THE ENGINEERING AND MINING JOURNAL.

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

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AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

THE October Meeting of the Institute will be held in Philadelphia, beginning Tuesday evening, October 24th. The Council has decided to have no excursions during this meeting, that the members in attendance may have the opportunity to visit the International Exhibition. Members are earnestly requested to give early notice to the Secretary of the titles of papers to be read. Due notice will be given of the place of meeting.

Authors of papers read before the Institute are entitled to twelve copies of the ENGINEERING AND MINING JOURNAL containing their papers. These copies will be sent on application to the Office of the Journal, or the Secretary of the Institute, immediately after the appearance of the papers. Back numbers cannot always be supplied.

EASTON, Pa., Sept. 18, 1876. THOMAS M. DROWN, Secretary.

DOCTOR SWANK'S DIAGNOSIS.

THE PATIENT DYING FOR WANT OF INFLATION.

WHEN a distinguished patient is in the hands of a distinguished doctor, it is customary to issue periodical bulletins of his condition, perhaps with the double purpose of satisfying the public and advertising the practitioner. Which of these motives inspires the periodical utterances of the *Bulletin of the American Iron and Steel Association* concerning the condition of American business and finance, we will not undertake to say. They cannot be very satisfactory to the anxious friends of the sufferer, for the doctor takes pains to say that the patient is getting worse; that the signs of improvement in him which have rejoiced the family are delusive, and that unless he can be promptly inflated he will collapse. Inflation to prevent collapse, and more inflation to cure it, constitute the obviously simple and scientific therapeutic theory of this doctor and his school.

The *Bulletin*, for September 13, goes for this subject in a leader, entitled "Is Prosperity returning?" and declares that renewed activity in business at low prices of commodities and labor is no sign of better times. Here is a piece of wisdom on the subject, extracted from the *Bulletin's* argument—wisdom which we must regard as precious, because it is scarce, nay, unique:

"If iron rails could be bought for twenty-five dollars a ton, would the company which would sell them at that price be as great a benefactor to the community in which those rails were made as if it had obtained fifty dollars a ton for them? If wages were fifty cents a day, would the men who were paid that sum be as likely to buy furniture, carpets, musical instruments, fine clothing, anything, indeed, except the merest necessaries of life, as if their wages were two dollars a day? If a tailor in a country village can obtain his Winter's supply of potatoes from a neighboring farmer at ten cents a bushel, what chance will that tailor have to sell that farmer a broadcloth suit? If the country doctor is obliged, by the general reduction in all values, to charge his neighbor, the carpenter, fifty cents for each visit to his sick family, instead of the old fee of one dollar, how many new houses is that doctor likely to get that carpenter to build for him, and how much stock will he be likely to subscribe to build a woolen factory or a railroad near by?"

Whoever tries to solve these appalling problems, will find that the data are lacking. The *Bulletin* don't tell us how many houses, factories, and railroads the doctor built in the good old times when the carpenter's family was always sick, and visits were worth a dollar; and the only light we have on the matter is the fact that the doctor down our way charges a good deal more than a dollar, and there is no sign of a woolen factory or railroad near by as the consequence. But then, we are not a carpenter, and our family is pretty well, thank you; so the facts are not appropriate.

On the tailor question, we are less helpless; for we have submitted that to a friend who is a tailor; and he says with the recklessness of his race that if potatoes were ten cents a bushel, and coats were cheap in proportion, he don't see but he would be just as well off. "But," we reply, "you must make potatoes cheap, and keep coats dear." To which that tailor responds by asking us what is meant then by "low prices of commodities" and "low wages of labor," and "the general reduction in all values." So we have to give up the tailor question, too.

In fact, these questions are carelessly drawn. Accuracy of statement is very important in such matters. We shall have to make a new question altogether. For instance: If a writer (say in the *Bulletin*) gets only half of the old fee of one penny per line for essays on political economy, what will be, in view of "the general reduction of all values," the reduced value of his contributions?

Alas, on showing this to a mathematical friend, we are told that we have got zero so mixed up in our equation that the answer may be either zero or infinity, or anything else. It occurs to us, therefore, that perhaps this method of discussing political economy by means of conundrums is, after all, not adapted to the purpose. We take the liberty, therefore, of dropping that line of argument, and stating in simple prose, quite free from spectral tailors, carpenters, and woolen factories, that we think business is reviving, and are glad of it; that we think this country was prosperous before the war, and that the return of all prices towards the *ante-bellum* figure does not frighten us; that we are opposed to inflation, and in favor of specie resumption at the earliest practicable time, and that we do not agree with this sentiment of the *Bulletin*:

"Let us hear no more talk about getting down to 'hard pan,' but let there be instead a hearty welcome extended to every instrumentality which promises to secure an advance in prices and wages all along the line."

This means more paper money; and we must beg to be excused from joining in the genial welcome. With due respect to Mr. SWANK, we prefer to sell our potatoes for less, and to get our pay in gold. *

THE LATEST ABOUT FRYER'S PROCESS.

