining interests of Joplin and these coal fields.—*Granby, Mo., Miner.*

ROCK DRILLS AT THE PHILADELPHIA EXHIBITION.

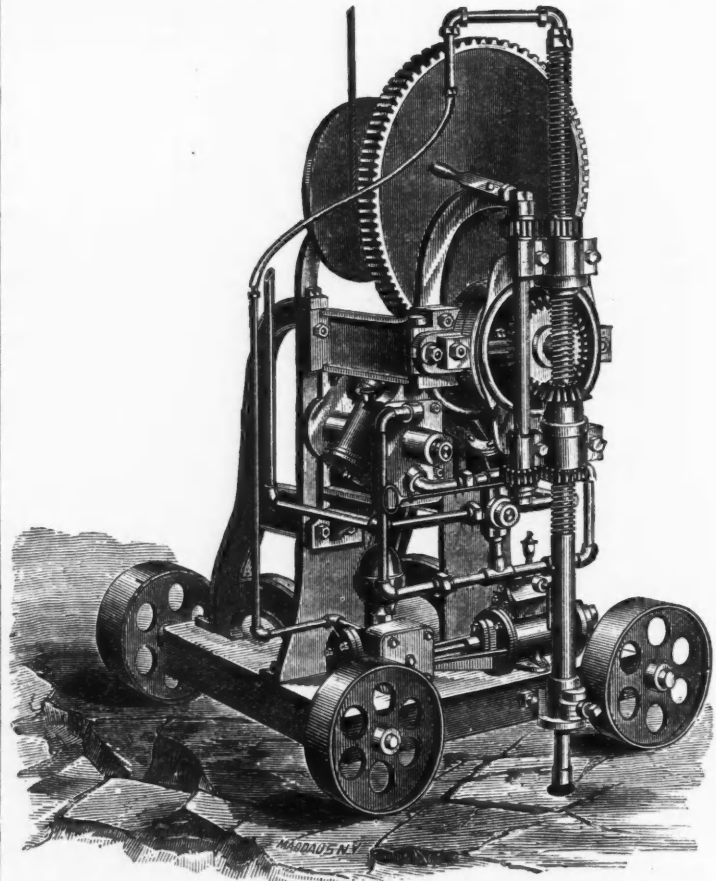
Special Correspondence of the Engineering and Mining Journal.

THE DIAMOND DRILL.

Two companies, one called the American Diamond Rock Boring Company, of Providence, R. I., and the other the Pennsylvania Diamond Drill Company, of Pottsville, Pa., own together the patents under which Leschot, the original inventor of diamond rock-boring machines, controls his inventions in this country. These two companies have, during the past ten years, been engaged in a very large variety of work, in most of which they have been eminently successful.

In all operations for the prospecting of mineral deposits, the boring of artesian wells, and in fact all long borings where the nature of the strata passed through is desirable to know, the diamond drills have shown themselves to be better fitted for the purpose than any other kind of apparatus. For boring at an angle, or even horizontally, they have no rivals of any kind. When the question of boring short holes in open work or tunnels is considered, experience rather points to some superiority in total cost of working in the case of percussion drills when compared with the diamond drill. Where blacksmith's labor is very expensive, the diamond drill may prove to be the most economical for this kind of work.

The two companies owning the diamond drill patents each made separate exhibits of their drills in Machinery Hall. The American Diamond Rock Boring Company showed one of their prospecting drills mounted on vertical boilers. The drill is driven by means of two oscillating cylinders set at an angle with each other, and working the shaft through the intervention of two bevel gears. Above the cylinders is a drum which can be turned by the engines, and which is used to hoist the drill tubing from the well. The feeding of the drill is accomplished by means of differential screws, and is uniformly progressive, no matter what variations there are in the nature of the rock passed through. A small drill made for open quarry work is also shown.



The engine, feed arrangements, and the drill rod are held by two parallel legs, while a third one, movable at pleasure in several directions, forms a tripod stand with the other two. The drill rod passes through the centre of the cylinder of the engine, which, being a rotary one, turns the drill without the intervention of cranks or gearing. The drill is fed downward by two worm wheels which engage a screw on the upper part of the shaft, which latter passes through a gallow's frame on the top of the two parallel standards.

When in operation the progress of the drill is regulated by friction clutches on the worm wheels. Besides the machines shown, the company boring make them of much larger size for sinking artesian wells, and even for large stone columns by means of annular bits.

During the construction of the Illinois State Capitol, some time ago, it was found that unless the stone columns used in erecting it were made lighter, much inconvenience and extra expense would result. To get rid of this difficulty a large size diamond boring machine was constructed, which cut a 24-inch hole and extracted a 22½-inch core from each of 260 of these columns. A piece of one of these cores was shown in the exhibit of the company.

The Pennsylvania Diamond Drill Company exhibited one of their rock drills which is provided with the hydraulic feed. The engine which drives the drills is a rotary one, connected to the drill shaft by means of bevel gears. On either side of the drill shaft are two hydraulic cylinders, connected together at two places by cast-iron frames. Piston rods on the lower side of these cylinders are fastened to a cross-head, through which also passes the drill shaft. The drill shaft, when working, is held by this cross-head, so that when the piston rods are forced downwards by the admission of water under pressure, the bits

are pressed against the rock with corresponding force. The advantage of using this form of feed consists in the use of a constant pressure, no matter what be the varying nature of the rock passed through. When the screw feed is used it sometimes may cause the breakage of the diamonds when passing suddenly from soft to hard rock. It is also very easy to alter the rate of progress by changing the pressure in the cylinders. When drilling in rock containing seams or empty pockets, the use of this hydraulic feed might not be the best, as the sudden shock to the diamonds in the bit, when driven through such an empty space, might break them.

A small drill for open quarry work, shown by this company, differs from the similar one shown by the American Company, in being driven by two small oscillating engines.

Among the important works in which the diamond drills have been employed in this country, the sinking of the two East Norwegian shafts, near Pottsville, Pa., to a depth of 1,600 feet each, deserves special notice. It is only necessary to recall the fact that sets of drills were employed in one shaft to drill holes about 300 feet deep, while in the other shaft workmen were at the same time engaged in blasting out the rock by means of holes bored previously by the same drills.

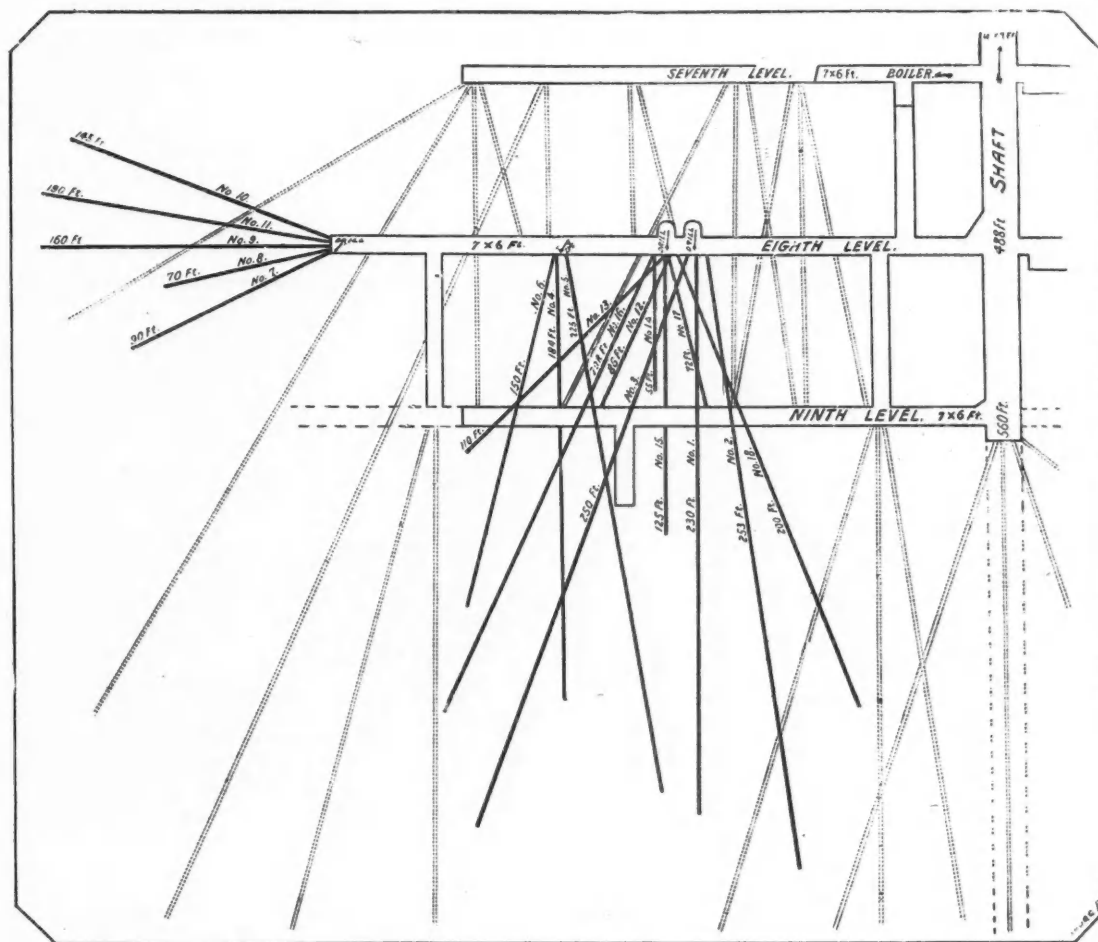
The experience gained in sinking these shafts led to many improvements in the details of the drills, particularly those relating to the method of feeding and keeping the bore-holes in truly vertical lines. Three bore-holes have been put down by Mr. O. J. Heinrichs at the Midlothian colliery, Va. These were respectively 1,142, 922, and 715 feet deep, costing per foot \$3.62, \$1.91, and 94c.

At the Mary Copper Mines of Ducktown, Tennessee, three bore-holes were put down to determine, if possible, the position of the copper deposits which had been lost. In the first case a vertical hole was sunk to a depth of 75 feet without discovering the ore. Another was then sunk 300 feet in a direction at right angles to the dip of the deposit without striking any paying bodies of ore, and at last one was sunk 488 feet, striking a rich body of copper ore in the iron pyrites.

other force as general, and more powerful, which differs materially from the above in requiring no chemical change to produce it, and which seems to be inseparable from matter—I mean attraction of gravitation.

When the sun gives out its heat and light it definitively loses a certain quantity of its original stock, and will be ultimately quenched; but when it gives out its attraction for the planets and other heavenly bodies, it does not seem to lose any of its stock. Thus, if the weight of a given body at a particular spot on the earth be expressed by $W=Mg$, and if that same body be transferred to a certain spot on the surface of Jupiter, we should have the equation $W=Mg$. Now, so long as there is no shrinkage of volume in these planets, and there is no addition to, or subtraction from, their mass, we have every reason to believe that after an interval of a thousand years there would be no change in the values of the forces gg' . It is but a question of time when all the stars, as well as the sun, which is but one of them, will be extinguished by the radiation of their heat and light. These black, inert (in all save their attractive power) masses will swing through space. No life that we can form an idea of can exist on them or their satellites. I can imagine no mode in which these masses can be revived by the return of heat and light, except it be by a collision of two systems through mutual attraction. Will the Creator, then, annihilate the useless matter? or will He form some new combination of forces to effect the purpose of making it conduce to the support of living organisms? Admitting the indestructibility of force, where are we to suppose the store of heat and light now contained in the heavenly bodies will be collected?

Again, are we to suppose that a certain portion of force is latent in matter under certain conditions? as it is in a lump of coal before being thrown into the furnace. And is the gravitation part unchangeable and inherent, while that in the form of heat, light, electricity and chemical action is variable, and only brought into the cognizance of the senses by the compression of the nebula from which the solar system is supposed to have been formed? just as in like circumstances air suddenly compressed will evolve sufficient heat to ignite tinder. I have seen no explanation of this question, and would be glad to be enlightened on it.



PROFILE SHOWING BORINGS IN THE SILVER ISLET MINE.

The Silver Mining Company of Silver Islet, Lake Superior, has been prospecting quite largely with the diamond drills during the past winter. The borings were all carried on at a depth from the surface of 488 feet in a level 7 by 6 feet. The borings (18 in number) were made at various angles, and were from 70 to 253 feet in length, the total distance bored being over three thousand feet, taking in time about six months. When the confined area in which the work was carried on is considered, these operations were very successfully accomplished.

THE FUTURE OF STARS.

TO THE EDITOR: SIR—I believe it is generally acknowledged in the present day that heat, light, electricity and chemical action are but different manifestations of the energy of matter, that these forces are mutually convertible, and that they, as well as matter itself, are indestructible (so long as God does not will a change of conditions in the universe). Now, all these manifestations of energy are caused by chemical change in matter. But there is an-

I think the ancients knew more of astronomy and the physical sciences than they get credit for. I cannot understand why Galileo should be considered the discoverer of the revolution of the earth round the sun, when I read in Plutarch: "The earth they supposed not to be without motion nor situated in the centre of the universe, but to make its revolution round the sphere of fire, being neither one of the most valuable nor principal parts of the great machine. Plato, too, in his old age is reported to have been of the same opinion, assigning the earth a different situation from the centre, and leaving that as a place of honor to a nobler element."

Again, he says, regarding the prediction of the lunar eclipse which occurred the night before the battle of Pydna, by an officer of the army of Amilius Paullus: "As for Amilius, he was not entirely unacquainted with this matter—he had heard of the ecliptic inequalities which bring the moon at certain periods under the shadow of the earth, and darken her till she has passed the quarter of obscurity and received light from the sun again."

SAN FRANCISCO, February 20, 1877.

D. COGHLAN.

AMERICAN INSTITUTE OF MINING ENGINEERS.

NEW YORK MEETING, FEBRUARY 27, 1877.

OFFICIAL REPORT.

The opening session of the Institute was held at the rooms of the American Society of Civil Engineers, No. 4 East 23d Street, Vice-President R. W. Raymond in the chair.

After a short introductory address by the Chairman, the following names were presented by the Council for election as members and associates of the Institute.*

MEMBERS.

Abbott, James W., Lake City, Colorado.
Abbott, Jr., J. J., " " " "
Bartlett, J. C., 922 Main St., Cambridge, Mass.
Billings, G. H., Norway Iron Works, South
Boston, Mass.
Blake, Frank C., Lafayette College, Easton, Pa.
Dewey, Fred P., " " " "
Douglas, Samuel T., University of Michigan,
Ann Arbor, Mich.
Emmons, S. F., 23 Fifth Ave., New York City.
Engle, Geo. U., 1823 Delancey Place, Phila.
Harrington, Dr. Bernard J., Montreal, Canada.
Hayden, Wm B., Columbus, Ohio.
Hill, Leslie C., Capelton, Quebec, Canada.
Laud, W. J., Atlanta, Georgia.
May, Wm. A., Scranton, Pa.

FOREIGN MEMBERS.

Nicolsky, L., Professor, School of Mines, St.
Petersburg, Russia.
Rolland, G., Ingenieur au Corps des Mines,
Paris, France.

ASSOCIATES.

Corning, Frederick, Freiberg, Saxony.
Dwight, Geo. S., 57 Astor House, N. Y. City.
Fairchild, A. C., Lafayette College, Easton, Pa.
Ferris, Lemuel P., 1351 Hancock Street, Phila-
delphia.
Flickwit, David W., Permanent Exhibition
Building, Phila.
Floyd, Fred. W., School of Mines, N. Y. City.
Fuller, J. T., Lafayette College, Easton, Pa.
Gay, Samuel, Shenandoah, Schuylkill Co., Pa.
Genth, Jr., Frederick A., 1212 Fairmount Ave.,
Phila.
Griffiths, Howard B., 2327 Ridge Ave., Phila.
Guterman, Franklin, Freiberg, Saxony.
Harper, Orlando M., Pittsburg, Pa.
Harrison, R. B., Lafayette College, Easton, Pa.

The Chairman then read the following resolutions that had been sent in to be submitted to the Institute:

Resolved, That the American Institute of Mining Engineers believes that system of Technical Education to be best which combines, as far as possible, theory and practice.

Resolved, That the American Institute of Mining Engineers believes that system of Technical Education to be best in which one or more years of practice is made to follow theory.

Resolved, That the American Institute of Mining Engineers believes that system of Technical Education to be best in which one or more years of practice is made to precede theory.

Resolved, That the Congress about to assemble be memorialized by the Council of the American Institute of Mining Engineers (or by a Committee specially appointed for the purpose), to make immediate provision for a creditable representation of mining and metallurgy of the United States in the Paris Exposition of 1878, by the appointment of a Commission to take the matter in hand.

Whereas, Efforts are being made to secure Congressional legislation, to secure in the near future the uniform adoption of the metric system of weights and measures in use in prominent European countries; therefore

Resolved, That the American Institute of Mining Engineers heartily endorse such action, and request the Council to take such action in the premises as they may deem best to express the favor with which the Institute would receive such legislation.

Resolved, That the Secretary be instructed to recommend members to use the metric system in all papers read before the Institute as far as practicable.

The Chairman ruled that these resolutions were out of order, stating that this course was taken for the purpose of bringing the whole subject of the competency of the Institute to pass such resolutions fully before the Institute, and of obtaining an expression of their will. He stated the principle of the ruling to be that the Institute, under its rules and according to its nature, could not declare opinions or take or recommend action on any subject outside of the conduct of its own proceedings and publications.

Mr. E. C. Pechin, for the purpose of getting the decision of the Institute, appealed from the ruling.

The Chairman then stated the grounds of his decision in substance as follows:

1. The objects of the Institute are declared in Rule I to be the promotion of certain ends by certain specified means, viz.: "Meetings for social intercourse, the reading and discussion of papers, and the circulation by publications of the information thus obtained." Rule VII declares, moreover, that "the Institute is not, as a body, responsible for statements of fact or opinion advanced in papers or discussions at its meetings." This applies to all such statements whether advanced by one member or by a majority, or by the whole number of the members present at any meeting.

2. The nature of the Institute necessitates this prohibition. Its largest meetings do not contain a majority of its members and associates; and the rules are intended to protect absent members and associates from being committed even in appearance to the opinions endorsed by the majority of those who happen to compose the audience at any one session.

3. The Institute contains between 600 and 700 members and associates, representing many different branches of the sciences and arts connected with mining and metallurgy. Perhaps no subject could be named with regard to which all these gentlemen would be able or willing to express as experts a decisive judgment. A body so constituted ought not to be asked to address to the public authoritative expressions of opinion.

4. On subjects of merely technical character, and, still more, on recommendations addressed to the public, to Congress, etc., there may be differences of opinion within the Institute. Discussion of such matters for information and for social enjoyment may be legitimate; but attempts to decide them by vote are manifestly injurious to both these objects, because the first object—information—requires that questions shall not be settled, but kept open, while the second object—social enjoyment—requires that the contests of parties shall be avoided.

5. Under this ruling, resolutions referring to our own publications and pro-

* The names of those elected at subsequent sessions of this meeting are here included.

ceedings are admissible. Thus, we may recommend the use in papers and debates of the metric system, just as we may choose a certain style of type, or a certain place of meeting. But we cannot recommend legislation, or express general judgments as the opinions of this body.

6. Some precedents have been established at previous meetings of the Institute which bear against this ruling. Those precedents passed at the time unquestioned because the attention of the members was not called to their bearings, and the subjects to which they referred were subjects on which the opinion of those present was unanimous. But they are believed to have been, nevertheless, in violation of the rules and proper policy of the Institute. In the present case the Chair individually approved most of the resolutions offered, and for that reason is the more willing to establish once for all, if sustained by the Institute, a precedent which will prevent the necessity of debating more objectionable propositions hereafter.

Mr. Pechin remarked that he fully agreed with the ruling of the Chairman, and had appealed from the ruling to call forth the foregoing remarks.

After some further remarks by Messrs. Egleston, Frazer and Birkinbine, the ruling of the Chair was sustained.

Mr. Raymond announced the programme of the meeting as arranged by the local committee of arrangements, after which a paper by W. M. Courtis of Wyandotte, Michigan, on "The North Shore of Lake Superior as a Mining District," was read by the Secretary. This paper was abundantly illustrated by mineral specimens.

Mr. E. B. Coxe, Chairman of the Centennial Committee of the Institute, made a verbal report of the work which had been done by the Committee, which will be published hereafter in full.

Mr. J. S. Alexander, Chairman of the Museum Committee of the Institute, made a report of progress, which will be published hereafter in connection with the report of the Centennial Committee.

SECOND SESSION.

The Institute met at 10:30 o'clock Wednesday morning, at the School of Mines, Columbia College.

Prof. H. S. Munroe exhibited two specimens of prehistoric Japanese bells, and described their discovery and the speculations as to their real character and use.

The Chairman, Mr. Raymond, read a paper on "Ferro-Manganese" by W. P. Ward of Cartersville, Georgia.

The Chairman then announced that the special order of this meeting was the motion of Mr. Holley at the previous meeting to adopt the report of the International Committee on "The Nomenclature of Iron and Steel."

The discussion was opened by Mr. H. M. Howe, and was participated in by Messrs. Park, Metcalf, Raymond, Hunt, Egleston, Frazer, Coxe and Barnes. After a prolonged and animated debate (an outline of which will be published as soon as practicable) the following resolutions were adopted:

Resolved, That the thanks of the Institute be tendered to the members of the International Committee on the Nomenclature of Iron and Steel, for the zeal, intelligence, judgment and harmony with which they have considered the subject referred to them.

Resolved, That the report of the International Committee on the Nomenclature of Iron and Steel be recommitted to the Committee, with the suggestion that some other term be substituted for the term *weld*; and that, without expressing any opinion concerning the preamble reported by the International Committee, the Institute recommends to its members to use hereafter in papers and discussions before this body the nomenclature proposed by the Committee, except the part hereinbefore recommended for suggested alteration: it being understood that the ingot-iron and ingot-steel of this classification constitute, taken together, what is now commercially known as cast-steel, including the so-called low or soft cast-steels.

THIRD SESSION.

After a recess, during which the members were afforded an opportunity to inspect the laboratories and collections of the School of Mines, and to partake a lunch hospitably supplied by Prof. Egleston, the Institute reassembled at 4 o'clock.

Dr. P. De P. Ricketts exhibited an electrical phenomenon with an analytical balance. By rubbing the glass case the balance was thrown out of adjustment, which could be restored by discharging the electricity of the glass. The possibility of errors in analysis resulting from this cause were apparent.

The status of Mr. F. N. Holbrook was changed from associate to member, on recommendation of the Council.

The following papers were then read:

On the Goderich Salt Deposit by Dr. T. Sterry Hunt, of Boston.

On the Trias in Eastern America by Prof. Persifor Frazer, Jr., of Phila.

Note on the Cost of Bessemer Rails by P. Barnes, of New York.

On Wednesday evening a *conversazione* of the Society of Civil Engineers and the Institute of Mining Engineers was held at the rooms of the former, when the subject of the introduction of the metric system of weights and measures as the legal standard of the country was informally discussed, Messrs. Wood, Briggs, Paine, Kothwell, Roberts, Brooks, Frazer and Raymond taking part in the discussion.

FOURTH SESSION.

The Institute met at the rooms of the Society of Civil Engineers on Thursday morning, at half-past ten.

The chairman reported the following resolutions from the Council for adoption by the Institute:

Resolved, That the Council be authorized in its discretion to provide for the adjournment of the May meeting, after counting the ballots and without the transaction of other business, to a later day in the summer.

Resolved, That the Secretary, before sending out the nominations for officers, consult as far as practicable with the persons nominated and their purposes, so that the names of persons who could not serve if elected, need not be submitted to the members.

Whereas, The Institute already comprises a considerable number of foreign members; and

Whereas, It is desirable that in the publications of the Institute permanent and universally intelligible units of measurement should be employed; therefore

Resolved, That members be recommended to employ, as far as practicable, in papers and debates, the metric system of weights and measures; and that the Secretary be instructed to add to papers and debates, before publication, the metric equivalent of the terms employed, wherever these have been omitted.

The above resolutions were unanimously adopted.

The following notifications of proposed changes in the Rules, to be acted on at the annual meeting, were then announced:

By Frank Firmstone—To amend Rule II as follows: Strike out the sentence beginning "Each person desirous of becoming a member or associate," etc., and insert instead: "Each person desirous of becoming a member or an as-

associate shall be proposed by at least three members or associates, and, if approved by the Council, shall be voted for by ballot as follows: Not more than two weeks after the adjournment of each regular meeting, the Secretary shall send to each member and associate ballots containing the names of all candidates for admission who have been approved by the Council since the meeting next preceding. Members who wish to vote shall do so by returning their ballots to the Secretary. At the next regular meeting all ballots received by the Secretary shall be examined by three scrutineers (of whom the Secretary may be one), to be appointed by the presiding officer at the first session, and they shall report the result of their examination before the adjournment of the meeting. Three or more negative votes shall exclude from admission. Any person admitted shall become a member on the payment of his first dues."

Also, to amend Rule V by striking out "two scrutineers," and inserting "three scrutineers."

By Prof. F. Prime, Jr.—To amend Rule II as follows: Strike out sentence beginning "Each person proposed as an honorary member, etc.," and insert: "Each person proposed as an honorary member shall be recommended by at least ten members or associates, and approved by the Council. The person thus recommended shall be voted for at the next general meeting after that at which the approval of the Council is made known to the Institute, and three negative votes shall be sufficient to prevent election; *Provided*, that the number of honorary members shall not exceed twenty."

Also, to change the sentence in Rule II—"Provided that honorary members, and members and associates permanently residing in foreign countries shall not be entitled to vote or to be members of the Council," so as to read: "Provided that honorary members shall not be entitled to vote or to be members of the Council."

Also, to amend Rule III by striking out the clause—"and members and associates permanently residing in foreign countries, excepting Canada, shall be liable to such annual or other payments only as the Council may impose, to cover the cost of supplying them with publications."

Also, to amend Rule IV by striking out the paragraph beginning "The Council elected under the former rules of the Institute," down to "hereinbefore provided."

Also, to change the paragraph in Rule IV from "or the Council may, by a vote of a majority of all its members, declare the place of any officer vacant on his failure for one year," etc., to read: "and the Council shall declare the place of any officer vacant on his failure for one year," etc.

By E. B. Coxe—To amend Rule IV so as to read "The affairs of the Institute shall be managed by a Council, consisting of a President, nine Vice-Presidents and fifteen Managers," etc., instead of six Vice-Presidents and nine Managers, as at present.

By Prof. Persifer Frazer, Jr.—To amend Rule V by inserting—"In case the number of names which remain on a ballot exceeds the number of offices to be filled, the requisite number of unstricken names shall be selected in the order of their occurrence on the list, and the ballot shall be assumed as cast for these names."

By T. M. Drown—To amend Rule V by substituting five weeks for thirty days, in the clause—"Nominations may be sent in writing to the Secretary . . . at any time not less than thirty days"; and by substituting four weeks for two weeks in the clause—"and the Secretary shall, not less than two weeks before the said meeting, mail to every member or associate," etc.

The following papers were then read:

On American Students of Mining in Germany, by J. C. Bartlett, of Cambridge, Mass.

On the Atlanta District, Idaho, by J. E. Clayton, of Salt Lake City.

On the Allouez Mine and Lake Superior Copper Dressing, by C. M. Rolker, of New York.

Major T. B. Brooks exhibited and described a simple portable solar compass for use in exploring in magnetic regions.

Dr. T. M. Drown exhibited a specimen of basic sulphate of iron which had been formed in a flue in a coal mine, which in the fresh condition so nearly resembled coal as to have led to the supposition that coal dust had in some way become consolidated to coal. An analysis was given of the deposit.

Dr. Raymond exhibited a sample of carbonate of iron from one of the Durham mines in Pennsylvania, and spoke of the diverse origin of limonite beds as suggested by the two specimens just exhibited.

The following drawings and maps, sent by J. H. Harden of the University of Pennsylvania, were then exhibited:

1. Isometrical view of the cribbing in the Hollenback shaft, Wilkes-Barre.
2. Plan of Mr. Attrick's boring at Goderich in 1876, illustrating Dr. T. Sterry Hunt's section of the strata.
3. Plan of the town of Goderich and a portion of Ontario.
4. Plan of brick and metal tubing.
5. Plan of the groundwork, Murton Winning.
6. Plan and section, Murton Winning.
7. Section of the pits, Murton Winning.
8. Chart showing the product of anthracite coal in the Lehigh, Schuylkill and Wyoming regions; anthracite, bituminous and charcoal pig iron in the United States, and petroleum in Pennsylvania, from 1820 to 1876. Accompanying these maps were two papers: The Hollenback Shaft at Wilkes-Barre, and Shaft Sinking and Salt Mining at Goderich, Canada.

On motion, the Secretary was instructed to express in writing the thanks of the Institute to the various societies and individuals for courtesies received.

On Thursday afternoon a number of the members visited the East River Bridge, and were received by the engineers in charge and afforded full opportunity for examination of the process of construction.

On Thursday evening the Institute were invited to a reception at the house of Edward Cooper, Esq.

FIFTH SESSION.

The concluding session of the Institute was held at the Stevens Institute of Technology, at Hoboken, on Friday morning at eleven o'clock, when the following papers were read:

On Ferro-Prussiate Paper for copying drawings, by Ogden Haight of New York.

On the Economy of Pumping Engines, by John Birkinbine, Philadelphia. Note upon Methods of Drawing Metric and other Scales on Engineering Plans, by P. Barnes of New York.

A supplementary paper on the Determination of Carbon by Magnetic Tests, by C. M. Ryder of Cleveland, Ohio.

On a Uniform Wire Gauge, by J. D. Weeks.

On a new form of Pinch Cock for chemical analyses, by H. E. Sadler, of New Haven, Conn.

At the conclusion of Mr. Weeks' communication, Prof. Egleston suggested that before any proposal was made towards the adoption of a metric wire gauge in this country, inquiries be made as to the gauge used for this purpose in France.

This proposal meeting with general favor, Prof. Egleston moved that the Chair appoint a committee for the collection of information as to the practicability of a legal standard wire-gauge in the United States.

The Chair subsequently appointed Messrs. Egleston, Weeks and Metcalf.

The following papers were read by title:

Notes on a Mill Campaign at Hall Valley, Colorado, by J. L. Jernegan, of La Grange, California.

Franklinite of Franklin Furnace, by J. C. Platt, Jr., of Waterford, N. Y.

American Ordnance, by G. Leverich, of New York.

The Use of Coal Waste, by J. F. Blandy, of Philadelphia.

Commercial Analyses of Furnace Gases, by Prof. T. Egleston, of New York.

Fuel of the Future, by R. P. Rothwell, of New York.

Technical Education, by Prof. L. M. Haupt, of Philadelphia.

Pulverized Zinc and its Use in Analytical Chemistry, by T. M. Drown, of Easton, Pa.

Specific Gravity of Certain Leads, by Prof. C. P. Williams, of Rolla, Missouri.

Alloys of Iron with Certain Metals, by G. H. Billings, of South Boston, Mass.

Calculation of Heat Requirements, and Gas Analyses, by T. F. Witherbee, of Port Henry, N. Y.

Determination of Carbon in Iron and Steel, by A. S. McCreath, of Harrisburg, Pa.

Mr. J. D. Weeks offered the following resolution:

Resolved, That permission be granted to the editors or accredited representatives of any responsible journal to copy in whole or in part, or to make an abstract of any paper read before the Institute, under such regulations for the care and safety of the same as the Secretary may prescribe.

Mr. Raymond said that a contract now existed between the Institute and the

ENGINEERING AND MINING JOURNAL whereby the latter was obliged to publish all the papers before the Institute in full, and that if other journals were permitted to make selection among the papers and publish the most interesting in advance of the ENGINEERING AND MINING JOURNAL, the editors would consider it a violation of the contract now existing.

After further explanations by Mr. Raymond and Mr. Weeks, and a general discussion, the resolution was unanimously rejected.

The Chairman then announced that the laboratories and work rooms of the Stevens Institute, including the testing department of the United States Test Board, were open for the inspection of the members of the Institute, under the guidance of the officers of the Stevens Institute. President Morton had also kindly invited the members to dinner, after which omnibuses would take any members who wished to visit the new tunnel under Bergen Hill, now in process of construction by the Delaware, Lackawanna & Western Railroad.

Resolutions were passed expressing the hearty thanks of the Institute to President Morton and the Professors and Trustees of the Stevens Institute, after which the Institute adjourned.

THE DELAWARE & HUDSON CANAL COMPANY.

TO THE EDITOR: Sir—I was disappointed to see your Journal, which has justly obtained so high a reputation for independence and reliability in coal matters, join in its last issue the cry of the hounds who are trying to run down and rain the good with the bad, in order that they may fatten upon the sacrifices made in the panic they cause. Your former criticisms upon the coal companies and business, proceeding, as was evident, from an intimate knowledge of them, have been in the main so wise and just as to render you an authority of weight on those things, therefore a timely word from you, spoken honestly and conscientiously, would, I believe, do much to allay the fever of apprehension into which the failure of the New Jersey Central and a newspaper flood of misrepresentation, ignorance and falsehood have excited many investors.

Consider a moment that the Delaware & Hudson Canal Company, for instance, is one of the oldest corporations in the country; that it has paid good dividends for many years, and consequently that its stock is held in small lots all over the country by guardians, widows and children, trusts, and people in moderate circumstances have invested all their savings in it perhaps to a larger extent than in almost any other corporation. I think it has about 3,000 stockholders, which would make an average of but \$6,600 apiece, while there are some holding over a million. Now, these small stockholders know almost nothing about the property except what they read in the papers (and many of them take their cue from you); seeing quotations constantly falling, they read suspicion everywhere and throw away their hard-earned savings for whatever they will bring.

Now, you know as well as I do, I presume, that this company is perfectly solvent, sound as a dollar, with one of the best properties in the world in proportion to its capital, with available assets sufficient to carry it in safety through two or three more unprofitable years such as the last without borrowing; that its management is conservative, honest and wise; that its facilities enable it to put its product in market as cheaply as any; that all it needs to earn a dividend for its owners is a market for as much coal as it has sold in any one of the last five years, except 1876; that the increase in consumption for steam and domestic purposes at this time about compensates for the present loss of the iron manufacturing; that a much longer continuance of the present prostration in business would be unparalleled in the history of commerce; that there are already signs of a revival of manufacture and trade, and that when these things do come that its stock will command par with its first dividend.

Why not say so then, and take the lead in an authoritative reassurance of anxious and alarmed stockholders who are frenzied to see their property apparently melting away day by day without knowing why, and so obtain their blessings forever that you have prevented them from falling victims to the prevalent distrust? These remarks, I doubt not, apply equally to D. L. & W., but I speak of D. & H. C. C., because I know more of that company. The causes which ruined the New Jersey Central do not operate with them, and it seems to me you should discriminate and point out to the public that there are sound and valuable investments to be made in the coal business with companies which have passed triumphantly through 1837, and '57 and '73. If they should not pay a dividend for two years, you know the stocks of these companies would be cheap at 75.

You have an opportunity, it seems to me, to make a record for yourself now, of which you may always be justly proud.

Please excuse the freedom with which I have addressed you, on account of

the deep feeling I have concerning the unnecessary distress which those persistent pessimists are causing. You are at liberty to use this as you please, retaining, of course, the privacy of my name.
 SCRANTON, Feb. 27, 1877.

REPORT OF THE LEHIGH COAL AND NAVIGATION COMPANY.

We give herewith the annual report of the Lehigh Coal and Navigation Company for 1876, which has recently been presented to its stockholders. The affairs of this company have been managed with great skill and prudence by Mr. E. W. CLARK, and were it not for the failure of the lessees of its mines and roads (the Lehigh and Wilkes-Barre Coal Company and the New Jersey Central Railroad Company), it would be in a very favorable condition. As it is, it paid 6½ per cent. dividend, and carried something to surplus account during the year. With regard to the effect of the combination on the coal trade, Mr. CLARK makes the following statement, in which the sentiments are similar to those that have been frequently expressed in these pages:

"The combination which sustained the prices of coal for four years was unwilling to reduce prices when nearly every other commodity was steadily declining in value. Excessive prices, depression in iron, and a general prostration of business interests, caused a light demand for coal in the first half of the year, and the cost of production was increased by the irregularities in working the mines, rendered necessary by the attempt to restrict shipments to the limited demands of the market. Thus, while the high prices were oppressive to consumers, the producers did not derive any material advantage from them, and there was a continued want of harmony, which resulted in an open rupture in August."