WE copy below an article from the Grass Valley *Tidings*, which, unless it proceeds from personal hostility (and personal hostility does not usually express itself, on the Pacific Coast, in terms so moderate) indicates a decay of the enthusiasm which once pervaded Grass Valley concerning the process of Mr. FRYER. If his period of indeterminate experiment last a little longer, he will, doubtless, be assailed as a humbug by the Western press, with the same unanimous fervor as formerly attended his apotheosis as a scientific discoverer. In this outcry we do not purpose to join. When Mr. FRYER was in his glory, we criticised his process, so far as he made it known, with a candor which offended his friends. Now that he appears to be down, we do not intend to join in kicking him. In our opinion, he began as an honest, sincere, persevering, intelligent but not well-informed inventor. His ingenuity and courage could not supply the place of a thorough knowledge of the principles involved in the roasting, crushing, and amalgamation of ores with respect to both efficiency and economy; but we think he was spoilt to some extent by flattery and sudden favor. In such cases the temptation is very strong to deny, even to one's self, the first indications of discouragement, and to allow the favorable reports which have already gone out to continue without contradiction, or even to keep them in circulation. Mr. FRYER was steadily reported to have secured extraordinarily good returns from all kinds of ores in small lots, until suddenly, and without warning, these favorable rumors died away. If it is true that his apparatus did not work satisfactorily, it is creditable to him that the blowing of trumpets about it ceased. Nothing would justify denunciation of him, except evidence that the returns he reported or permitted to be reported concerning earlier tests were, to his knowledge, incorrect.

But our Grass Valley cotemporary naïvely avows that it never condemns a "process" at first on general principles, as some do, because it believes that some good may come of any experiment. After a process has failed, according to this rule, is the proper time to point out its evident vanity. Then "there is no use, that we can see, of holding back any longer the expression of our candid opinion."

THE ENGINEERING AND MINING JOURNAL is conducted on a different plan. If a process is objectionable "on general principles," we prefer to express our candid opinion at a time when it may benefit both the experimenter and the public. After it has failed, the candid opinion of people who "always thought so," but didn't say it, is of no great benefit to anybody. Of course, there is no reason for their "holding back any longer"—unless it should occur to them that their tardy display of wisdom may make them ridiculous. *

"FRYER A FAILURE.

"FRYER, and his last attempt to make his 'process' work, down at the Prospect Mine, had nearly passed out of mind until yesterday, when we happened to think that the grand revolutionizer of noble metal reduction must be hereabouts yet, and we asked a Prospect stockholder how the thing was getting along. 'FRYER be hanged,' said he, 'we are losing all this season and nothing done. If we had put on a mill, Prospect would have been all right now.' It seems the octagon stamp-pan-barrel crusher-pulverizer-amalgamator don't perform all it agreed to, and resort is had to stamps some miles away, which makes it slow work testing the 'process.' Some little change is understood to be necessary in order to make it a success. 'Twas ever thus: 'We never are, but always to be,' etc. It is well known here that since we looked the 'process' over, last Spring, we have never expressed the least faith therein, but said but little about it, preferring to let all be done that could be done to bring it out. There is no use, that we can see, of holding back any longer the expression of our candid opinion of the 'process,' which is that as a 'process' there is nothing in it. The roasting may partially desulphurize the ore, but this kind of roasting, it is our honest conviction, can be better, easier, and more cheaply done in a common 'draw' lime-kiln than in the tilt-bottom one of FRYER. The subsequent treatment by FRYER, which was claimed at one time to be the important part of the process, always appeared to us child's-play.

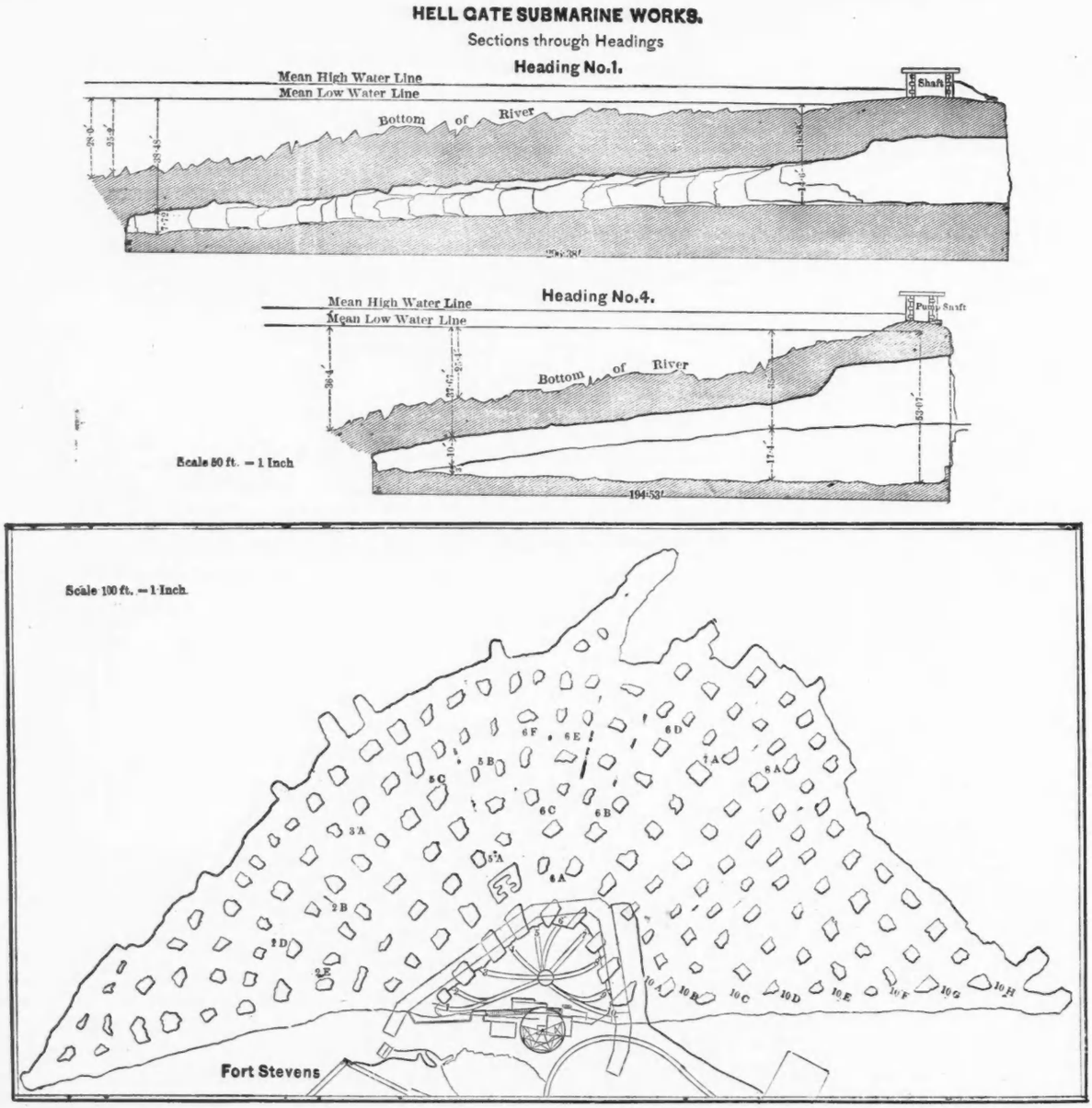
"On the principal that there is room for much improvement in the manipulation of our ores, both silver and gold, more especially those which contain there metals in combination with minerals of a baser nature, we never condemn a 'process' at first, as some do on general principles, for we believe some good may come of any experiment, but there certainly can be no use in winking at this attempt any longer, and thereby keeping mine owners in suspense in regard to the kind of works they ought to put up."—*Grass Valley Tidings.*

THE HELL GATE EXPLOSION.

THE works undertaken by the United States Government for the improvement of New York Harbor have been continued at irregular intervals since 1848, when Lieutenants DAVIS and PORTER, of the United States Navy, made an examination of the narrow channel known as Hell Gate, leading from Long Island Sound to the East River. The narrow channel between Long Island and Ward's Island was rendered very dangerous by Hallett's Point Reef, that projected out into the river some three hundred feet, and caused the tide coming in from the Sound to be thrown over against an opposing rock known as the Gridiron. Besides these rocks there were the Pot Rock, the Frying Pan Rock, and Way's Reef. These were blasted in 1851 and 1852, by exploding cans of powder laid on their surface. 284 of these charges, containing 34,231 pounds of powder, were exploded upon the Pot Rock, and removed about ten feet of it. 240 charges, containing 28,000 pounds of powder, were exploded on Frying Pan Rock and Way's Reef. From 1852, nothing was done till 1866, when Major General JOHN NEWTON was assigned the duty of making an examination of the obstruction at this point, and was instructed to prepare plans and estimates for the works necessary to remove them. He submitted several plans, a prominent feature in each of which was the removal, by submarine works, of the Hallett's Point Reef. In 1869, Congress made the first appropriation for carrying out these plans, and General NEWTON was placed in charge of what have since been known as the Hell Gate improvements. The following brief record of the progress of these works has been published in some of the city papers:

"For operating on rock in mid-channel a steam-drilling cupola scow was constructed. It had a well hole in it thirty-two feet in diameter, through which twenty-one drills could be worked. This scow was first used on Diamond Reef in the same year. Holes were drilled in the rock and charged with nitro-glycerine, which was found to be most efficient. In 1871, operations were begun with the scow on Coenties Reef, which in 1873 was thoroughly broken up. In 1872, the scow was moved to Frying Pan Rock, and a number of blasts were made.