It does not appear that the cause of re-combination has much to hope for from Mr. CLARK, and as he is now the receiver for the Lehigh and Wilkes-Barre Coal Company, his views are of great interest.

Since this report was issued, the following announcement has been made:

"In consequence of the non-payment of the note for \$250,000, due on the 7th inst., given by the Central Railroad Company of New Jersey to the Lehigh Coal and Navigation Company for unpaid rentals, the proceedings of the latter against the former will be continued, and the leased property will be returned to the Lehigh Coal and Navigation Company on the 15th inst."

The Lehigh Coal & Navigation Company again in possession of its road and mines, and having a contract with the Lehigh & Wilkes-Barre for the transportation of its coal, and with several large collieries in the Lehigh basins, will be in a very strong position. Its own mines have a capacity of 1,000,000 tons a year, those of the Lehigh & Wilkes-Barre Coal Company, at Wilkes-Barre, a capacity of 2,000,000 tons, and the other mines on the line of the road can produce probably at least 1,500,000 tons. Appearances point to great activity at these several collieries, whatever the price of coal may be. The company's road (the L. & S. RR.), which terminates at Easton, Pa., has from that point no less than four road outlets to tidewater, viz., the New Jersey Central, the Lehigh Valley, the Morris & Essex, and the Belvidere Delaware, all of which are exceedingly anxious to secure business, so that this company can almost make its own terms for freight. We hear of each by turn coquetting with the Lehigh Company, but in the end it will probably get control of the New Jersey Central. It would, indeed, be rather strange that the Lehigh Coal & Navigation Company, which a few years ago was barely saved from bankruptcy by the New Jersey Central, should now be the stronger of the two, and in a position to absorb or at least control that line.

LEHIGH COAL & NAVIGATION COMPANY—STATEMENT OF ITS BUSINESS DURING THE YEAR 1876.

The Board of Managers respectfully submit their report for the year 1876, as follows, viz.:

Revenue from railroads.....	\$923,275 32
Revenue from Nesquehoning tunnel tolls.....	29,228 40
Revenue from canal.....	200,000 00
Revenue from coal lands.....	500,000 00
Net profit on real estate sold.....	13,164 00
Miscellaneous receipts.....	66,327 02

Total.....\$1,732,004 74

DISBURSEMENTS.

General expenses.....	\$56,734 74
Rent and taxes, Nesquehoning Valley Railroad.....	143 208 10
Interest account.....	819,789 77
Taxes chargeable to landed property and improvements.....	10,498 16
Taxes due State on dividends.....	69 811 91
Sinking fund of 10c. per ton on 626,773 tons of coal.....	60 677 30
Three dividends paid in 1876.....	563 670 25

1 724,300 23

Surplus credited to dividend fund.....	\$7,614 51
Balance to credit of dividend fund, December 31, 1875.....	650 073 83

Balance to credit of dividend fund, December 31, 1876.....\$657,688 34

The coal tonnage on the Lehigh and Susquehanna Railroad & Lehigh Canal, compared with that of 1875, was as follows, viz.:

	1875. Tons.	1876. Tons.
From the Wyoming region.....	1,551,644	1,422,436
" " Upper Lehigh region.....	133,102	250,577
" " Hazleton region via Lehigh Valley Railroad.....	169,464	137,149
" " " via Sandy Run branch.....	.....	74 632
" " " Beaver Meadow region, via N. V. RR.....	335,270	478,281
" " " via Lehigh Valley RR.....	21 057	19,420
" " " Mahanoy region, via Lehigh Valley Railroad.....	33,867	17,234
" " " Lehigh region (L. C. & C. Co.'s land).....	398,042	605,660
" " " Hazardville.....	60,984	29 838
" " " sundry shippers.....	22 389	.....
Total.....	2,725,819	3,035,227

Distributed as follows:

	1875. Tons.	1876. Tons.
Delivered east of Mauch Chunk by railroad.....	1,805 860	2,092,185
" " " by canal.....	640,821	685,195
Consumed along the line above Mauch Chunk.....	81,405	71 309
Delivered to connecting lines above Mauch Chunk.....	72,601	119,852
" " to Lehigh Valley Railroad at Packerton.....	35,132	32,457
Increased stock at Hazardville.....	.....	34 229
Total.....	2,725,819	3,035,227
Increase.....	.....	309,408

Of the foregoing tonnage there was shipped by the Lehigh and Wilkes-Barre Coal Company 2,257,289 tons.
 The total production of that company was:

	1875. Tons.	1876. Tons.
Of their mines in Wyoming region.....	1,350,927	1 284,119
" " " in Beaver Meadow region.....	336,773	409 663
" " " in Lehigh region (L. C. & N. Co.).....	397 338	606,773
Total.....	1,085,038	2 300,555

RAILROADS.

The gross receipts of the company's railroads during 1876, as compared with 1875, were as follows:

	1875.	1876.	Decrease.
Passengers.....	\$163,078 01	\$159,202 01	\$3,876 00
Freight and express.....	329,918 05	293,977 75	35,940 30
Coal.....	2,685,649 94	2 316,646 18	369,003 76
Total.....	\$3,178,646 00	\$2 769,825 94	\$408,820 06
L. C. & N. Co.'s proportion.....	1,059,548 67	923,275 32	136,273 35

The revenue for the year was \$117,080.79 less than in 1875.
 The railroads yielded \$136,273 35 less, and the other sources of revenue \$19,192.56 more than during the previous year.

There were three dividends paid, two of 2 per cent. in March and June, and one of 1½ per cent. in September, amounting in the aggregate, including the tax, to \$614,400.57. The December dividend could not be paid without encroaching on the dividend fund, and it was deemed wise to pass it. A small surplus for the year of \$7,614.51 has been credited to the dividend fund, increasing it to \$657,688.34. The result, after the payment of 5½ per cent. in dividends, is very gratifying, as the year just closed has been a disastrous one to coal mining and coal transporting companies. The combination which sustained the price of coal for four years was unwilling to reduce prices when nearly every other commodity was steadily declining in value. Excessive prices, depression in iron, and a general prostration of business interests, caused a light demand for coal in the first half of the year, and the cost of production was increased by the irregularities in working the mines, rendered necessary by the attempt to restrict shipments to the limited demands of the market. Thus, while the high prices were oppressive to consumers, the producers did not derive any material advantage from them, and there was a continued want of harmony, which resulted in an open rupture in August.

The resulting decline in prices was aggravated by the sale at auction, in New York, of 500,000 tons on the 29th of August. Prices were low and unremunerative during the remainder of the year, but the demand was active at the decline and business more regular, and conducted both in the mining and transporting departments at lower cost. Our revenue being fixed on the canals and coal lands, we were not directly interested in the fluctuations in the price of coal, excepting as to the earnings of our railroads. Our lessees, however, suffered severely, both from the irregularities and small amount of business early in the year, and the low prices after August. They were heavily in debt, and engaged in an effort to sell bonds, when the break in the coal combination compelled them to abandon that attempt to fund floating indebtedness.

The contracts existing between this company and the Central Railroad Company of New Jersey, and the Lehigh and Wilkes-Barre Coal Company, while not involving us in any responsibility for their debts, make it to the interest of each company to sustain its associates as far as possible within the limits of safety to itself. As long as there seemed any reasonable grounds for expecting a successful result to their several plans for relief from embarrassment, your managers deemed it wise to extend aid to both companies by the postponement of the payment of rents, and by temporary loans to the Coal Company, which last have all been repaid. Previous, however, to the break in the coal combination, when it seemed probable that a sale of bonds of the Coal Company would be effected, we agreed to purchase one million of the bonds if other purchasers could be found for four millions additional, and we made a cash advance of about \$200,000 in anticipation of the consummation of this scheme, which was ready for presentation to the stockholders of the Railroad Company about the time of the rupture of the alliance between the coal companies. That plan was then abandoned, as have been all other later efforts to obtain relief, and both companies have recently passed into the hands of Receivers. It would have been better for them and for this company if they had yielded to the urgent advice of this company and had abandoned the contest in December instead of waiting until February.

On the 31st of December our account against the Railroad Company was as follows:	
Railroad rent (part of May and September) extended.....	\$200,000 00
Canal income due July 1, ext. nted.....	50,000 00
	\$250,000 00

—for which we hold a note of the Central Railroad Company of New Jersey, due March 7, secured by the pledge of \$400,000 new ten-year, generally called "blanket mortgage" bonds of that Company.

There is also due from the Railroad Company:

Rent for October, November, and December.....	\$266,996 99
Unpaid income from canal.....	62,751 39
Sundry rents.....	431 38

Less credit.
 Six months interest on Construction Loan Account..... 32,898 42

The balance of the Construction Loan Account was \$974,425.50 at the close of the year. We have the right to repay these advances at any time, but the lessees cannot claim repayment while they retain possession of our roads.

The account against the Coal Company is as follows:—

L. and W.-B. Coal Co.'s rent of Lehigh mines for July.....	\$41,666 67
L. and W.-B. Coal Co.'s interest, September 1, convertible gold bonds.....	25,713 84
Drafts in favor of Central Railroad Co. of New Jersey.....	90,334 00
Sundry rents due by Coal Company.....	13,099 87
Cash advances.....	229,185 62
	\$400,000 00

For this amount we hold notes of the Coal Company, payable on demand and secured by mortgages on real estate believed to be good, amounting to \$200,000 00 Consolidated mortgage bonds of the Coal Company..... 333,000 00

There is also due by the Coal Company:—	
Rents of mines for October, November and December.....	\$125,000 00
Other rents, etc.....	49,168 70
	\$174,168 70

Should it ever become necessary to re-enter upon the leased lands and to cancel the lease, it is believed that in such a contingency our security is ample for the recovery of all the overdue and extended rents.

The item, \$88,202 17, stated in the balance sheet as due by the coal company, was a temporary loan since paid.

The amounts due by the two companies aggregate as follows:—

Note of the Railroad Company, due March 4, 1877.....	\$250,000 00
Book account against the Railroad Company.....	297,281 34
Notes of the Coal Company.....	400,000 00
Book account against Coal Company.....	174,168 70
	\$1,121,450 04

This company needed all of its revenues to meet its payments of dividends and of interest on its debt, and failing to receive rents from its lessees, it became necessary, from time to time, to borrow money, and the loans thus made amounted on 31st of December to \$1,003,173.33. We had under control \$1,496,000 of the consolidated mortgage bonds of the company, and the right to issue \$504,500 additional for bonds of earlier issues, cancelled by the operations of the sinking funds. We had also \$986,970.82 of the convertible debentures due in 1882, part of which has been converted into stock and used as collateral in that form. No difficulty has been experienced in obtaining loans, and none is anticipated. It is believed that no necessity will arise for an increase of this debt, but that it will be gradually reduced through the payment by the receivers of the two companies of overdue rents.

Current interest charges will be met by current revenue, which the receivers must pay if they wish to retain possession of our property.

The reports presented to the stockholders in 1875 and 1876 gave detailed information about our contracts with the Central Railroad Company of New Jersey, and the Lehigh and Wilkes-Barre Coal Company, but it will not be considered inappropriate if we again refer particularly to our relation to the two companies. There is—

First—The lease of March 31, 1871, of the Lehigh and Susquehanna Railroad, and branches to the Central Railroad Company of New Jersey, under which they agreed to pay us one-third of the gross receipts of the road, and to assume the principal and interest of \$2,310,000, of our five million gold bonds, which mature in 1897.

Second—The contract of December 31, 1873, under which the same company operates our canals, and assumed the obligations under our contract with the Delaware Division Canal Company. The income guaranteed to us from this source is \$200,000 a year.

Third—We sold our Wyoming lands to the Lehigh and Wilkes-Barre Coal Company, and as part of the purchase money they gave to the trustees of our five million gold loan a first mortgage for \$500,000 on eight hundred acres of coal land, and they also assumed the outstanding bonds issued under our convertible gold loan due in 1897, then amounting to \$856,000, now reduced by the action of the sinking fund to \$717,000.

Fourth—We leased our Lehigh coal property on December 31st, 1873, to the Lehigh and Wilkes-Barre Coal Company, at a minimum rental of \$500,000 a year.

The leased railroads connect the leased and other mines of the Lehigh and Wilkes-Barre Coal Company with the Central Railroad Company's main line at Phillipsburg. The Coal Company's mines produce an abundant supply of first-class coal of the different varieties of anthracite, and this product forms the largest and most profitable source of revenue of the Central Railroad Company.

The alliance is a very natural one, and the earning capacity of the joint properties is, in prosperous times, very large.

In the present condition of the coal trade, and the fact that both of the companies to which we leased our property are in the hands of Receivers, raises the question whether our lessees can carry out their agreements, and if not, what will be the result to this company if the properties revert to us? The properties ought to be held together and operated under one control, and we do not propose to take any active steps towards severing the alliance, unless compelled to do so by the action of our lessees, or the Receivers managing for them.

While the claims of bondholders and other creditors were constantly maturing and had to be met, we could not collect our rents, but these creditors are now deferred, and we ought to be paid regularly.

In regard to the first of the leases named, we desire to call attention to the fact that the annual reports made to the Auditor-General of Pennsylvania of the operation of our railroad by the Central Railroad Company of New Jersey, give in detail the receipts and the cost of maintenance and operation. These reports show that the lessees have, during every year since it obtained possession of the roads, made a profit in operating them over and above the one-third of gross receipts paid to this company, and over and above the interest on the \$2,310,000 bonds assumed.

The recent large decline in the price of the bonds of the five million gold loan indicates a want of knowledge of the fact that the equipment which was sold to the Central Railroad Company for \$2,310,000, payable in bonds secured by that mortgage, remains under the control of the trustee of the mortgage. It is all marked "L. O. & Nav. Co.," has been subject to frequent inspections by our agent, is known to be in good condition, and all locomotives and cars abandoned or destroyed have been replaced. It that company fails to pay the interest on the bonds it is a violation of the contract which entitles this company to repossess itself of its whole property, railroads as well as equipments; and the equipment has an earning power in excess of the amount of annual interest on the \$2,310,000 bonds.

Second—The canals yielded us an average annual income of \$140,000 over and above the rent of the Delaware Division Canal for the six years, from 1868 to 1873 inclusive. Since 1873 they have been operated by the Central Railroad Company of New Jersey, under the agreement to pay us \$200,000 a year, and to assume the Delaware Division Canal charges. A small profit over the amount paid to us was realized in 1874, but there was a considerable loss to them in 1875, and a larger loss in 1876, which losses were partly due to a diversion of canal tonnage to the railroads.

The canals are in fine condition, and are capable of earning, under judicious management, the amount contracted to be paid to us. There is some collateral advantage to the Railroad Company in the control of this as a parallel line of transportation. The canals cannot be returned to us without thereby giving us the option of cancelling the lease of our coal lands to the Lehigh and Wilkes-Barre Coal Company.

Third—If the Coal Company fails to pay the interest on the \$500,000 mortgage, it will be foreclosed by our trustee. The \$771,000 convertible gold bonds are secured by a first mortgage of property worth, at a low valuation, at least \$2,000,000.

In explanation of the "Fourth" item, namely, the lease of the coal lands, we will state that when we made the lease the mines had a productive capacity of about 500,000 tons per annum. To reduce the cost of mining it was necessary to increase the product, and this involved a large expenditure of money. As we could not at that time command the necessary means, we were willing to lease to a party who would make the improvements and pay us a minimum annual rental of \$500,000 while the improvements were in progress, as well as afterwards. It was supposed when the lease was made that losses would be sustained by the lessees during the first two years, but that in the third year there would be a profit. The anticipated result of the operation of the mines for the year 1876 was not realized. They have expended a million of dollars in improvements, the mines can now produce a million of tons of coal a year, but the prices realized from sales are unremunerative.

The minimum rent is \$500,000 a year, but there is a memorandum account kept of royalty on the coal actually mined and sent to market, at 21 per cent. of the selling price at Mauch Chunk. We have heretofore reported annually to the stockholders the condition of this memorandum account, and have explained that the lessees have the right to take, hereafter, from the lands, enough coal at the current rate of royalty at the time to recover this excess without interest. They have no further claim, and must first mine and pay for a minimum quantity of coal, which, after this year, is fixed at 1,000,000 tons per annum. This may increase the rent, which is never to be less than \$500,000 a year.

In the present condition of the coal trade it is impossible to make any reliable esti-

mate of revenue for this year. The mines tributary to our roads are capable of delivering to the railroads and canals a much larger amount of coal than they have at any time heretofore transported. The Sandy Run branch was completed in June last, and delivered to the main line after that date 74,632 tons of coal. It will be a valuable feeder, giving us a large increase of tonnage. The roads and equipment, the canals and mines, are all in good condition, and we need only an increase of demand and of price of coal to yield large returns to all parties interested.

There can be no reasonable doubt that, according to the terms of the several leases, we might now exercise the options therein reserved to us, and terminate the leases themselves. Both the railroad and coal companies having failed to comply with the terms of their contracts, our right to re-enter upon the respective properties cannot be questioned, in which case they would revert to us in excellent condition, and in the case of the Coal Company without cost to us for the improvements made; but we have hesitated to enforce a measure involving so serious a loss to the lessees, which an early change in the coal trade would save to them. Our efforts have been exerted to preserve the alliance between the companies until brighter times, in the belief that the best interests of all would be promoted by the preservation of the leases in their integrity, and it was in pursuance of this object that we have allowed the lessees to become so largely indebted to this company.

We desire to express to the stockholders our belief that the company has abundant security for the amounts due, and that the liberality of our course was fully justified by the circumstances at the time, and that no other course would have entitled us to your confidence.

By order of the Board of Managers of the Lehigh Coal and Navigation Company.
E. W. CLARK, President.

STATEMENT A.

BALANCE SHEET OF THE LEHIGH COAL AND NAVIGATION COMPANY, JANUARY 1, 1877.

Dr.		
Lehigh and Susquehanna Railroad Construction and Branches.....	\$13,718,106 26	
Lehigh Navigation, Shipping Pockets and Shipping Improvements—		
Hazardville.....	3,909,056 71	
Coal Lands and Improvements—Lehigh Region.....	7,788,627 36	
Landed Property and Improvements.....	836,485 49	
Canal Boats.....	22,081 93	
Contingent Fund.....	279,699 48	
Bills receivable.....	\$286,242 17	
Bonds and Mortgages.....	37,739 58	
Ground and Water Rents.....	172,134 54	
	496,116 29	
Cash on hand.....	296,134 04	
Gold Loan, 1897, assumed by C. R. R. Co. of N. J.....	\$2,310,000 00	
Gold Loan, 1897, assumed by L. & W.-B. C. Co.....	500,000 00	
Convertible Gold Loan, 1894, assumed by L. & W.-B. C. Co.....	771,000 00	
	3,581,000 00	
Due by C. R. R. Co., of N. J. on current account.....	308,044 53	
Due by L. & W.-B. Coal Co., on current account.....	\$174,168 70	
Due by L. & W.-B. Coal Co., on boats purchased.....	25,033 54	
Due by L. & W.-B. Coal Co., on loan account.....	400,000 00	
Due by L. & W.-B. Coal Co., temporary loan.....	88,202 17	
	687,424 41	
Balance of Individual Ledger.....	129,882 19	
	\$31,242,639 69	
Cr.		
Capital Stock, 208,971 shares.....	\$10,448,550 00	
Loan due 1877 (Debentures).....	\$762,779 18	
Loan due 1882 (Convertible Debentures).....	41,550 00	
Loan due 1884.....	5,381,963 59	
Loan due 1894 (Convertible Gold).....	771,000 00	
Loan due 1897 (Gold).....	4,658,500 00	
Loan due 1897 (Railroad).....	2,000,000 00	
Loan due 1911 (Consolidated Mortgage).....	1,115,000 00	
Greenwood Mortgage Loan, due February 1, 1892.....	717,000 00	
Greenwood Mortgage, due October 1, 1877 (L. S.).....	140,000 00	
	15,587,792 77	
Bills Payable.....	784,600 00	
Central R.R. Co., of New Jersey, Construction Loan.....	974,425 20	
Ground Rents, Mortgages, and Dowers.....	64,157 12	
Interests and Dividends, due January 1, 1877, and arrears.....	138,122 12	
Profit and Loss, Old Account.....	2,587,304 14	
Dividend Fund.....	657,688 34	
	\$31,242,639 69	

C. F. HOWELL, Auditor.

ABSTRACTS OF LECTURES ON MINING.—No. XXXI.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(From the London "Mining Journal.")

In the case of shafts sunk through stratified deposits, mechanical arrangements are made for bringing the mineral to the bottom of the shaft, and getting it raised or hoisted as soon as possible, though there may be a small accumulation of cars or mineral at the bottom. Such accumulation as there is will probably be accommodated by having a double line of rails, a sort of siding in fact, where one set of trams can be replaced by another. But the case is very different in mines working on anything like lodes. There you have down the shaft, levels going off at intervals, in our own country 10 or 12 fms. apart, in Saxony 20 fms., and in Bohemia as much as 30 fms., and in a great number of these levels there may be places working vigorously. The machinery at the surface must constantly be varying its objects, drawing sometimes from deep sometimes from shallow levels. At galena and silver works, where there are no great amounts of mineral, the accumulations will only amount to a few tons, but with tin, gold, etc., where the mineral is disseminated, there will be an accumulation sometimes of hundreds of tons. Sometimes the material is allowed to accumulate in the levels, but this is a very bad plan, since it checks the ventilation, and moreover it is undesirable as impeding the passage about the mine. Again, there may be reasons for the ore at certain parts being kept below; for example, the miners will often keep it under their feet till such times as it can be raised. In some cases, especially where the ground is worked by tutwork, it would be convenient to have adjoining the shaft some means of storing the mineral. This in the West of England is usually termed a plat, the variety now ordinarily used is called a tip-plat. Where the level opens into the shaft for a distance of 2 or 3 fms. back from the shaft, or in some cases as much as 6 fms., a slope is taken generally about the same height as the level, and the rails for the level will be continued over this slope by a framework of timber. The wagon will therefore be run on to the framework, and the material tipped into the space below, where it will accumulate until the drawing apparatus is ready to raise it. In some instances arrangements may be made by which the material can be stored in boxes, which have a sliding bottom, and a stout door,

so that the kibble can be brought to the side, and the material tipped into it. The angle of the upper portion of the level above the plat should be taken off, so that the rope may not be injured when the kibble is drawn aside. In weak ground the plat has to be supported by wall plates, lagging, etc. In some of the continental mines still greater attention is paid to the means of accumulating the mineral. Thus, in the Hungarian mines of Schemnitz, a district where it is desirable to separate the ore into several classes, the division of the shaft is more looked to, and a large plat as long as the shaft is made, and divided into as many divisions, and then the wagon is tipped into one or other divisions of the plat, according to the nature of the charge. When such a plat has to be carried out in ground of a somewhat difficult character, it is usually the case that the timbering of the shaft and level will be put in temporarily at first; then when the level and stopes have been established to a sufficient extent the plat is formed and the timbering completed. The plat is begun half the height at first, at the two ends, leaving a central solid pillar. After driving a short distance, anything put in to support the roof will have to rest upon longitudinal sole pieces by means of leg pieces. Laths are driven in at the sides and above where they are required. The plat will then have to be enlarged by taking another stope below, and as it advances supporting the longitudinal piece by putting uprights under it. Then, when the two sides are driven to a certain distance, come the taking away of the central pillar and the permanent timbering. As we get in a longitudinal cap piece will be put in transverse to the first cap pieces, and will rest at the corners on large wedge pieces, which will again rest on longitudinal leg pieces. Across the top transverse pieces will be placed at some distance asunder, assisted by laths, or it may be close together. By inserting only a single one of these strong beams at a time, and as soon as it is got in wedging it up by these wall pieces, we shall get a very strong structure, and shall be able to remove the temporary timbering. On a far larger scale are the magnificent plats which have been put in of late at Prizibram. Two or three years ago the lecturer found them putting in plats at the 27th level, which were to be 6 fms. high, 6 fms. long, and 3 fms. wide. Sometimes the places into which the ore falls are made to converge towards the bottom, so as to enable you to put in a sort of door, or trap. The filling can be done in such a plat (German, Füll-ort) by simply running a wagon underneath, and then opening the door. A suitable length for such a plat is 6 fms., and the whole is built partly of brick and partly of stonework.

The division of the shaft may be effected by putting in a repetition of part of the framework, props or studdles, and then lining these with a casing of strong plank. This point has not been overlooked in the Act for the better arrangement of metallic mines; for the men to be hoisted in the same shaft where the mineral is being raised is very dangerous. Where a separate shaft cannot be used the division can be simply effected by spiking a casing of planks to strong beams across the shaft. In the North of England this kind of division has been put in for the separation of the currents of air, and under these circumstances such bratticing is a point of very high importance. In some cases it has been by strong planks spiked to the buntons, in others by solid timbering, 4 or 5 inches thick piled up one above another. The division may sometimes pass across as a diameter, in other cases it will be nearer to one side, especially where there are pumps; the larger division may be again divided into two, but the drawing shaft is commonly separated from the upcast only by buntons. At other times the primary division will be into three or four parts. The annals of last century furnish some very bad cases of the brattices catching fire from the ends being too near the ventilating furnace. On this account, and since an explosion is liable to blow out the brattice, and thus destroy the ventilation at a time when it is most vitally necessary, it is altogether better to have another shaft. The brattice may be made of brick or stone, and then it becomes very expensive, but, nevertheless, where there is any danger of fire the importance is very great.

If we come next to consider the application of masonry to the securing of shafts, the simplest case we find is where the shaft is put down in the lode with its sides represented by the sides of the lode. Where the material is dug out of the lode itself, a great part of it may remain as deads, to be stowed within the walls. A piece of timber is put in as a bearer, supported it may be against a head board, and on it is stacked the stone got out of the lode. As soon as the pressure begins to be felt from the sides you have within the walls a good strong buttress to withstand the pressure. Sometimes water, with a little lime, or oxide of iron, or other substance in solution, cements these loose masses into one very solid mass. Usually this sort of packing is merely of dry stone, but in some cases, where you have a suitable material near, you may throw a flat arch across, with the proper abutments cut for it in the sides, and this may be 2 or 3 feet thick. This gives you a suitable sort of security so long as the pressure is not within the walls, which it is not likely to be. When the longer sides of the shaft require to be protected the question of walling becomes more serious. In some cases in parts of Belgium and England, where there is an abundant occurrence of clay, bricks are made specially adapted to the curvature of the shaft. In all the cases that we have been considering to-day it must be remembered that there is this disadvantage—before we can put in any permanent structure we have first to go down to such a point as will give us a secure and firm foundation. In the mines of Saxony, where the sides of the shaft require to be secured, stonework is put in on the sides in the form of successive arches, while on transverse arches atle or loose stone will be built up for a distance of 1 or 1½ fm., and then the arching repeated; the temporary timber being removed gradually upwards as the arching proceeds. It is best to remove the temporary timber altogether, that no empty spaces may be left behind. Where the pressure is great on all sides, each of the four sides has been arched; some pretty walling of this kind has been carried out with the lias limestones of the district. This arched form is, however, only a transition to the circular form, which is the strongest. In most of our own colliery districts the shafts are secured with stone where there is plenty; in other cases bricks have taken its place. At the present time lining of shafts is carried out much more generally than it used to be, since many of the shaft accidents were due to the non-protection of the sides.

In securing circular shafts a couple of strong balks will be placed across the surface ground, having the shaft between them. Then the foundation for the timbering of the shaft itself will be by putting in of curbs or cribs—circular frames of wood, which must obviously consist of a number of segments. Where not required to be permanent the segments do not require to be of any great thickness, and if brickwork is to follow they will generally be made of the same size as the bricks. These curbs used to be made of pieces of oak fitted together, or simply abutting, or one cut so as to overlap the other. Of late years the curbs have been made of cast-iron. Behind these a planking of 9 or 10 feet planks is driven down, and if we are employing the method of spilling, these planks will be made to fit to each other very carefully. The curbs will be held together by stringing deals or laths. In this way the pit will

be put down from the surface till you reach such a foundation as leads you to expect that you can base on it a satisfactory lining of brickwork. At this point the shaft will be widened, a little pit being sunk below for the accumulation of water during the process. The cutting will be by pick, or hammer and gad, or by any method except blasting, so as not to injure the ground. Then a curb is put in, now usually of cast-iron, and above this will be built the walling. The curb need not be solid, quite as commonly it is cast in a hollow form. The precautions to be taken are that the bed should be very smooth and perfect, and that between the segments of cast-iron there should be thin sheets of deal, so as to give a perfect joint when pressed together. And if we are careful about not letting any water through the joints, wedges of wood will also be driven between the deals. As the walling is built up, all hollows behind are carefully filled up, so that nothing can fall suddenly on the brickwork. In this manner one of the segments will be completed, then another segment will be proceeded with in like manner below the first, and when the second casing of brickwork has been built up the bracket of ground between it and the first will gradually be removed, and the lower brickwork will be built close up to the upper. In some deep shaft, as that of Dukinfield, in Cheshire, bricks of unusual size, specially made to fit the circle, have been used, and at every 8 yards a strong coursing of stone put in for the purpose of getting a firm hold on the measures; this we may regard as a curb. In some of the old pits a circular lining was placed on a square curb.

THE COAL AND IRON ORES OF SOUTHEASTERN OHIO.

By Andrew Roy.

The "great vein" seam of coal of Southeastern Ohio is remarkably free from troubles such as horse-backs, clay veins, warts in the coal, etc., and, in the counties of Hocking, Perry and Athens, it is often had level free, requiring no costly machinery to pump the water and raise the coal. The seam ranges from 5 to 13 feet in thickness, the additional height over 7 feet being due to the union of two coals. In the Hocking Valley mines of Athens and Hocking Counties the thickness of the seam is from 6 to 7½ feet; the coal is not so dry burning as in Perry County, but it is a fine gas coal and is extensively employed for that purpose. In the Perry County mines of Straitsville and Shawnee the seam is 10 and 11 feet high, open burning in character, and fitted for furnace use in the raw state. The upper 2 to 2½ feet of the bed is rather impure, being impregnated with iron pyrites, and this part is now left unwrought in several of the mines in both the Shawnee and Straitsville districts. The mines are level free, and the numerous hollows in the coal-field cut down through the coal so that several of the entries of each mine are run out to-day. The price paid for digging at present ranges from 40 to 50 cents per ton, and from 15 to 20 cents per ton in addition completes the cost of delivering the coal in the cars on the railroad, or in the stock-houses of the blast furnaces.

A noted seam of iron ore of Southeastern Ohio is the ferriferous limestone ore. It is found and mined in the counties of Lawrence, Sciota, Jackson and Vinton, and lies immediately over a bed of limestone 2 to 12 feet thick, hence the name "ferriferous limestone." Between Vinton and Athens counties this ore thins out or appears only at irregular intervals, and the limestone is also frequently wanting where it is due, being replaced by sandstone. There are, however, several other beds of ore of the limonite character, which extend through from Sciota and Jackson to Perry and Athens counties. These seams lie both below and above the horizon of the great vein of coal, and there appears no end to their abundance. They range in thickness from 4 to 36 inches, yield after being calcined from 40 to 50 per cent. of iron, and are being used exclusively in the blast furnaces at Gore and Shawnee. Some of the assistants of the State Geological Survey are at present engaged in surveying the area of these mineral lands for the forthcoming volume of the geological report; this special report cannot fail to be one of unusual interest and value. The coals and ores belong to the lower coal measure series; the aggregate thickness of coal exceeds 25 feet, and that of the iron ore 8 feet. Four different beds of limestones are also enclosed in the series.

MINING NOTES.

THE COMSTOCK MINES.

The *Gold Hill News* of the 28th ult. says: On the 1,650-foot level of the California Mine the ore vein is opening up large and rich, and the appearances are that the bullion production will yet eclipse that of any other mine ever worked on the line of the Comstock. The daily yield is about 550 tons, keeping all of the mills steadily running up to their full crushing capacities. The Consolidated Virginia produces nearly 300 tons of ore per day. The recent connection with the California Mine from the 1,650-foot level has had the effect of gradually cooling the drifts and putting them in a better working condition. A great deal of retimbering has been necessary in this mine in order to secure those portions which were weakened by the rapid extraction of ore.

Connection has been made on the 2,135-foot level of the Imperial Mine with the Yellow Jacket, greatly improving the ventilation of both mines. Work will soon be resumed in the Kentuck. But little is known about this mine below the 1,000-foot level. Considerable good pay ore is known to exist between the 800 and 1,000-foot levels, and the extraction and milling of it will be resumed as soon as the requisite arrangements can be made. This mine paid liberal dividends for two years under O'Donnell as foreman some eight years ago.

Immense pumps are being put into the Ophir. The Overman has encountered an increased flow of water on the 1,400-foot level. The heat in the 1,900-foot level of the Hale & Norcross Mine is intense, and notwithstanding the utmost exertions of the men progress is necessarily slow.

The Chollar yields 100 tons of ore per day, principally from the upper levels. No water to trouble. The Justice is keeping all of its mills steadily running, the daily yield being about 400 tons. Slow progress is made in the operations on account of the steady flow of water and bad ground encountered.

The Sutro Tunnel is being driven at the rate of about 90 feet per week, the rock encountered being of the hardest character. About sixty men are at work directly and indirectly in the header.

LEASE OF THE MINES OF THE LEHIGH AND WILKESBARRE COAL COMPANY.—The following telegram has been received from Wilkesbarre, Pa., under date March 7:

Charles Parrish, president of the Lehigh and Wilkesbarre Coal Company, has leased from the receivers all the mines of the company in this locality, and will henceforth conduct their operations; he to receive \$1.25 per ton for all coal mined, and the receivers agree to take the coal away from the mines and assume all responsibility. Mr. Parrish is to be paid monthly for coal furnished by him. It is claimed that the receivers have made arrangements to dispose of the coal as fast as it can be sent to market, and this will keep every mine in this valley running on three-quarter time for many months to come. Although the price is considered very low it is thought that the miners will be better satisfied to work steadily at low rates than to continue on in the way they have been doing for over a year past. So far, this year, the com-

pany has worked only eighteen days, while 150 days, all told, made up the aggregate of last year's work. The business portion of the community is well pleased with the arrangements that have been made, as the system guarantees a continuation of work in the mines for an indefinite period, and consequently inspires confidence in the future.

NOTES.

MT. STERLING, KY., COAL RAILROAD.—This road now extends twenty miles, with two branches, connecting with coal mines.

THE REPORT that the Lehigh Valley Railroad Company was negotiating for the control of the Lehigh Navigation Company is confirmed.

TO HARDEN ZINC.—Ammonium chloride is said to possess the property of hardening zinc considerably if added in a very small proportion to the melted metal.

COAL IN PRINCE EDWARD'S ISLAND.—Principal Dawson, of McGill College, Montreal, says: "From geological observations there can be no doubt but that under the Island of Prince Edward vast coal formations exist."

THE BRITISH IRON INDUSTRY.—In the United Kingdom there are 314 mills, forges and malleable ironworks, aggregating 7575 puddling furnaces and 900 rolling mills. Of this total Scotland possesses nineteen works, containing 337 puddling furnaces and forty-eight rolling mills.

PRE-ADAMIC COAL MINING.—In the coal shale at Wezikon, Switzerland, a series of painted fit poles, covered with wicker-work have been found. They are supposed to be the most ancient evidence yet known of the existence of man, and belonging to the period between the two glacial epochs.

LARGE WINDING ENGINES.—A pair of the largest winding engines ever made by the Stavelay Coal and Iron Company for drawing coal at the Ireland New Colliery Company, near Chesterfield. The cylinders are 36 inches in diameter, with a 72-inch stroke, and are vertical with a drum 21 feet in diameter.

ALGIEES, which has made the fortune of Creusot and other French works by its Mokka ores, is about to open fresh mines of magnetic ore for the benefit of French ironmasters. The new mines are situated at Collo, and are reported to be able to yield 200,000 or 300,000 tons of ore per annum, of a quality superior to Daunemora. The yield of the Mokka-el-Hadid mines is from 430,000 to 450,000 tons a year.