"In August, 1869, the work at Hallett's Point was begun. A coffer dam in the form of an irregular pentagon, whose greatest diameter was 140 feet, was erected on the shore, and a shaft 105 feet by 95 feet in diameter was opened. In June, 1870, the funds appropriated for the improvement having been exhausted, the work on the shaft was suspended. At that time 484 cubic yards of rock had been taken out, at a cost of $5.75 per yard. In the latter part of July operations were resumed, and the shaft was sunk to a depth of thirty-three feet below mean low water. Ten diverging tunnels were then commenced, and opened to distances varying from fifty-one to one hundred and twenty-six feet. As these were sufficiently advanced concentric galleries were excavated. The amount of rock taken out during the year was 8 306 cubic yards, the drilling being all done by hand. In 1871 the work was pushed on more rapidly, steam drills having been introduced. The number of feet of tunnel driven during the year was 1,653, and of transverse galleries, 653 75. The quantity of rock removed was 8,293 cubic yards. In November, 1873, operations were again suspended for want of funds. At the end of the fiscal year, June 30, 1874, work having been carried on for four-and-a-half months only, 896 lineal feet of tunnels were opened and 4,648 cubic feet of rock taken out. The total length of tunnels and galleries then amounted to 6,780 feet."



GROUND PLAN OF EXCAVATION.

The work, since 1874, has been prosecuted with greater constancy, the accompanying map—which we have had reduced to a scale of 100 feet to the inch, from the official plans kindly furnished us by General NEWTON—shows accurately the extent of the work, and the actual relative area of pillars and chambers when the work was completed a week ago. We also give sections through two of the headings, showing, on the scale of fifty feet to the inch, the size of the head-

ings, and in the case of heading No. 4, the drainage level which carried the water back from the face of the heading to the foot of the pump shaft On the section of heading No. 1 we give also the position of the face of the work at the close of each month, thus showing at a glance the rate of progress of the work.

The headings were driven radially from the large shaft out under the sea, and as an accurate survey had been made, in 1871, of the bottom of the river, the inclination of the heading was varied, so as to have from 6 to 15 feet of rock between the excavation and the bottom of the water. It is said that more than 16,000 soundings were made, in obtaining the data for the maps and models, which guided the subsequent work.

When the pillars between the headings became too thick, they were split by another heading, and galleries or cross cuts were driven through the pillars, still further reducing them, till finally they assumed the dimensions shown on the plan. The following table gives the dimensions of the main headings :

NUMBER OF HEADING.	Height of opening at the shaft.	Width of opening at the shaft.	Length of tunnel.
No.	Feet.	Feet.	Feet.
1	22	9	296
2	21	10	186
3	22	11	200
4	22	11	195
5	20	11	191
6	19	9	124
7	19	11	231
8	19	12	214
9	17	13	226
10	13	10	300

The total length of headings was 4,857 feet, and of the circular galleries or cross-cuts, 2,568 feet, or a total of 7 425 feet. The amount of rock taken out was 47,461 cubic yards. The cubic contents of rock contained in the reef above the depth of 26 feet at mean low water, amounted to 51,000 yards. The greatest possible care had to be taken in driving the headings, so as not to get too near the river bottom, or not to shatter the roof of the rock by too heavy shots. In only one case, we believe, was the roof endangered, and there a wall had to be built to support it. When we consider the nature of the rock, which is a hard, tough, foliated, hornblende gneiss, containing a variable inclination of the bed, and numerous quartz veins, the difficulty of the work, and the skill and ceaseless care shown in its successful completion will be appreciated, and every engineer will be ready to accord to General NEWTON, and his able assistants, the credit they have so well earned, and which they are now receiving

The explosives used in making the excavations were nitro-glycerine, several of its compounds, and common black powder. After the excavation was completed, the work of preparing for the final blast was commenced. The scale of our maps is too small to permit us to show the different holes that were driven and their direction, as is done on the original, from which we reduce.

The following report, made to Gen. NEWTON by Capt. MERCUR, the day before the explosion, gives, in a few lines, all the important details :

GOVERNMENT WORKS AT HALLETT'S POINT,
ASTORIA, September 23, 1876.

GENERAL—The following are the numbers and weight which you desire me to give you, viz.:

	Pounds.
Dynamite in tin cartridges	24,812
Dynamite in paper cartridges	1,164
Dynamite in priming cartridges	2,925
Total dynamite	28,901
Rendrock in tin cartridges	9,061½
Vulcan powder in paper cartridges	14,244
Total charge in mine	52,206½
Total number of tin cartridges	13,596
Total number of brass primers	3,680
Total number of holes with primers	3,645
Number of iron pipes	35
Number of holes charged and not primed	782
Total number of holes and pipes	4,462
Number of feet of connecting wire, about	100,000
Number of feet of leading wire	120,000

The number of cells in the priming battery is 960, consisting of 12 batteries of 40 cells each, 4 batteries of 43 cells each, and 7 batteries of 44 cells each.
Distance from firing point to the shaft about 650 feet.

Respectfully,
JAMES MERCUR,
Capt. Engineers, U. S. A.

The holes were from two to three inches in diameter, and had an average depth of about nine feet. They occurred at from six to ten feet apart. The explosives used in each particular hole were determined by a consideration of the rock, and "work to be done."

The holes were charged usually with three cartridges, and over them the primer of dynamite, which was exploded by fulminate of mercury, ignited by electricity in the usual manner. As the works were filled with water no tamping was required ; indeed, the cartridges or primers projected, in many cases, from the holes. A large number of these were exploded simply by the concussion of the neighboring charges, and not directly by primers.

Numerous explosives were at different times tested on the work, and preference seems finally to have been given to rendrock and vulcan powders, both of which are compounds of nitro-glycerine. It is not, of course, claimed for either of these that it is as powerful as the pure liquid explosive, for it required nearly ten ounces to do the work formerly done with eight ounces of nitro-glycerine ; but the cost was less, and there are some inconveniences attending the use of a liquid explosive, that do not occur in using those solid compounds of nitro-glycerine.

The headings were driven in the usual manner—the first drill-holes being inclined so as to lift out a cone of rock from the center of the heading, the other holes were grouped around these, to blow the balance of the section out.

Previous to 1872 the drilling was done by hand; since that time almost all was done with Burleigh Rock Drills, and the Rand Drill, which is spoken of in flattering terms by the officers in charge. The average progress of the work for twelve months, by six Burleigh Drills, was 235 lineal feet of heading per month. Each shift of eight hours drilled, on an average, 30 feet of holes with each machine. The Diamond Drill was also used to some extent, principally for exploring the rock ahead of the work, but for ordinary hole-boring, the varying hardness and inclination of the rocks was unfavorable to it, especially where inclined veins of white quartz were encountered. The work of drilling was contracted for at so much per foot. The cost of drilling with the Burleigh Drill was found to be, on an average, 36 to 37 cents per foot, this including repairs, etc. Hand-drilling cost about 95 cents per foot.

Without giving any figures as representing the actual cost of removing the rock, we can give the percentage of each item of the cost as follows :

Blasting	46·00	Pumping	10·37
Transporting rock to shaft	17·00	Incidental	21·32
Hoisting	3·28		
Dumping	2·03	Total	100·00

The explosion of the mine was effected by 66 batteries, containing in all 960 cells. Each of the groups of holes had its own battery, of from 40 to 44 cells. This had sufficient intensity to ignite about 160 primers. To obtain the simultaneous explosion of all the holes, the wires were held on a cross-bar, forming a circuit closer. On lowering the bar, the brass points to which the wires were attached, plunged into small cups filled with mercury, and which were connected with the second set of wires from the primers. The closing of the circuit was effected by firing (by electricity also) a small torpedo, which held the cross-bar or plate up, so that the brass wires were held out of the mercury. When this torpedo was fired, the bar fell, and the circuit was closed.

Everything having been in readiness, at 2:50 P. M. on Sunday, the 24th inst., the key which made the circuit of the torpedo was touched by the little three year old daughter of General NEWTON, and the famous mine was instantly fired. The water over the entire extent of the ground, shown on our plan of the works, rose in a beautiful white sheet to an almost uniform height of about fifty feet ; as it reached its highest point, there shot up through it pieces of rock, and broken timber from the coffer-dam, which went somewhat higher, though probably none of them attained a height of over 75 feet. The sight was quite impressive, but the moderate height to which the water was thrown, was disappointing to those who, not having had experience in blasting, and not understanding how closely the charges can be proportioned to the work they have to do, expected to see, feel, and hear, something like a mighty volcano in active eruption. Those on the water, at a distance not exceeding a quarter of a mile, did not perceive the least shock, and but a slight report ; even the glass in the houses standing within a few feet of the shaft was not broken, and but a very slight vibration was felt throughout the cities of New York and Brooklyn.

Subsequent soundings show that the rock was completely shattered, and the bed of the river is already considerably lowered even before removing any of the *debris*, which will all eventually be dredged up. Nothing could be a more convincing proof of the skill and care with which the whole work was executed by General NEWTON, than the accuracy with which he proportioned the charges to the work to be done. The following is the formula adopted for determining the charge of dynamite. It is based upon the well-known fact that the charges required in blasting are about proportional to the cubes of the lines of least resistance. From this was deduced the formula

$$L^3 \times \cdot 038 \times \cdot 75 = \text{pounds of dynamite in charge.}$$

Where L=line of least resistance in feet, *i.e.*, the least distance from the lower portion of the hole to the surface of the rock and ·038=the experimental numerical co-efficient, representing the weight in pounds (avoirdupois) of nitro-glycerine, necessary to blast out, in this rock, a hole whose line of least resistance is one foot. The weight in pounds of nitro-glycerine required, multiplied by ·75, gives the weight, in pounds, of dynamite The strength of dynamite being taken as 75 per cent. that of liquid nitro-glycerine.

The co-efficient ·038 is for the average of the rock met with here ; it would, of course, be different for different kinds of rock. The remarkable confirmation of the accuracy of this formula must have been very gratifying to the gentlemen who had charge of the work, as it was satisfactory to the citizens of the neighboring cities.