PENNSYLVANIA COAL COMPANY.—The number of coal cars run in each train during the past week on the Pennsylvania Coal Company's Railroad has been increased to forty. The company have been dumping quite a large amount of coal on their dumps during the winter, more than for several years past, and the reloading of this coal must necessarily give employment to a large number of laborers during the season.—*Seranton Republican*.

NEW IRON AMALGAM.—Sideraphthite is the name of a new iron amalgam which is composed of sixty-five parts iron, twenty-three nickel, four tungsten, five aluminum, five copper. It resists sulphuretted hydrogen, is not attacked by vegetable acids, and only slightly by mineral acids. It is really more useful than standard silver, while it can be produced at a cost not exceeding that of German silver. For alloys which have to be silver-plated to prevent oxidation, the inoxidisable iron, as the above is called, is stated to be a perfectly successful substitute.

AN ANALOGUE TO SINGING FLAMES.—Montenat (*Comptes rendus*) lowers a little wire vessel full of live charcoal to the bottom of a long, straight, metallic tube, placed in an upright position. The current of air produced by the elevation of temperature gives rise to a sound which is feeble at first, but increases in intensity as the combustion proceeds. On raising the charge, the sounds become at first more intense, and then diminish, disappearing altogether when the fire is about the middle of the apparatus, but reappearing when it is brought nearer the opening. This renewed sound is the double octave of the one first heard.

OXIDIZED SILVER.—The color of so-called oxidized silver does not depend on oxidation, but on sulphurization. The silver goods are dipped into a boiling hot solution of calcium sulphide or hyposulphite of soda, or into ammonium sulphide, until they have taken the proper color. "Old silver" is a coloration produced by laying on a mixture of blacklead and oil of turpentine, or some fatty matter, and cleaning off with blotting paper until no more color comes away. Copper acquires a handsome look if treated in the same manner. If it is desired to varnish oxidized silver, take 18 parts alcohol, 3 red arsenic, and 1 castor oil, and a non-transparent varnish can be made, which may be diluted with its own volume of alcohol, if a particularly tain coating is wished.

BASIS FOR MINERS WAGES IN SCHUYLKILL COUNTY.—The collieries drawn from which to average wages for the month of February were as follows:

Bear Ridge, No. 2, average price of coal at Port Carbon	.....	\$1 91	per ton.
Mahanoy City	.....	1 69 1/2	"
Tunnel Ridge	.....	1 85	"
Suffolk	.....	1 86	"
Keely Run	.....	1 81	"
Average	.....	\$1 82	

The rate of wages for February will therefore be twenty-two per cent. below the basis, or an advance of four per cent. on the January wages.

RAW LIGNITE IN BLAST-FURNACES.—The following details are given of the utilization of raw lignite in the blast furnaces in Styria. In 1875 the furnaces of the Styrian Eisenindustrie Company were daily producing 800 cwt. dark gray Bessemer pig, from ores containing 46 to 50 per cent. iron. Per cwt. of iron the consumption of coke was 150 lb., and of limestone 30 lb., the temperature of blast about 400 degrees Cent. The coke burden was 30 cwt., carrying 40 to 42 cwt. ore. The furnace possessed six tuyeres of 3 inches diameter, and the pressure of blast was about 2 1/2 lb. In April 1875, the manager had been able to replace 50 per cent. of the coke by raw lignite. He considers as essential to the success of this charge an increased pressure of blast, an increased temperature of hot blast, and the ore being in pieces and not in dust.

ALUMINIUM.—In a paper on the use of this metal, Dr. R. Biedermann states that aluminium bronze is used in this country for making the large preserving pans used by wholesale confectioners; and that aluminium is recommended as an alloy in type metal. Lange, in Glashütte (Saxony), employs an aluminium in the manufacture of watch springs. The new springs have the advantage over the old in not being subject to rust, in not being magnetic, and in possessing greater hardness and elasticity. An alloy of 100 parts aluminium and five silver can be worked like pure aluminium, but is harder, and takes a beautiful polish. An alloy of five parts aluminium and 100 silver is almost as hard as ordinary silver, but has the advantage over it of containing no metal which is of a poisonous nature, or which can effect a discoloration of the silver.

ISSUE GLASS.—In German and Austrian laboratories there has come into use an invaluable filter made of a fine-spun glass, presumably different from that which may now and then be seen used in ornamental toys. It has the appearance and most of the mechanical peculiarities of cotton or silk thread, and is stated to be very valuable as a filter where the solution would be affected by the ordinary filters, or as a collector for precipitates. If we wish to calcine an insoluble compound on the filter used for its separation, we find in the crucibles, with the residue, without ash, a crystal globule, which represents the original filter. An allied use is found for it in the preparation of brushes used in solutions which attack those made of organic material, and safe, therefore, when used in such matters as chromic acid, nitrate of silver, iodine, etc. The German term for it is *glaswolle*; the French, *coton de verre*.

REPORT OF THE UNION PACIFIC RAILROAD.—The annual meeting of the stockholders of the Union Pacific Railroad Company was held in Boston on Wednesday. The whole number of votes cast was 297,989, all of which were for the following gentlemen, and they were declared elected:—Oliver Ames, Boston; Elisha Atkins, Boston; Sidney Dillon, New York; F. Gordon Dexter, Boston; Benjamin E. Bates, Boston; William L. Scott, Erie, Pa.; David Daws, New York; Horace H. Porter, Chicago; Cornelius R. Garrison, New York; S. H. H. Clark, Omaha, Neb.; Jay Gould, New York; Ezra H. Baxter, Boston; James Richardson, New York; John Sharp, Salt Lake City, and Grenville M. Dodge, Council Bluffs, Iowa. Immediately thereafter a meeting of the new Board of Directors was held. Sydney Dillon, of New York, was chosen President, and Elisha Atkins, of Boston, Vice President. Hon. E. H. Rollins, United States Senator from New Hampshire, resigned the office of secretary of the corporation, and Henry McFarland, who has been assistant treasurer, was chosen secretary and treasurer.

The report was submitted to the stockholders and contained the following:—
Earning and expenses for 1875 and 1876 compared:—

	1875	1876.
Gross earnings	\$11,993,832 09	\$12,886,858 84
Operating expenses	4,982,047 95	5,268 211 20
Surplus earnings	\$7,011,784 14	\$7,618,647 64
Percentage of expenses	41 54-100	40 88-100

As compared with last year, the gross earnings show an increase of \$893,026 75, the operating expenses \$286,163 25, and the surplus earnings \$606,863 50. The funded debt was decreased \$415,000 during the year. The coal mines of the company have produced satisfactory results during the past year. The business is increasing and the sales to the public are much larger.

Coal Production and Cost of Mining.—The production of the mines for the years 1875 and 1876 was as follows:—

	Tons.	Cost of Mining.	Cost per Ton.
1875	208,222	\$391,885 10	\$1 88
1876	264,771	375,520 56	1 41 1/2
Increase	56,549	Dec. \$16,251 41	Dec. 46

The decrease of forty-six cents per ton in the cost of mining has resulted in a net to the company, in last year's operations, of \$121,792 82.

The sales of land for 1876 were 125,995 21-100 acres, at an average price of \$2 98 1/4 per acre, amounting to \$375 540 82.

The total sales to December 31, 1876, were 1,319,818 12-100 acres, at an average price of \$4 32 1/2 per acre, amounting to \$5,711,582 84.

The interest received on contracts was \$412,759
Received on forfeited contracts 1,140

Total proceeds \$6,125,483

The amount of land grant bonds cancelled to date is \$2,996,000, and the company has on hand land notes and contracts \$3,182,934, and cash \$94,201, to be applied to the further cancellation of these bonds. The land still unsold amounts to 10,758,134 acres. The report advocates the building of a road in the direction of the Black Hills to accommodate the increasing trade with that section.

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 March 3.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co.	38,821	319,423	3,184	244,050
D. L. and W. RR. Co.	34,143	318,254	4,827	197,201
Penn. Coal Co.	13,851	131,006	6,054	179,259
L. V. RR. Co.	11,854	154,932	1,181	116,235
P. and N. Y. RR. Co.	1,473	7,145	—	3,952
C. RR. of N. J.	19,510	166,551	437	114,883
	117,632	1,097,321	15,993	855,588
Lehigh Region.				
L. V. RR. Co.	42,236	374,813	9,159	220,444
C. RR. of N. J.	19,573	143,943	59	138,955
D. H. and W. B. RR.	313	4,022	918	4,441
	62,122	522,778	10,136	363,840
Schuylkill Region.				
P. and H. RR. Co.	68,474	599,180	10,611	271,886
Shamokin & Lykens Val.	6,573	57,877	3,660	28,025
	75,047	657,057	14,271	299,911
Sullivan Region.				
Sul. and Erie RR. Co.	70	2,054	1,085	9,465
Total	255,259	2,279,210	41,485	1,528,804
Increase	213,784	750 466	—	—
Decrease	—	—	—	—

* Year beginning January 1st. 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.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 39,868 tons, as compared with the corresponding period in 1876.

Receipts of Coal at Boston, for the week ending March 2, and years from Jan. 1.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
From				
Alexandria and Georgetown	478	478	—	3 462
Philadelphia	6,759	36,065	460	21,776
Baltimore	5,300	11,450	—	13,894
Other places	2,160	31,512	2,489	26,952
Great Britain	—	707	—	1,806
Nova Scotia	—	—	—	199
Total	14,748	80,212	2,949	67,789

Perth Amboy business: Received for the week 11,537
Shipped for the week 20,707
On hand March 3 153,079

The Production of Bituminous Coal for the week ending March 3 was as follows:

Tons of 2,240 lb., except where otherwise designated.	Week, Tons.	Year, Tons.
Cumberland Region, Md.	7,196	105,696
Barclay Region, Pa.	6,620	66,514
Broad Top Region, Pa.	2,663	21,653
Huntingdon and Broad Top RR.	735	6,124
*East Broad Top	—	—
*Clearfield Region, Pa.	—	—
*Snow Shoe	1,190	8,608

*Tyrone and Clearfield, Allegheny Region, Pa.	29,724	179,786
*Pennsylvania RR., Pittsburgh Region, Pa.	3,984	27,657
*West Penn. RR.	3,314	29,904
*Southwest Penn. RR.	775	9 973
*Penn. & Westmoreland gas coal, Pa. RR.	16,063	134,998
*Pennsylvania RR.	6,605	56,874
*For the week ending Feb. 21.	—	—

The Production of Coke for the week ending Feb. 21.

Tons of 2000 lb.	Week.	Year.
West Penn. RR.	2,975	13,274
Southwest Penn. RR.	14,652	93,518
Penn. & Westmoreland Region, Penn. RR.	1,399	12,917
Pittsburgh, Penn. RR.	2,402	26,782
Total	20,826	146,491

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, March 2, 1877.

Anthracite.

The condition of the anthracite coal business is unchanged; the demand is small, and prices as low as at any time in the history of the trade. In our last issue we expressed the opinion that the advance in prices at the Delaware, Lackawanna and Western Railroad Company's auction sales was unwarranted by the general condition of the trade. Subsequent developments and the condition of trade since then fully warrant the inference that this advance was due to an abnormal stimulus which could probably be discovered by a care-

ful study of the movements of the Company's stock on the Stock Board.

We are well aware that by the large attendance at the sale, and spirited bidding, some dealers were led to believe that a reaction had set in, and made purchases in good faith which they have since regretted. It would almost seem as if it was not the intention of some of the buyers to take the coal they purchased, or if they did, it was purchased with the view of creating the impression that the coal companies are about to obtain much higher prices for their coal. There are several opinions expressed in the trade as to the causes of the advance; among others, that a stock "pool" purchased a portion of the coal through regular coal dealers anticipating a profit on stocks through the advance in coal, while losing upon the coal; that some of the other companies bid up prices that they might secure higher rates for their coal; and that the Delaware, Lackawanna & Western Railroad Company introduced "Peter Funk," so familiar to the trade in some of the sales of last year. If the advance was a part of a stock operation, which is the most probable theory, it was quite a success, but if brought about by any other unnatural agency, it failed in its intended results. The influence of an auction sale that has been tampered with must always be of great injury to all the producers of coal. It cannot increase the consumption, while it creates with other producers the impression that an active demand has set in and prices are to be more remunerative, resulting in an increased output, and it thus actually makes the condition of the market worse than it was before.

Coal is reported to be freely offered at prices considerably below those realized at auction: stove coal, for instance, being offered at \$3.30 f.o.b. at shipping ports, as against \$3.49 1/4 the average price bid at the Delaware, Lackawanna & Western Railroad Company's sale, while we hear of sales since the auction as low as \$3.25.

It is now reported that the receiver of the Lehigh & Wilkes-Barre Coal Company has accepted a proposition from Mr. Charles Parrish to operate the mines of the company, and, it is stated, is to pay him \$1.25 per ton for the coal delivered in cars at the breakers. That this contract may be remunerative to Mr. Parrish, it will be necessary that he shall be able to do a large business, and it is therefore another argument, if another were needed, to show the improbability of a new combination being organized.

It is also intimated that the Lehigh Coal & Navigation Company will annul its leases to the New Jersey Central Railroad Company and resume possession of its property on the 15th inst. In the competition that will occur for the coal that passes over the Lehigh & Susquehanna Railroad, the New Jersey Central Railroad will have to take the business at a very low rate of transportation, or lose it altogether, in which event its ruin would be complete.

The production of anthracite coal for the week ending March 3, was 255,269 tons as against 276,383 tons for the previous week, and 41,485 tons for the corresponding week of 1876. The total production from January 1 to March 3 was 2,279,210 tons as against 1,528,804 tons for the corresponding period of last year, showing an increase this year of 750,406 tons. Of this increase nearly one-half has been made by the Schuylkill region.

Bituminous.

No new business of note has been reported in these coals, nor is there likely to be much, if any, previous to the settlement of freight rates and the labor question at the Cumberland mines. According to the last report received, the Clearfield Region continued to do a very fair business, while the Cumberland trade, owing to its labor troubles, continues to show a decrease in business, as compared with last year, the total loss up to the closing of the last week having been 36,868 tons.

The Chesapeake & Ohio Canal will not prepare for business until the labor question is settled in the Cumberland Region, and as the Baltimore & Ohio Railroad Company refuses transportation over its line to those who are willing to pay more than 50c. per ton for mining, it compels all the companies to join in the movement to reduce wages. There is now a proposition to make the reduced wages 40c. per ton, instead of 50c. as now offered by the companies and refused by the men. The bottom in miner's wages, as in all classes of industry, appears to be almost as low as previous to the war, and it is folly for those in the Cumberland Region to think they can hold their trade, and, consequently, give steady employment, at higher rates than are paid in rival regions. Low wages with steady work leaves the miner better off than half work at high wages, and we would urge contracts

with a large number of the men for steady employment at something like anti-war wages. When this shall have been accomplished, and with the reduced rates of toll over the Cumberland & Pennsylvania Railroad, and the promised still lower ones of the George's Creek & Cumberland Railroad, this region will be in a position to meet all competition, and we will have to record a steadily increasing, instead of a steadily decreasing trade, as has been the case for several years past. The necessities of the case must receive an early appreciation or a large amount of trade will be lost for this year.

DECISIONS IN THE CASES OF THE STATE OF MARYLAND AND THE AMERICAN COAL COMPANY VS. THE CONSOLIDATION COAL COMPANY.

On March 1 Judge Bartel delivered the opinion of the Court of Appeals in the cases of the State of Maryland vs. the Consolidation Coal Company, and the American Coal Company vs. the Consolidation Coal Company. In the first named case proceedings were instituted by the Attorney General, under authority of the Governor, to forfeit the charter of the Consolidation Coal Company for alleged abuses of its franchises and corporate powers. The appellee contended that the proceedings were without lawful authority. This was overruled by the Court. The State contended that the act incorporating the company was invalid, because it conferred rights and privileges inconsistent with the provisions of the constitution. The Court holds that so much of the act as conflicts with the constitution is simply inoperative, and that the whole charter is not thereby vitiated or void. As to the validity of the deed by which the Cumberland and Pennsylvania Railroad Company sold and conveyed to the Consolidation Coal Company its property and franchises, the Court decides that the acts incorporating and extending the road, etc., did not authorize it to execute the deed without the consent of the Legislature. The appellant contended that the charter of the Consolidation Coal Company, which authorized it to construct, lease, hold, purchase, etc., other railroads, etc., conferred by implication upon every other railroad in the State the power to sell to the Consolidation Coal Company. The Court decided that to constitute a valid sale and transfer it is necessary not only that the purchaser be legally competent to take, but also that the vendor have legal power and authority to sell and convey the title. The railroad possessed no power to sell, and the charter of the appellant did not create any. The Court is of the opinion that it would be contrary to reason and authority to imply from anything contained in the charter of the appellee that the Legislature intended to authorize the Cumberland and Pennsylvania Railroad to sell and convey all its franchises and property, and to escape from its duties and obligations to the public. It follows, therefore, that the deed was inoperative, and that the railroad company continued to hold the property, notwithstanding the deed, and remained subject to the power of the Legislature.

The Court further decides that the general railroad law, which limits the charge to be made by all roads created under the law to 1 1/2c. per ton per mile, does not apply to such companies as the Cumberland & Pennsylvania Railroad Company, which was created by special act. But the Court sets aside the alleged sale of the railroad, and says: "The Cumberland and Pennsylvania Railroad Company is still a subsisting corporation, vested with rights, franchises and property, granted by and acquired under its charter and subject to the power of the Legislature to regulate the rates, etc."

This decision brings in force the amended law of 1876, chapter 64, which reduced freights on the road to 2, 3, and 4c. per ton per mile, according to distance, and makes the charges of the Consolidation Coal Company, after the passage of the act excessive and illegal. Upon which grounds the attorney-general asked a forfeiture of the charter of the Consolidation Coal Company. The Court, however, takes the grounds that the company acted in good faith, believing that it had a perfect title to the railroad, and the power to enforce rates of freight, provided under its own charter, and it therefore affirms the decision of the circuit court of Allegany County, and refuses to annul the charter of the company.

Most of the points in the case of the American Coal Company vs. the Consolidation Coal Company are covered in the case reviewed above. The demand made by the American Coal Company was that the Consolidation Coal Company be enjoined from making higher rates of charge for tolls than provided for by the amended charter of 1876, and this relief the court decided the appellant is entitled to.