In conclusion, we simply add the amounts of the several appropriations made by Congress for the improvement of the East River, in which work these Hell Gate excavations were the most important item :

1868	$85,000	1874	$ 250,000
1869	180,000	1875	250,000
1870	250,000	1876	250,000
1871	225,000		
1872	225,000	Total	$1,940,000
1873	225,000		

Of this amount there was expended up to August 1st, 1876 ..... $1,686,841
The total estimated cost of completing the East River and Hell Gate improvements is 5,139,120

The occurrence of the final explosion on Sunday was, as General NEWTON has

clearly explained, a matter not deliberately planned, but forced upon him by delays in furnishing the explosives, for which he was not responsible. The hasty protests of the Sabbath Committee and of some other gentlemen were, therefore, entirely uncalled for, and tended only to render a good cause ridiculous. The risk that would have attended any delay in firing the mine, when it was once ready, fully justified General NEWTON in his action.

THE APPROACHING ABANDONMENT OF THE GREAT ZINC MINE AT FRIEDENSVILLE, PA.

WE hear it stated that the Bethlehem Zinc Company, having contracted with the New Jersey Zinc Company for the supply, for five years, of 12,000 tons a year of zinc ore from their Mines at Stirling, New Jersey, has decided on allowing its own famous mines near Bethlehem, Pa., to fill up with water. Most of our readers are aware of the fact that these mines are provided with the largest Cornish pumping engine in the country, its principal dimensions being as follows: Steam cylinder, 110 inches diameter; 120 inches stroke, four lift pumps 31½ inches diameter, and four plungers of 30 inches diameter, and a capacity of 17,000 gallons per minute when pumping from a depth of 300 feet.

The mine is an exceedingly wet one, the amount of water pumped amounting to somewhere about 30,000,000 gallons per day. It is said that the cost of pumping has for some time past exceeded $4 per ton on all the ore raised.

We have no doubt the arrangement entered into with the New Jersey Zinc Company will prove advantageous to both parties. The ore deposit at the Stirling Mines is enormous, and so easily worked, that the cost of the ore delivered on the cars is said not to exceed 75 cents per ton.

PROFITS ON GAS MAKING.

IF the German Continental Gas Light Company is able to declare 13 per cent. dividends on its capital of nearly $3,000,000, when paying $5.75 per ton for its coal, and charging $1.01 and $1.35 per thousand feet for its 15·9 candle-gas, what are the profits of New York Gas Companies, which pay $6 per ton for their coal, and charge $2.50 per thousand feet for a poorer gas?

STEEL WIRE FOR THE EAST RIVER BRIDGE.

WE beg to refer to an advertisement on another page asking for proposals for the supply of 6,800,000 lb. of galvanized steel cable wire. Full specifications, indicating the quality of the wire and the several tests to which it will be submitted etc., can be obtained on application to W. A. ROEBLING, Esq., Engineer of the Bridge. The following particulars summarize the matter:

2. The East River Suspension Bridge has one main span of 1,600 feet, and two side spans of 930 feet each, besides approaches at each end, making a total length of more than one mile. The main floor is suspended by 4 cables, each 15 inches in diameter, each cable composed of 6,300 parallel laid wires, which are laid up in place and it is for the manufacture of these cables that the steel wire, called for in these specifications, is required.

3. The general character of the wire is as follows: it must be made of steel; it must be hardened and tempered; and lastly, it must all be galvanized.

4. The size of the wire shall be No. 8 full, Birmingham Gauge A length of 14 feet must weigh exactly 1 lb. before it is galvanized, but the weight of the galvanized wire is taken in making up the 3,400 tons.

5. Each wire must have a breaking strength of no less than 3,400 lb. This corresponds in wire weighing 14 feet to the lb. to a rate of 160,000 lb. per square inch of solid section. The elastic limit must be no less than 47-100 of the breaking strength, or 1,600 lb. Within this limit of elasticity, it must stretch at a uniform rate corresponding to a modulus of elasticity of not less than 27,000,000 nor exceeding 29,000,000. The quality of the wire, in regard to its stretching, is further alluded to under the head of "Tests."

THE VERONA TOOLS.

IT is a well-established fact that the useful product of a man's labor has been very considerably increased in late years, owing to the use of better tools with which the work is performed. So fully is this appreciated, that the poorest workman, where he has to find his own tools, will stint himself in the very necessaries of life in order to acquire the fine steel pick or shovel, in preference to buying the cheaper iron shovel, or heavy iron steel-pointed pick which some few years ago were used exclusively. The workman who is paid by the day, finds he can accomplish as much work with much greater ease, when using the best tools; and the contractor, or other employer, finds that he can obtain much more work for the same money in the same way.

The result has been a strife among manufacturers to supply tools of a quality never equalled before. Among the most successful firms which manufacture these superior mining and railroad tools, we are pleased to note the Verona Tool Works of Pittsburg, Pa. Messrs. METCALF, PAUL & Co., after trial of various home and foreign steels, are making an article unexcelled for quality or thorough workmanship, in this or any other country. The steel used is from the Crescent Steel Works of Pittsburg, where, as is well known, nothing but the very best material is used in producing, by the most approved Sheffield methods, a steel that has been found at least equal, and, in some respects, superior to the best brands of the imported article.

The Verona Works have, during the past year, received several orders from abroad, and, in view of this growing market, have found it to their interest to establish agencies in Great Britain, France, Italy, Belgium, and Russia, in all of which countries their tools have been received with great favor. No more satisfactory proof of their excellent quality and low price can be demanded. We refer to their card on another page for further particulars.

OIL DISCOVERY AT GRAND LEDGE, MICH.—Great excitement prevails at Grand Ledge, Mich., over the discovery, Tuesday morning, September 5th, of a flow of crude oil running from the sewer under the Denison House to the river, and spreading itself over the surface of Grand River. The flow is quite abundant, and the whole village is excited over it. Pails full have been gathered and it burns readily when a match is applied to it.

GOLD EXHIBITS AT THE PHILADELPHIA EXHIBITION.—VI.

Special Correspondence of the Engineering and Mining Journal.

(*Continued from page 200.*)

SOUTH AFRICAN REPUBLIC.

THIS country which has within a few days been prominently brought into notice, by the news of battles between the natives and the Dutch settlers, is sometimes called the Transvaal Republic. It was formed some years ago by Dutch Boers, who did not wish to remain in the neighboring colonies which then came under British rule. The territory comprised within this republic is not as yet clearly defined, owing mainly to continued annexations which are being made of the lands hitherto controlled by the native tribes. In general it extends from about south latitude 26° to 28°. Its breadth from east to west is included between meridians 26° and 30° east from Greenwich. The two principal rivers which the country possesses form boundary lines during portions of these courses. The river Limpopo, which rises in the central portion of the Republic, flows some distance to the north-west, and then turning to the north-east, forms the northern boundary to the State. The River Vaal, which rises in the Drakenberg Mountains, forms the southwestern boundary to the State. The strip of country, from fifty to one hundred miles wide, which forms the coast to the east of the Republic, is flat and low, and is at all seasons infested with the well-known Tsetse fly, the sting of which is fatal to all kinds of domestic animals. For about six months in the year, or during the Summer season, the district also breeds the worst forms of malarial fevers. For the remainder of the year, it is, however, perfectly healthy. After this flat district is crossed, the remainder of the country consists of elevated table lands and mountains, and is healthy at all seasons of the year. Coffee and sugar grow well in the northern portions of the country, and cereals of every variety, as well as fruits and vegetables, in the south. The principal mineral development yet made has been of deposits of gold, several districts having been found to contain considerable quantities of that metal. The richest one of these yet worked is called the Leydenburg District, and is situated in the eastern portion of the Republic, to the north of latitude 28° South. The great obstacle which has hitherto prevented the country from developing its resources has been the want of ready means of communication with the coast. Owing to the destruction of cattle by the tsetse fly, communication between the interior to the eastern coast is entirely cut off at all seasons of the year, so that supplies to be taken in, or products brought out, have to go by way of Natal, or even Cape Town, in Cape Colony. Quite recently the Republic has contracted with a Belgian firm, to construct and stock a railroad from Delgoa Bay to the principal mining town of Pretoria, which is 180 miles inland. By this means a quick and ready communication will be established to the coast, which will not be affected by the tsetse flies. The road is already in process of construction, and will probably be finished within a year.

The discovery of gold in any quantity in the Republic, has only been made within a few years, and the fields at present known have not been very extensively worked. The mining laws of the Republic are very simple, and are designed so as to give the miners every encouragement to search for gold. A license fee of $1.25 per month only is charged, and no tax is made on the gold found, whatever be its amount. Besides the field already mentioned, another, lying near the settlement of Ersteling, has been worked to some extent. Mr. CAMERON, an American, who has been in the Republic for a number of years, has recently returned to this country, bringing with him some of the gold which he has mined during a quite extensive trip through the principal mining districts. A considerable portion of the coarse gold and some larger nuggets which he obtained in this way, amounting in value to between fourteen and fifteen thousand dollars, is to seen near P. 66, in the American Department, Main Building.

This display of gold specimens, which is the most valuable one in the Exhibition, contains several nuggets, the four largest of which weigh respectively 27, 29½, 37½, and 68 ounces. They are all covered with a thin coating of iron rust, which can be easily removed by dilute acid. With one exception, they do not hold any gangue matter inclosed in the gold. The purity of the metal is characteristic of all the African golds, some four thousand dollars worth of which, having been assayed at the Mint in Philadelphia, showed its fineness to be .932½. The nuggets and coarse gold shown, are much water worn and rounded, but were mainly taken from gravel workings in the first terraces above stream beds. One lot of 400 ounces was obtained by sluicing from a single claim by Mr. CAMERON. The rock formation of the mountains in which the gold occurs is made up of slates, sandstones, and granites, the quartz veins which have as yet been discovered being it is said, in soft granite, or as is more probable, in schistose rocks. One quartz-crushing mill has been started at Erseling by an English company.