By these decisions the Consolidation Coal Company will be compelled to pay back the overcharges made

since the passage of the act which reduced the tolls on that road. As a considerable amount of these overcharges will only have to pass from one pocket to another in meeting the overcharges of the Consolidation Coal Company, there will probably not be over \$130,000 to be refunded to the other companies.

This decision corresponds with that of the United States Supreme Court in the so-called "Granger" cases, where the authority of the Legislature to regulate railroad tariffs and elevator charges, was fully affirmed. The Supreme Court bases its ruling upon the opinion that "where private property is affected with a public interest it is not *jures privatis* only. * * * Property does become clothed with a public interest when used in a manner to make it of public consequence, and affect the community at large. When, therefore, one devotes his property to a use in which the public has an interest, he in effect grants to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest he has thus created."

New York and Philadelphia.

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

	Lump.	Steamer.	Grate.	Egg.	Store.	Chestnut.
Wyoming Coals.						
Lackawanna and Scranton at Hoboken and Weehawken...	2 95	2 95	2 95	3 00	3 60	3 25
Wilkesbarre at Port Johnston.	3 00	3 00	3 00	3 10	3 65	3 25
Plymouth, R. A.	3 00	3 00	3 10	3 75	3 35	3 35
Susque. Coal Co., (S. H. Brown & Co.) at Amboy.....	2 80	2 80	2 80	2 95	3 50	3 20
Kingston at Hoboken.....	2 85	2 85	2 90	3 00	3 60	3 25
Pittston at Newburgh:						
A. S. Swords.....	2 85	2 85	2 85	2 95	3 50	3 25
Penn. Coal Co.....	3 10	3 10	3 10	3 20	3 60	3 25
Lehigh Coals.						
Old Company at Port Johnston	3 75	3 25	3 25	3 65	3 25	3 25
Old Company's Room Run "	3 75	3 25	3 25	3 65	3 25	3 25
Sugar Loaf, Hobok. & Amb. "	3 75	3 25	3 25	3 65	3 25	3 25
Lehigh Coal Exchange "	3 75	3 25	3 25	3 75	3 50	3 25
Honey Brook Lehigh.....	3 75	3 25	3 25	3 65	3 25	3 25
Beaver Meadow at South Amboy	3 75	3 25	3 25	3 65	3 25	3 25
Mount Pleasant at Hoboken...	3 75	3 25	3 25	3 50	3 30	3 25
Cross Creek at Elizabethport...	3 75	3 25	3 25	3 75	3 25	3 25
Schuylkill Coals at Port Richmond, Philadelphia.						
Schuylkill white ash.....	2 75	2 75	2 60	2 65	3 25	2 75
Schuylkill red ash.....	2 75	2 75	2 75	3 35	2 75	2 75
Lorberry.....	3 00	3 00	3 00	3 00	3 00	3 00
Lykens Valley.....	4 15	4 15	4 15	4 15	4 15	3 30

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

	Per ton.
Freight from Hoboken and Weehawken to New York.	35¢@40c.
" " Elizabethport & Port Johnston to N. Y.	35¢@40c.
" " South Amboy to New York.	35¢@40c.

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 60c. per ton additional.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.	At the Shipping Ports.	
	Per ton of 2240 lb.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia.....	\$4 70	\$6 00
" " at S. Amboy....	5 50	6 00
Red Bank Cannel Pa. at Philadelphia....	8 00	8 50
Youghiogheny, Waverly Co., at Balt....	4 25	5 05
Despard, West Va.....	4 50	6 00
Murphy Run, West Va., at Baltimore...	4 50	5 85
Fairmount, West Va., " " " " " "	4 40	5 70
Newburgh Orrel, Md. " " " " " "	4 50	6 00
Cannelton Cannel, W. Va.....	6 00	10 00
" Splint, " at Richmond.	6 00	7 00
" Gas Coal at Richmond.....	4 15	5 05
Peytons Cannel W. Va. at Richmond...	6 00	10 00
Manufacturing and Steam Coals.		
Cumberland at Georgetown and Alexandria, Va.....	3 50@3 75	5 00
Cumberland, at Baltimore.....	3 75@3 90	5 00
Clearfield f.o.b. Canton, Baltimore.....	3 50@3 75	5 00
Pennsylvania Semi-Bituminous Coals.		
At the mines, per 2,000 lb. 90c. as f.o.b. at Greenwich, Phila., for Eastern and foreign shipments, per 2240 lb. \$3 25@3 35 for Sound ports, 3 50@3 65, f.o.b. at South Amboy, N. J., per 2,240 lb., \$4 10@4 75. Discharged, in New York, per 2,240 lb., \$5 00 @5 15.		

Foreign Gas Coals.	Sterling.		Am. cur cy.
	9/6@11/	6 50@7 00	
Newcastle, at Newcastle-on-Tyne.....	26/	13 00	7 00
Liverpool House Orrel, at Liverpool....	42/	18 00	13 00
Ince Hall Cannel " " " " " "	28/	13@14	10 00
Scotch Gas Cannel, at Glasgow, nominal, Gold.	25/	7 50	7 50
Block House, at Cow Bay, N. S.....	1 75	4 75	4 75
Caledonia, at Port Caledonia.....	1 50	4 25	4 25
Glance Bay, at Glance Bay.....	1 50	4 25	4 25
Lingan, at Lingan Bay.....	1 75	4 75	4 75
Sydney, International and Reserve mines, at Sydney.....	2 00	5 50	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75	5 75

Retail Prices in New York.

Table listing retail prices for Anthracite and Bituminous coal in New York, including items like Pittston coal, Lackawanna coal, and various grades of coke.

Boston, Mass. March 3, 1877.

COAL.—There is a rather better feeling throughout the trade, based on the favorable result of Wednesday's auction sales. A considerable decline had been anticipated here, but the market fully held its own.

It is reported, on what seems to be good authority, that the Philadelphia and Reading Coal and Iron Company is contracting to deliver coal at Boston throughout the season at less than current rates.

The retail demand here continues light, the reduction in prices not having stimulated consumption to any marked extent.

Table listing Boston wholesale prices for Anthracite, do egg, do stove, Cumberland, Clearfield, Westmoreland, and Caledonia.

—Commercial Bulletin.

Chicago, Ill. March 6, 1877.

Specially reported by Messrs. RENO & LITTLE.

Table listing Chicago prices for Lackawanna Stove, Chestnut, Grate & Egg, and other items.

Cincinnati, O. March 6, 1877.

Specially reported by the Consolidated Coal and Mining Co.

Prospects are that bituminous coal will be lower, as there is about 4,000,000 bushels on the way from Pittsburg. Miners along the Ohio River, between Cincinnati and Pomeroy, are out on a strike for an advance of 3/4c. per bushel.

Below please find prices of coal in our market for present delivery.

Table listing Cincinnati prices for Youghiogheny lump, Camden, W. Va., Kanawha, Peytona, and other grades of coal.

Cleveland, O. March 6, 1877.

Specially reported by Messrs. LAMBIE & BATES.

The following are the prices established by the Coal Exchange until further notice:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

Table listing Cleveland prices for Brier Hill lump, Massillon and Mineral Ridge, Stratsville Lower Vein, Del Carbo, Rich Hill, Columbians, Lackawanna, and Lehigh.

New Orleans, La. March 5, 1876.

Specially Reported by Messrs. C. A. MILLSBARGER & Co.

On hand March 1st, 89 boats and 10 barges; consumption during February, 16 boats and 2 barges of Pittsburg

coal; arrivals during February, 55 boats and 12 barges of Pittsburg coal.

We can report a decline in the New Orleans coal market since our last, as well as a falling off in the demand. The stock on hand is not large, but is ample for immediate wants. We quote:

Table listing New Orleans prices for Pittsburg coal, Anthracite, Virginia Cannel, Scotch, Mt. Carbon, St. Bernard, and other grades.

Philadelphia, Pa. Mar. 8, 1877.

From our Special Correspondent.

Trade continues dull both at retail and wholesale. The Reading Coal and Iron Company have issued their circular for March rates, which at the present rates of tolls cannot be met by any of the producers, including the company, without serious loss.

It would be fairer to the trade if the tolls were commenced first and the prices afterwards, but it would deprive the company of some of those advantages which they never allow to escape.

Combination is still whispered about by some as a sure thing, but with the large sales already made and the circular just issued, a reduction in production seems like an absurd thing.

Pittston, Pa. Feb. 27, 1877.

From the Commercial Herald, March 1, 1877.

Table listing Pittston prices for Lump, Egg and Stove, Chestnut, and Pea.

Richmond, Va. March 6, 1877.

Specially reported by S. H. HAWES, Dealer in Coal.

Table listing Richmond prices for Kanawha Cannel, Coalburgh Splint, Lewiston, Kanawha Gas, and other items.

San Francisco, Cal. March 1, 1877.

Table listing San Francisco prices for Anthracite, Australian, Coos Bay, Cumberland, and English.

We are in constant receipt of liberal supplies from British Columbia, Nanaimo and Wellington finding ready sale at \$8@9. Seattle, Coos Bay, Bellingham Bay, etc., from the Northern Coast, arrive daily, and these, with the California Black Diamond (Mt. Diablo) mines, go far to supply the current wants of trade.

St. Louis, Mo. March 6, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Table listing St. Louis prices for Lackawanna, Wilkes-Barre, Blossburg, Pittsburg, and Indiana Block.

Toledo, Ohio. March 6, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR.

Table listing Toledo prices for Lackawanna lump, Lehigh lump, Hocking lump, and Willow Bank lump.

Montreal, Canada. March 6, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Table listing Montreal prices for Scotch Steam, Pictou, Anthracite at retail, Egg, and Stove.

Toronto, Canada. March 3, 1877.

Table listing Toronto prices for Scranton and Lackawanna, Lehigh lump, and Soft coals.

Freights

Representing the latest actual charters up to March 8, Per Ton of 2240 lb.

Large table listing freight rates for various ports including Augusta, Albany, Alexandria, Amesbury, Bangor, Bath, Baltimore, Boston, Bridgeport, Bristol, Cambridgeport, Derby, Dighton, East Cambridge, Fall River, Gloucester, Hallowell, Hartford, Hoboken, Hudson, Jersey City, Lynn, Middletown, Mystic, Newark, New Bedford, Newburyport, New Haven, New London, Newport, New York, Norfolk, Norwich, Pawtucket, Philadelphia, Portland, Portsmouth, Providence, Poughkeepsie, Rockport, Saco, Sag Harbor, Salem, Salisbury Pt., Stamford, Stonington, St. Johns, Taunton, Troy, Warren, Wareham, Washington, and Weymouth.

* And discharging and towing. † And discharging. ‡ And towing. \$ 3c. per bridge extra.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, March 9, 1877.

American Pig.—We are reported but very little business. The demand has fallen off and prices are more notably weak than for a long time past. Numerous sales are reported to have taken place at \$19 per ton for No. 1 foundry, while but few would think of paying more than \$19.50.

Scotch Pig.—The business in this article has been only in a very small way at lower prices. We quote Coltness at \$27@27.50; Eglinton, \$24.50@25; and Glengarnock \$26.

Rails.—The market for these has been very quiet. We quote iron rails at mills at \$33@37 and steel at \$48.50@50.

Old Rails.—We learn of no business in these and quote at \$19.

Scrap.—In the absence of business we quote at \$26 per ton for No. 1.

Baltimore, Md. March 7, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co. We have no change in the iron market, and quote prices as follows:

Table listing Baltimore prices for Virginia Charcoal, Anthracite No. 1, Anthracite No. 2, and Anthracite No. 3.

Buffalo, N. Y. March 8, 1877.

Specially reported by Messrs. PALEN & BURNS, 246 Washington Street.

Consumers are buying only for immediate use. Low prices no inducement to buy any large quantity. Foundries doing fair business.

Prices per Gross ton at Buffalo.

Table listing Buffalo prices for No. 1 Foundry, B 1, No. 2, and Gray Forge.

LAKE SUPERIOR CHARCOAL IRONS.

No. 1	.....	\$26 75	—4 MOS
No. 2	.....	25 75	—4 "
No. 3	.....	25 25	—4 "
No. 4	.....	25 25	—4 "
No. 5	.....	25 75	—4 "
No. 6	.....	26 25	—4 "

AMERICAN SCOTCH—CHERRY VALLEY.

No. 1	.....	\$25 50	—4 MOS
B. 1	.....	24 00	—4 "
No. 2	.....	23 00	—4 "

One dollar off for cash.

Chattanooga, Tenn. March 5, 1877.
Specially reported by J. F. JAMES, pig iron broker, etc., 233 Market Street.

The demand for pig iron during the past week has been equal to any previous week since the commencement of the new year. Inquiries are numerous, and several large offers for round lots at present market prices for future delivery have been declined. The feeling of the trade south is better, based upon light stocks and indications of a general improvement in all branches of industry. A couple of idle stacks along the line of the Selma, Rome and Dalton Railroad and Rising Fawn furnace are being repaired with the utmost despatch for resumption of operation immediately. No alteration in prices, as below:

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	.....	\$20 @ 22
" " " " No. 2 foundry	.....	19 @ 20
" " " " gray forge foundry	.....	16 @ 17
" " " " coke, No. 1 foundry	.....	20 @ 21
" " " " " No. 2 foundry	.....	18 @ 19
" " " " " gray forge foundry	.....	16 @ 17
Charcoal or Coke, White and Mottled	.....	15 @ —
Tennessee, Alabama and Georgia cold-blast car wheel	.....	22 @ 28
Old Rails	.....	18 @ 19
Old car wheels	.....	16 @ 17
Wrought Scrap, No. 1	.....	17 @ —
" " " " " 2	.....	12 @ —
Cast Scrap	.....	10 @ —
Muck Bar	.....	32 @ 33

Iron Ores.
Red Hematite (about 55 per cent. metallic iron), f.o.c. at mines..... 1 25
Brown Hematite (about 25 per cent. metallic iron)..... 1 75

Cincinnati, Ohio. March 6, 1877.
Specially reported by Messrs. TRABER & AUBREY, commission merchants for the sale of pig iron, blooms, ore, etc.

Below please find closing quotations of our pig iron market, viz.:

CHARCOAL.

Hanging Rock, No. 1 Foundry	.....	\$25 00 @	—4 MOS
" " " " No. 2	.....	24 00 @	—4 MOS
" " " " Mill	.....	22 00 @	—23 00—4 MOS
" " " " Soft Silver Gray	.....	21 00 @	—22 00—4 MOS
Tennessee, No. 1, Foundry	.....	23 00 @	—21 50—4 MOS
Tennessee, No. 2	.....	22 50 @	—21 00—4 MOS
" " " " Mill	.....	21 00 @	—22 00—4 MOS
Missouri, No. 1, Foundry	.....	20 00 @	—4 MOS

STONE COAL.

Ohio, No. 1, Foundry	.....	22 50 @	—23 00—4 MOS
" " " " No. 2	.....	21 50 @	—22 00—4 MOS
" " " " Soft Silver Gray	.....	21 00 @	—21 50—4 MOS
Ohio Mill	.....	21 00 @	—4 MOS
Missouri, No. 1, Foundry	.....	25 00 @	—4 MOS
" " " " No. 2	.....	23 00 @	—23 50—4 MOS
" " " " Mill	.....	21 00 @	—22 00—4 MOS

CAR-WHEEL.

Hanging Rock, C. B.	.....	38 00 @	—43 00—4 MOS
Tennessee	.....	39 00 @	—33 00—4 MOS
Missouri	30 00 @	—32 00—4 MOS
Alabama	28 00 @	—32 00—4 MOS

BLOOMS.

Charcoal	55 00 @	65 00—cash
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SCRAP IRON.

Cast	60c @	1 00—cash
Wrought	1 00 @	1 40—cash

Cleveland, Ohio. March 6, 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.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	.....	26 00 @
No. 2	.....	25 00 @
No. 1, Anthracite	.....	23 00 @
No. 2	.....	22 00 @
No. 1, Bituminous	.....	24 00 @
No. 2	.....	23 00 @
American Scotch, No. 1, Cherry Valley	.....	24 00 @
" " " " " B-1	.....	23 00 @
" " " " " No. 2	.....	22 00 @
No. 1, Massillon	.....	24 00 @
B-1	.....	23 00 @
No. 2	.....	22 00 @

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	.....	26 00 @
No. 4	.....	27 00 @
Nos. 5 and 6	.....	27 00 @

REHEMER IRON.
Nos. 1 and 2 Lake Superior Charcoal..... 26 00 @

FORGE IRON.
No. 1, Gray..... 21 00 @
White and Mottled..... 19 00 @

Louisville, Ky. March 6, 1877.
Specially reported by Messrs. GEORGE H. HULL & Co.

The sales during the last week have been small, but now that the Presidential question is settled, we look for a better demand. Prices are without change.

The usual time, four months, allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	.....	\$24 50 @	25 50
No. 2	.....	22 00 @	23 00
No. 1, Mill, from	.....	21 50 @	22 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	.....	20 50 @	21 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	.....	20 00 @	20 50
No. 1, Mill, from	.....	20 50 @	21 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	.....	23 00 @	23 50
No. 2	.....	21 00 @	22 00
No. 1, Mill,	.....	21 00 @	22 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	.....	20 00 @	20 50
No. 2,	.....	19 50 @	20 00
No. 1, Mill,	.....	20 00 @	20 50

No. 1 Foundry, from Missouri Ores	.....	24 00 @	24 50
No. 2	.....	23 00 @	24 50
No. 1 Mill, from Missouri Ores	.....	23 00 @	24 50

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	.....	37 00 @	40 00
" " Tennessee	.....	26 00 @	28 00
" " Alabama and Georgia Ores	.....	28 00 @	35 00
" " Kentucky Ores	.....	28 00 @	40 00

Milwaukee, Wis. March 6, 1877.
Specially reported by Messrs. R. P. ELMORE & Co.
Lake Superior No. 1 Charcoal..... \$26 00
Lake Superior No. 1 Anthracite..... 25 00
" " " " " 2..... 24 00

Philadelphia, Pa.
(Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending March 8, 1877.)

Pig Iron.—The market for pig is dull and depressed, little business having been done. The large contract for cast iron pipe for Boston, having been all contracted for, brings a lull in trade for a few days. It is reported another large lot of pipe is to be let; if this is so we may hope for some trade next week. There is no change in prices, in fact a change would not affect sales, so makers hold on to the old prices, feeling confident what business is doing all will have a share of. We report sales of about 2,500 tons all grades and brands. We quote, No. 1, \$20 to \$21; No. 2, \$18.50 to \$19.50; Gray Forge, \$17.50 to \$20, as to brand.

MANUFACTURED IRON.—The demand for bar has fallen off again, with a desire to sell at present prices. The demand for plate and tank iron continues in a small way, no new or large orders coming on the market, but most of the mills are running on old orders. We quote bars 2 1/2 to 2 3/4 per lb.; tank and plate, 2 1/2 to 7c, as to brand and quality; skelp, 2 1/2 to 2 3/4 per lb.

RAILS.—As at our last all the steel mills are busy, with a firm feeling as to price. There is more doing in iron rails than for some months. We quote \$49 to \$51 for steel, and \$36 to \$40 for iron.

OLD RAILS.—There is some demand for old rails, but buyers and sellers are about a dollar apart in price. We report sales of 500 tons at \$20.50, and quote \$20 to \$21.50.

Pittsburg, Pa. March 6, 1877.
Specially reported by A. H. CHILDS.

No change of importance has taken place in the condition of the metal market since last report. The stock of good strong iron short pig iron is light and held firmly at full rates, but the ordinary neutral and cold short irons continue in plentiful supply. Most of the mills are now running, and it is not thought that there will be any further decline in prices. Quotations unchanged.

No. 1 Foundry	.....	23 00 @	—24 4 MOS
" " " " " 2	.....	22 00 @	—23 "
Gray Forge	.....	20 00 @	—22 "
White and Mottled	.....	18 00 @	—19 "
Warm blast Charcoal	.....	23 00 @	—20 "
Cold blast Charcoal Western	.....	40 00 @	—45 "

Richmond, Va. March 5, 1877.
Specially reported by ASA STUBBS, Esq.

The demand for first class wheel irons continues good; really desirable irons are scarce. About 125 tons have been sold since last report. Quotations unchanged.

Virginia Cold Blast Charcoal Pig Iron..... \$27 to \$33

" " " " " War'n	.....	24 to 28
" " " " " " " " " " " 1 X	.....	23 to 24
" " " " " " " " " " " 2 X	.....	21 to 22
" " " " " " " " " " " 3	.....	20 to 21
" " " " " " " " " " " Anthracite 1 X	.....	— to —
" " " " " " " " " " " 2 X	.....	— to —
" " " " " " " " " " " 3	.....	— to —

St. Louis, Mo. March 6, 1877.
Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market is quite active, there is a very good demand for foundry irons, and prices at our quotations are maintained. Prospects are very encouraging for a good trade this Spring. We quote same as last.

MISSOURI CHARCOAL.	.....	\$23 @ 25
Missouri No. 1 Foundry	.....	22 @ 23
" " " " " 2	.....	22 @ 23
" " " " " Gray Mill	.....	22 @ 23
H. Rock No. 1 Foundry	.....	25 @ 26
" " " " " 2	.....	23 1/2 @ 24
" " " " " Gray Mill	.....	23 @ 24
Tenn. No. 1 Foundry	.....	23 1/2 @ 24
" " " " " 2	.....	22 1/2 @ 23
" " " " " Gray Mill	.....	22 1/2 @ 23

STONE COAL.

Missouri No. 1 Foundry	.....	25 @ 24
" " " " " 2	.....	23 @ 23
" " " " " Gray Mill	.....	22 @ 26
" " " " " White & Mt'd	.....	21 @ 22

COLD BLAST CHARCOAL FOR CAR WHEELS.

All Numbers.	.....	35 @ 46
Tennessee	.....	30 @ 33
Kentucky	.....	30 @ 33
Missouri	.....	28 @ 30
Georgia	.....	28 @ 30
Alabama	.....	28 @ 30
Assorted Bar Iron	.....	\$2 25, rates.
No. 1 Wrought Scrap	.....	95c cwt.
Heavy cast	.....	70 "
Light	.....	40 "

Montreal, Canada. Feb. 20, 1877.
We quote: Pig Iron.—Gartsherrie, \$22.50 @ 23.00; Summerlee \$22.00 @ 22.50; Eglinton \$10.75 @ 20.75; Hematite \$26.00 @ 27.00. Bar, per 100 lbs., Scotch and Staffordshire \$2.00 @ 2.10; best do., \$2.20 @ 2.30, Swedes and Norway \$4.75 @ 5.50; Loomoor and Bowling, \$6 @ 6.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Mar. 9, 1877.
Although no great improvement has set in yet there is a better business doing in metals, and some fair inquiries are reported.

Gold Coin.—During the week under review the price of gold has ranged from 104 1/4 to 105 1/4, and closed at 105 1/4.

Bullion.—The prices of silver are lower than a week ago, and in the absence of demand from China and the East Indies, the tendency for the present appears to be downward. We quote in this city at 121; in London 55 1/2 d. @ 56 d.; in San Francisco 5 per cent. discount.

Copper.—The sales during the week have amounted to from 300,000 to 400,000 lb. of ingot copper at 19 1/2 c. @ 19 3/4 c. In the absence of a large demand and with outside lots constantly coming on the market, prices have been but little improved, although the statistical position of the article is a very good one and most of the copper is held at higher figures than our quotations.

Tin.—There is but little business doing in this article. The London price has declined to £72 for Straits. Prices in this market, in gold, per lb., are as follows: Straits, 17c; L. & F., 16 1/2 c @ 16 1/4 c.; Refined, 16 1/2 c.; and Banca, 19 1/4 c.

Messrs. ROBT. CROOKS & Co., of Liverpool, under date of Feb. 22, say of Tin Plates:—"Some of the weaker holders of Coke Tins have booked themselves up for the present at a reduction for immediate delivery, but there are others who have not, so far, given way, but will soon be obliged to, should demand not improve. There have also been considerable transactions in Charcoal Ternes, which now stand in much the same position as Coke Tins. In Charcoal Tins and Coke Ternes little has been done, and the tendency here is therefore in buyers' favor.

Tin Plates.—A fair business on western and southwestern accounts is reported. Prices remain unchanged as follow—in gold, per box: Charcoal tins, \$6.75 @ 7, and ternes, \$6 @ 6.25; coke tins, \$6, and ternes \$5.50 @ \$5.75.

Lead.—A small amount of business is reported to have taken place at 6 7/8 c., while some large sales are reported without particulars. The asking price is 6 7/8 c. for ordinary domestic.

Spelter and Zinc.—Domestic spelter is quiet at 6 1/4 c. @ 6 1/2 c. currency. Domestic sheet zinc is quoted at 7 1/2 c. @ 7 3/4 c. currency.

Antimony, with but a moderate business, is quoted at 13c. gold.

Quicksilver.—The London price of this article has declined to £7 @ £7 5/8, while San Francisco quotes at 43 1/2 c. @ 44c. There is no regular quotation in this market.

The San Francisco *Commercial Herald*, of March 1, says of Quicksilver:—"The supply continues free, and prices irregular. Small sales are made 44 @ 45c. but by reason of lower London quotations, export buyers are enabled to secure large parcels at less rates. The tendency of the market appears to be downward, although at this writing we do not feel justified in quoting it as low as we think a round cash offer would buy it for export."

THE SALT LAKE CITY ORE & METAL MARKET.

Telegraphic advices from Salt Lake City, dated Mar. 2, 1877, give the following prices for base bullion, and argentiferous lead ores:

Argentiferous Lead (Base Bullion).—\$73 1/2 per ton for lead. \$1.22 1/2 per ounce for silver. \$20 per ounce for gold. The quotation for silver is based upon the silver contents in the lead of 70 ounces per ton of 2,000 lb.

We are reported a sale of 5 cars of Jordan bullion at \$74.40 per ton for lead, and \$1.23 1/4 per oz. for silver.

A correspondent of the *Inter-Ocean*, under date of the 6th inst., says:

"The Live Yankee mine of Bingham Canyon has been purchased for \$35,000. The ore from this mine carries 51 per cent. in lead, 33 ounces in silver, and 6 in gold to the ton. The mine is considered one of the most valuable of the undeveloped mines of that district.

"Leeds district reports good prospects for their mines. These sandstone ores seem to continue, and the Leeds mill is doing well. This property though rich, can only be operated by large incorporated companies, capable of building mills, etc., etc.

"The shipments of ore and bullion for the week ending February 24, were as follows: Omaha, 23 cars bullion; New York, 5 cars; St. Louis, 13 cars; Pittsburg, 10 cars; Pennsylvania, 1 car, copper ore; Hilliard, 10 cars, lead ore; Pittsburg, 5 cars; total, 67 cars, amounting for bullion to 1,060,075 lb.; copper ore, 22,000 lb. lead ore, 311,520 lb.; total 1,393,605 lb."

THE GEORGETOWN COLORADO ORE MARKET.

Following is the scale of prices now prevailing for silver ores in Georgetown, Colorado:

BASIS:—Silver \$1.25.		Premium on Gold \$1.10	
50 oz ore	47c.	per oz.	300 oz. ore 108c.
75 "	66c.	"	109c. "
100 "	84c.	"	400 " 111c. "
125 "	90c.	"	450 " 113c. "
150 "	95c.	"	500 " 114c. "
175 "	97c.	"	600 " 115c. "
200 "	100c.	"	700 " 116c. "
225 "	102c.	"	800 " 117c. "
250 "	104c.	"	900 " 118c. "
275 "	106c.	"	1000 " 119c. "

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, March 9, 1877.

Until to-day the market for coal shares had represented a gradual improvement in prices. The report of a new coal combination and the denial of the application for a receiver for the Delaware & Hudson Canal Company, which application was generally considered as preposterous and thought to be more in the interest of stock dealers than in the interest of the Creditors of the company seemed to give courage and remove further onslaught on the Companies, and a temporary improvement was imported to the whole list. To-day however the stocks all close lower.

Delaware Lackawanna and Western Railroad Company.—112,402 shares of this stock have changed hands at from 62½ to 66½ closing 64½. A large number of laborers have of late been employed in the new Tunnel under Bergen Hill. The arching of its entire length is about completed and it is said it will be ready for use in three weeks. This company has laid a double track on the Bloomsburg Division from Avondale to Scranton. Over 100 men have been discharged from the Company's shops at Scranton, and a reduction of wages is ordered of those retained.

Delaware & Hudson Canal Co.—The quotations of this stock have ranged throughout the week at from 48½ to 53½ closing at 51½ with sales of 34,034 shares. Judge Lawrence, in Supreme Court, Chambers, on the 7th inst. rendered a decision in the case of Anderson against the Delaware and Hudson Canal Company, denying the plaintiff's motion for the appointment of a Receiver of the company. In a memorandum of his decision Judge Lawrence says: "On the conclusion of the argument yesterday I was strongly of the impression that this application had no merits. The examination and reflection which I have since been able to give to the case have confirmed this impression. The motion is therefore denied, with costs."

Pennsylvania Coal Company.—We note a recent auction sale of 100 shares of this stock at from \$198¼ to \$200 per share.

Bonds.—The dealings in these during the week have been very large, the total sales here and at Philadelphia amounting to nearly \$800,000. The bonds of the New Jersey Central Railroad have been the most prominent feature in these dealings, over one-half of the transactions being in them and at an average decline of probably 5 per cent. for the week.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here and at Philadelphia, for the week ending the 9th inst., are given in the following tables. The Philadelphia quotations will have a * affixed.

STOCKS.

	QUOTATIONS.			Sales Shares.
	High. est.	Low. est.	Clos. ing.	
American Coal Co.....	—	—	25	—
*Cambria Iron Co.....	—	—	60	—
*Pennsylvania Salt Manuf. Co.	—	—	66	—
*Westmoreland Coal Co.....	—	—	—	—
*Buck Mountain Coal Co.....	—	—	—	—
St. Louis, I. M. & S.....	10½	10½	10	50
Spring Mountain Coal.....	—	—	50	—
BONDS.				
D. L. & W. 7s. Conv't., 1892.....	103½	103½	103½	\$2,000
" " 2d mtge., 1881.....	105	105	105¼	9,000
N. J. C., 1st mtge., new.....	104½	102	103¾	50,000
" " 1st mtge., cons.....	60	50	56½	312,000
" " Conv't., 1881.....	52	40	48¾	159,000
L. & W. B. Coal Co., cons.....	35	30	32	92,000
Am. Dock & Imp. 7s.....	44	44	42¾	8,000
D. & H. C. Co., 1st m., 1884.....	100	98	98	17,000
" " " reg., 1891.....	—	—	96	—
" " " 7s, 1877.....	—	—	98	—
" " " reg. & con., 1894.....	86	86	88¼	4,000
St. L. I. M. & S., 1st mtge.....	99½	99	99½	30,000
Ches. & Ohio, 1st mtge.....	—	—	93	—
*L. V. RR., con. mtge., 6s, 1923.....	96	96	96	3,000
" " 2d mtge., 7s, 1910.....	109	109	109	7,000
" " reg. & con., 1898.....	107	107	107	3,000
" " 1s mtge., 6s.....	—	—	—	—
*P. R. RR., 1st mtge., 1880.....	104½	104½	104	5,000
" " Gen. mtge. reg. 1910.....	107½	107½	107	1,000
" " Con. m. 6s. con. & reg. 1905.....	—	—	106	—
*P. & R. RR. 7s, 1893.....	105	105	105	1,000
" " con. m. 7s. con. 1911.....	95	93	94	8,000
" " Deb. 6s, 1893.....	—	—	35	—
" " New conv't. 7s.....	50	44	50	10,000
" " Con. mtge. 7s reg.....	93	93	93½	17,000
" " 6s 43-80.....	101	101	100	2,000
*P. & R. C. & I. Co. Deb. 7s.....	50	50	50	9,000
*L. C. & N. Co. 6s, 1884.....	101	100	100	700
" " RR. loan, '97.....	99½	99½	98	1,150
" " Con. mtge. 7s.....	—	—	—	—
" " Conv't. gold, 1894.....	98½	98½	96	500
Gold loan, 1897.....	88	88	88	13,000
*Schuylkill Nav. 6s 1897.....	80	80	80	1,700

Total transactions for the week.....\$774,050

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, March 9, 1877.

The quotations of stocks at Philadelphia have been fairly maintained. During the past week the market has been moderately active, the total sales amounting to 147,254 shares.

The shipments of oil over P. & R. RR. from Harrisburg, in January exceeded those of any previous month in quantity. The average number of cars containing oil was nearly one hundred a day, 2,500 having passed over the line in all. The number of barrels was about 175,000, and gallons 7,000,000.

North Pennsylvania Railroad Company.—We note the statement that the chattel mortgage bonds of this company falling due and payable on the first day of April next, will be paid at the office of the company. Interest will cease on that date.

AUCTION SALES OF STOCKS AND BONDS during the week have been as follows:

Seyfert, McManus & Company.—Bonds due in 1889, guaranteed by the Philadelphia & Reading Railroad Company, \$150,000 at 60 per cent.

International Petroleum Company.—1,000 shares at \$1.25 for the lot.

Pennsylvania Railroad.—\$7,000 consolidated mortgage 6 per cent. bonds at 98¾ per cent

Susquehanna Coal Company.—\$3,000 6 per cent. bonds at 68½ per cent.

Danville, Hazleton & Wilkes-Barre Railroad.—\$1,500 first mortgage 7 per cent. bonds at 25 per cent.

Emaus Iron Company.—250 shares of stock par \$100, at \$10 for the lot.

Pennsylvania Combined Iron and Steel Association.—500 shares at \$3 for the lot

Schuylkill Navigation Company.—\$120 6 per cent. mortgage, loan of 1832, redeemable in 1897 at 79¾ per cent.

East Sturdy & Hall's Run Petroleum Company.—28,125 shares at \$2 for the lot.

French Creek Lubricating Oil Company.—582 shares at 75 cents for the lot.

Consumers Mutual Coal Company.—60 shares at 25 cents for the lot,

Royal Petroleum Company.—600 shares at 2¼ cents per share.

Porter Farm Oil Company.—2,500 shares at ½ cent per share.

McElheny Oil Company.—100 shares at 3¼ cents per share.

Bull Creek Oil Company. 893 shares at ¾ cents per share.

Adamantine Oil Company.—300 shares at 25 cents for the lot.

Mammoth Vein Coal and Iron Company.—The annual meeting of this company will be held on the 28th inst.

The Volcanic Oil and Coal Company has declared a dividend of 25 cents per share.

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, March 9, 1877.

There has been a very noticeable increase of interest within the past month taken in mining investments in this city, and it seems as though we were entering upon an era of active speculation in mines. There are several very valuable mines now quoted on the mining stock boards, and though some of the best of these seem as yet to attract but little attention, being above the tricks of the mock auction and washed sales which the "wild cats" and generally worthless mines resort to to sell their stocks; yet, with the example of a few mines paying regular dividends, this class of security will rapidly come into popular favor. This time seems now to be at hand, and we propose to make the ENGINEERING AND MINING JOURNAL an indispensable text-book for all who invest and deal in mining securities. We are making arrangements by which we will have the latest and most reliable information obtainable of the several mines dealt in in this city, and by pointing out the good and the worthless, we trust to be able, by diminishing the risk of investors, to encourage the interest in mining investments which is even now becoming noticeable.

Pioneer Mining Company.—200 shares, \$12 for the lot.

Ema Mining Company, Michigan.—125 shares at 3 cents per share.

The California Mining Company declared its usual monthly dividend of \$2 per share on the 8th inst., from the February product. It is not probable that the Consolidated Virginia Company will be in a position to pay any dividends for some time to come, as a large amount of work is stated to be necessary before the mine can be made productive. This is the "panning out" of Superintendent Fair's glowing statement of the unfailling dividends the mine was to pay. Probably the Bonanza "kings" or "knaves" have unloaded.

The principal feature of the week is the calling an assessment of \$1 per share by the Belcher Mining Company. This is the first assessment levied by this company in six years, the date of the last being the 14th of April, 1871. The total sum received by this company since its organization from this source amounts to \$764,400, while the total dividends paid amount to nearly \$1,540,000, being, with a single exception, the largest sum returned to its stockholders by any mine in the country. The last dividend declared by this company was in April, 1876, and was the fourth monthly dividend of \$1 per share paid during the year. The bullion product of this mine for 1876 amounted to \$2,920,460, the average yield of ore being about \$22.23 per ton, the total output was 131,328 tons, for crushing this amount of ore \$1,534,924 was paid, or more than one-half of the total value of the same. The present yield of the mine is about 125 tons of ore per day. Sinking the main incline and drain-shaft, and opening the 1,800-foot station, constitute the principal operations in the mine.

Clarendon Gold Mining Company, Mass.—\$3,200 of the stock of this company were sold at auction in Philadelphia during the week at \$2 for the lot.

The sales and quotations on the New York Mining Stock Exchange during the week, omitting those stocks which are quoted on the American Mining Board, are given below:

Lacrosse Gold Mining Company, 4,300 shares at from 28c. to 32c. per share.

Bobtail Gold Mining Company, 1,950 shares at from \$1.45 to \$1.55 per share.

Bobtail Tunnel Company, 50 shares at \$3.50 per share.

American Flag Gold Mining Company, 1,300 shares at from '07 to '08 per share.

Quotations have been as follows:

Smith & Parmlee Gold Mining Company. .08 at 15c.

Eureka G. V. California Gold Mining Co. .52½ at 3¼.

Silver Islet Silver Mining Company 50c. bid

Copper Stocks.

Specialty reported by Messrs. WILSON W. FAX & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING March 7, 1877.

The market for copper stocks remains in the same condition as before reported, and requires little comment. Calumet has taken a decided jump to 183¼ this afternoon on the report that copper is firmer. Duncan is very quiet but steady at 5¼ bid. Franklin is offered at 12¼, 11¼ best bid; the stock could probably be bought at 12 or less. Quincy is steady at 40½ bid, with an occasional sale at 41. Pewabic is not quite as strong as it was a week ago, 4 being best bid. Mesnard is at 37 bid, with sales at 40. In the small coppers there is nothing doing.

COPPER PRODUCTS FOR FEBRUARY.

The *Portage Lake Mining Gazette* gives the following as the product of the reporting mines for the month of February: Calumet & Hecla 1,054 tons; Osceola 142 tons; Franklin 116 tons 305 lb.; Pewabic 31 tons 200 lb.; Quincy 130 tons. Total about 1,473 tons.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Mar. 9, 1877.

With but few exceptions we note a slight decline in gas stocks. The market is very quiet. Slight transactions in the stocks of the New York and Manhattan Companies are reported to us at our quotations.

The New York City Gas Supply.—At a meeting of the Gas Commission on the 8th inst., the following awards were made for lighting the public lamps of the city for the nine months ending December 31st, 1877. We have also added to these awards the amount paid for the first quarter of the year:

Company.	Paid for 1st quarter of the year.	Cont't for the remaining nine months of the year.	Total per lamp for the year 1877.
New York Gas Co.....	\$7 50	\$12 40	\$19 90
Manhattan Gas Co.....	7 50	12 40	19 90
Mutual Gas Co.....	9 00	22 25	31 25
Harlem Gas Co.....	10 50	24 75	35 25
Metropolitan Gas Co....	9 00	21 00	30 00

The districts lighted by the above companies are as follows:

New York, South of Grand street.

Manhattan, from Grand to 34th street.

Mutual, from 34th to 79th streets.

Metropolitan, between Thirty-fourth and Seventy-ninth streets, except the lamps situated east of Third avenue and between Fifty-sixth and Seventy-ninth streets.

Harlem, between Seventy-ninth street and Harlem River, except lamps situated between Fifth avenue and East River, north of Seventy-ninth street.

To the New York and New Jersey Globe Gaslight Company (gasoline), for all lamps between Fifth avenue and East River, north of Seventy-ninth street and the lamps east of Third avenue, between Fifty-sixth and Seventy-ninth streets, awards were made at \$20. per lamp.

It is stated in the Department of Public Works that the actual saving by these awards over 1876 will be \$74,000.

The Brooklyn Gas Supply.—At a recent meeting of the Brooklyn Board of Aldermen the offer of the gas companies to supply the city with gas during the coming year at \$2.25 per 1,000 feet was accepted.

The Cumberland, Md., Gas Question.—A resolution was introduced into the Cumberland Common Council on the 5th inst, offering the Gas Company \$1.50 per 1,000 feet for the gas supplied to the city lamps instead of \$2.50 as formerly. If the gas company will not reduce to that figure the city will refuse to use gas altogether.

The Chicago Street Lamp Appropriation.—\$200,000 has been appropriated by the Common Council of Chicago for lighting the street lamps during 1877.

Abandoning Gas in Mahanoy City, Pa.—The *Schuylkill Republican* says: We learn that the Mahanoy City people have become dissatisfied with their gas, and propose to light their streets with the Globe Gas Light. This will be a severe blow to the gas company, which is yet in its infancy.

The Camden, N. J., Gas Company has reduced the price of gas from \$3.15 to \$2.60 per 1,000 feet.

The Consumers Gas Company of Toronto, Canada, has issued the following announcement reducing the price of gas from the 1st of April next: The gross price will be 13 per thousand cubic feet, and a discount of 33½ per cent. will be deducted from all accounts paid by the 15th day of the month, and 20 per cent. if they are paid by the end of the month in which they are dated. A further discount of 25 cents per thousand feet will be allowed to all consumers of over 400,000 feet per annum.

Auction Sales of Gas Stocks during the week have been as follows:

Washington, D. C. Gas Company.—8 shares in Philadelphia at \$23¼ per share.

Northern Liberties Philadelphia Gas Company.—6 shares at \$43 per share.

Lynn, Mass., Gas Company.—10 shares at \$85 per share.

Boston, Mass., Gas Company.—3 shares at \$805 per share.

Dorchester, Mass., Gas Company.—25 shares at \$99 per share.

Manhattan, N. Y., Gas Company.—20 shares of \$50 each at \$222, ex-dividend.

COAL TRANSPORTATION AND MINING STOCKS.

Table with columns: Amount of Cap. Stock, Shares issued, Date, percentage and amount of last dividend, QUOTATIONS g (Sat, Mon, Tues, Wed, Thurs, Fri, Clg. Bid), SHARES SOLD. Lists various coal and mining companies with their financial details and stock prices.

Total sales for the week.....312,794

MINING STOCKS,

New York.

Table with columns: Name of Company, Location, Feet on Vein, Capital Stock, a No. of Shares, Total Assessments Levied, Date and Amount of Last Assessment per share, Total Dividends paid, Date and Amount of Last Dividend per share, These quotations are in currency, and in the absence of final bid prices are based on the latest sales as they occur during the operations of each day. Lists various mining companies with their financial details and stock prices.

Boston.

Table with columns: Name of Company, Location, Capital Stock, a No. of Shares, Total Assessments Levied, Date and Amount of Last Assessment per share, Total Dividends paid, Date and Amount of Last Dividend per share, These quotations are in currency, and in the absence of final bid prices are based on the latest sales as they occur during the operations of each day. Lists various mining companies with their financial details and stock prices.

g. Gold. a. Silver. L. Lead. c. Copper. a The par value of shares is \$100, unless otherwise designated. b Par value \$10. c Par value \$50. d Par value \$25 each. e Par value \$15. f Par value \$20. g Quotations represent the latest prices bid. Prices asked will have a * affixed. For readines of comparison the quotations of Philadelphia Stocks and the shares being \$50 each, are based upon a percentage value, or 100, equal to shares of \$100. h Full paid. i On the four old companies. j This company declared a dividend of 3 1/2 per cent. on its preferred stock in July, 1876. k New York Stock Exchange quotations.

ADVERTISERS' INDEX.

Assaying Tools and Chemicals:	Page.	Swords, A. S., New York.....	vi	Locomotives:	Page.	Rock Drills:	Page.
Benjamin, E. B., New York.....	v	Williams, R. H., New York.....	vii	Burnham, Parry, Williams & Co, Phila..	v	Am. Diamond Rock Boring Co., N. Y.....	vii
Blasting Powder:		Coal and Ore Separators:		Machinists' Tools:		Burleigh Rock Drill, New York.....	vii
Lafin & Rand Powder Co., New York..	vi	Bradford, H., Philadelphia, Pa.....	v	Bement, Wm. B., Philadelphia, Pa.....	—	Delamater Iron Works, New York.....	vii
Miners' Supply Co. (Blasting Squibs),		Fraser, Chalmers & Co., Chicago, Ill....	iv	Hull & Beiden Co., Danbury, Conn.....	vii	Rand & Waring Drill & Comp. Co., N.Y. vii	
St. Clair, Pa.....	i	Foot & McNulty, New York.....	ii	Mining, Crushing, Stamping and Smelting Machinery:		Rubber and Belting:	
Oliver, Paul A., Wilkes-Barre, Pa.....	vi	Wetmore, George C., New York.....	ii	Ball's Steam Stamping, Holyoke, Mass..	iv	Gutta Percha and Rubber Co., The, N.Y. i	
Books and Periodicals:		Engineers and Chemists:		Baugh & Sons' Ore Mill, Phila., Pa.....	iii	New York Belting and Packing Co.....	i
Allen, Lane & Scott, Philadelphia.....	164	Courtis, Wm. M., Wyandotte, Mich.....	v	Blake's Crushing & Ore Breaking, New Haven, Conn.....	iv	Steel Works:	
Baird's Books for Practical Men.....	—	Blast Furnace Chemist, Boston.....	i	Copeland & Bacon, N. Y.....	iv	Crescent Steel Works, Pittsburg, Pa....	v
Capital and Labour.....	—	Endres, John J., New York.....	v	Council Bluffs Iron Works, Iowa.....	iv	Edgar Thompson Steel Co., Pittsb'g Pa. 164	
Catalogue of Mining & Eng. Pamphlets.	i	Foot & McNulty, New York.....	163	Crane Bros. Mfg. Co., Chicago, Ill.....	iv	Park Bros. & Co., New York, Boston,	
El Minero Mexicano.....	v	Hale, A. W., New York.....	v	Delamater Iron Works, New York.....	viii	Pittsburg and Cincinnati.....	v
La Houille.....	iv	Hill, John W., Hamilton, O.....	v	Fraser, Chalmers & Co., Ill.....	iv	Pittsburg Steel Casting Co., Pittsb'g, Pa.	
Relief Map of the San Juan Co., S.W. Col.	164	Keyes, W. S., San Francisco, Cal.....	v	Hartford Foundry & Machine Co., Conn.	iv	Tubes and Pipes:	
Spon, E. & F. N., New York.....	164	Morton, J. H., Salt Lake City, Utah.....	v	Krom, Stephen B., New York.....	ii	Abendorth & Root Mfg. Co., New York..	vii
Teknisk Tidsskrift.....	iv	Nicolls, W. J., Baltimore, Md.....	v	Lane & Bodley Co., Cincinnati, Ohio...	v	Morris, Tasker & Co., New York.....	ii
Van Nostrand's Eclectic Engineering Magazine.....	164	Rothwell, R. P., New York.....	v	Morey & Sperry, New York.....	vii	National Tube Works Co., Boston, Mass.	iv
Van Nostrand's Science Series.....	164	Stetefeldt, C. A., San Francisco, Cal...	v	Morgan Iron Works, New York.....	iv	Worthington, H. R., New York.....	i
Cement:		Wilson Bros. & Co., Philadelphia, Pa....	v	Rogers, H. A., New York.....	i	Ventilators:	
Brand, James, New York.....	v	Wurtz, Henry, Hoboken, N. J.....	v	Philadelphia Hydraulic Works, Phila....	iii	Murphy, Francis, Philadelphia, Pa.....	v
Fleming, Howard, New York.....	iv	Engineer's Instruments:		U. S. Hoisting & Conveying Co., N.Y... 164		Wanted and For Sale:	
Merchant, Anderson & Co., New York..	i	Instruments for Sale.....	viii	United Royal Smelting Works.....	164	Blast Furnace Chemist, Boston.....	i
Coal:		Engravers:		Pumps:		Engineering and Mining Journal—Vols.	
Berwind, White & Co., New York.....	vi	Crosscup & West, Philadelphia, Pa.....	v	Carr, A., Selden Direct-Acting N. Y....	ii	for Sale.....	vii
Borda, Eugene (Koh-i-noor Coal), Phila.	vii	Fire Brick:		Cameron, A. S., New York.....	164	Kanawha Coal Lands.....	163
Borden & Lovell, New York.....	vii	Kriescher, B. & Son, New York.....	163	Clayton, James, Brooklyn, N. Y.....	iii	Manganese.....	vi
Brown, S. H. & Co., New York.....	vi	Mauer, Henry, New York.....	v	Crane Bros. Mfg. Co., Chicago, Ill.....	ii	Mining Engineer Wanted.....	
Cannelton Coal Co., Philadelphia, Pa....	vii	Valentine, M.D. & Bro., Woodbridge, N.J.	v	Delamater Iron Works, New York.....	viii	Situation Wanted as Mining Engineer..	
Coxe, Bros. & Co., New York.....	vii	Gas Process:		Harris Steam Pump, New York.....	iii	Situation Wanted by a Graduate Eng'r.	
Detmold & Cox, New York.....	163	Stevens, S. A. & Co. (Lowe Process), N.Y.	ii	Knowles Steam Pump Works, N. Y.....	iii	Wire Rope:	
Heissenbittel & Wells, New York.....	vii	Gas Works' Machinery:		Niagara Steam Pump Works, Brooklyn,		Halladie, A. S., San Francisco, Cal.....	ii
Hoboken Coal Co., New York.....	vii	Morris & Tasker, New York.....	iii	N. Y.....	1	Hazard Mfg. Co., Wilkes-Barre, Pa.....	ii
Kittanning Coal Co., Philadelphia, Pa....	vi	Hot Blast Stoves:		Norwalk Iron Works Co.....	147	Mason, John W. & Co., New York.....	i
Lehigh Valley Coal Co., New York.....	vi	Whitwell's.....	—	Worthington, H. R., New York.....	ii	Roebing, John A., Trenton, S. J.....	ii
Lehigh & Wilkes-Barre Coal Co., N. Y..	vii	Hydraulic Jacks and Punches:		Railroads & Transportation Lines:		Miscellaneous:	
Maryland Coal Co., New York.....	vii	Dudgeon, Richard, New York.....	v	Pennsylvania Railroad.....	i	Incombustible Mineral Wool.....	164
Pardee, A. & Co., New York.....	vii	Lyon, E., New York.....	v	Roofs, Girders, etc.:		Vickers, P. O., Augusta, Maine.....	164
Pennsylvania Gas Coal Co., New York..	vii	Locomotives:		Dwight, G.W., jr. & Co., Spr'gfield, Mass.	iii	Riley, Henry A.....	vii
Phila. & Read, Coal & Iron Co., Phila., Pa.	vi	Books, Girders, etc.:		Scaife, Wu. B. & Sons, Pittsburgh, Pa..	i	Situation Wanted as Superintendent... 1	

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Companies in New York and Vicinity	Cap. Stk.	Par.	last Div.	When Paid.	Bid.	Askd.
Mutual, N. Y.....	\$5,000,000	\$ 100	2 1/2	Jan. '77	101	103
" Bonds	90,000	1,000	1 3/4	Feb. '77	109	109
New York, ".....	4,000,000	100	5	Nov. '76	131	—
Metropol. ".....	2,500,000	100	5	Sep. '76	140	144
" Certf.	1,000,000	100	3 1/2	" "	102	—
" Bonds	500,000	1,000	3 1/2	Dec. "	102 1/2	—
Harlem ".....	1,850,000	50	4	Feb. '77	104	—
Manhattan ".....	4,000,000	50	10	Dec. "	219	222
Brooklyn, B'klyn.....	2,000,000	25	5	Nov. '76	168	172
Nassau ".....	1,000,000	25	4	Jan. '76	80	—
" Certf.	700,000	1,000	3 1/2	Nov. '76	95	—
People's ".....	1,000,000	10	3 1/2	Jan. '76	47	52
" Certf.	300,000	1,000	3 1/2	July '76	84	90
" Bds	325,000	—	3	Feb. '77	90	96
Metropol. ".....	1,000,000	10	3 1/2	Nov. '76	78	80
Wmsburgh ".....	1,000,000	50	3	Oct. '76	130	—
" Certf.	1,000,000	—	3 1/2	July "	99	102
Citizen's ".....	1,200,000	20	2 1/2	Jan. '76	98	102
" Certf.	320,000	1,000	3 1/2	Oct. "	98	102
J. C. N. J.....	750,000	20	5	July '75	160	—
Centl. Westch. N.Y.	466,000	50	4	July "	90	—
Subur'n ".....	295,000	50	3 1/2	Oct. 1, '76	90	100

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2	100	5	2 1/2	6
3	150	6	3	7
4	200	7	3 1/2	7
5	275	7	3 1/2	10
6	325	8	4	10
7	400	10	5	14
8	425	10	6	12
9	480	12	7	12
10	550	14	9	15
11	700	16	10 1/2	15
14	850	18	12	18

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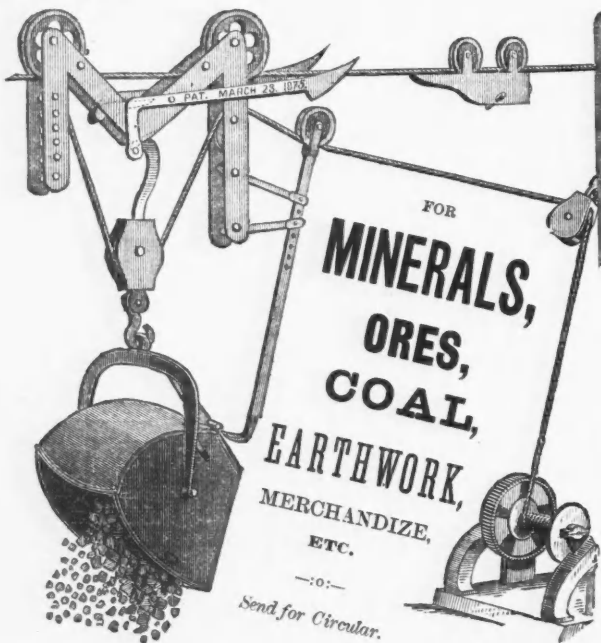
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