The country lying to the north of Limpopo River is as yet under the control of native chiefs, who are generally indisposed to permit white men to search for gold. One locality called the Jahc District has, however, been opened, and both placer and quartz mining established. In this district, and in the country lying further to the north, explorers have discovered remains of ancient quartz mining which are quite wonderful. Some of the veins have been mined to depths of several hundred feet, the rock in places showing that disintegration by fire was probably used for its removal. The depths to which these operations have been carried on, were in all cases limited by drainage levels. Whether these veins are located in the ancient land of Ophir, yet remains to be determined.

INTERNATIONAL EXHIBITION OF 1876.

Special Report of the Engineering and Mining Journal.

ADMISSIONS FOR THE WEEK ENDING SEPTEMBER 25, 1876.

Date.		Paying Visitors.	Press, Complimentary, and Exhibitors.	Total Visitors.
Previously reported.....	.....	3,575,109	1,159,229	4,734,338
Sept. 19	114th Day..	92,866	11 801	104,667
" 20.....	115th " ..	101,496	11,861	113.357
" 21.....	116th " ..	122,003	12,585	134,588
" 22.....	117th " ..	89,433	11,918	101,351
" 23.....	118th " ..	84,627	11,205	95,832
" 25.....	119th " ..	80 944	11,812	92,756
Totals.....		4,146,478	1,230,411	5,376,889

PROJECT FOR THE ERECTION OF BLAST FURNACES IN NEW JERSEY.

By William Kent, M.E.

(*Continued from page* 188.)

In the table of the Composition of Furnace Gases, given on page 188, I. is an actual analysis of gases at Alfreton, England, as given in PERCY's "Metallurgy," but changed from parts by volume to parts by weight.

II. is the calculated average analysis of the gases of a set of five Pennsylvania anthracite furnaces in 1855, as given in a paper by J. A. CHURCH, in the ENGINEERING AND MINING JOURNAL, July 11, 1874.

III. is from the same paper, and is the calculated average analysis of the gases of the same furnaces from 1869 to 1873.

IV. is the calculated analysis of the gases of a furnace in West Virginia, using coke for fuel; from a paper by J. A. CHURCH, in ENGINEERING AND MINING JOURNAL, March 27, 1875.

V. and VI. are the calculated analyses of the gases of the Bangor and Bay State Furnaces in Michigan, using charcoal for fuel; from a paper by CHARLES E. WRIGHT, M. E., in ENGINEERING AND MINING JOURNAL, May 20, 1876.

It must be borne in mind, that of the above, only the first is an actual chemical analysis of the gases escaping from the mouth of the furnace. The others are all *calculated* from the analyses of the materials charged, and their weight, with the weight of the air blown into the furnace. There does not appear to be a single published determination by actual analysis of the composition of the gases of any anthracite furnace in the United States. There is but little probability of error, however, in the results obtained by calculation, provided the analysis and the weight of the materials charged, including the air, are accurate.

In general, the lower the percentage of carbon in the gases, the greater is the ratio of carbonic acid to carbonic oxide, and hence, according to BELL, the better is the working of the furnace. It would, therefore, appear, from the tables, given on pages 187 and 188, that there is a manifest improvement in the working of the five Pennsylvania furnaces between 1855 and 1869 to 1873, and that the furnace in West Virginia is by far the most efficient of all those given in the table.

If we assume 15·5 per cent. to be a fair average proportion of carbon in a good furnace gas, such as may be supposed to be given off from the proposed furnaces, we have, for the total weight of the gases for each 100 pounds of iron produced,

$$118{\cdot}29 \div \frac{15{\cdot}5}{100} = 763{\cdot}16 \text{ pounds.}$$

The table of distribution of the charge shows that of this amount 174·98 pounds was derived from the solid materials of the charge. The difference, or 588·18 pounds is, consequently, the weight of air blown into the furnace, including moisture.

The moisture in the air is taken at ·0062 of its weight, or 3·62 pounds; the weight of air blown in, exclusive of moisture, is, therefore, 584·56 pounds.

We have now the following table, showing the complete distribution of all the materials, including the air, which enter the furnace. A similar table was given in a paper by the writer, entitled "Determination of the Composition of the Gases and Slags Discharged from Blast Furnaces," published in the ENGINEERING AND MINING JOURNAL, April 3, 1875, and translated for *Dingler's Polytechnic Journal*, November, 1875.

DISTRIBUTION OF ALL THE MATERIALS OF THE CHARGE.—No. 1.

Charge.	Lb.	Fe.	C.	O.	N.	H_2O and Vol.	S.	P.	SiO_2.	CaO.	MgO	Al_2O_3.	TiO_2.	MnO.
Ore	160.	94·75	.....	39·62	.....	3·57	·12	·43	13·83	1·83	·37	3 7	·64	·11
Coal	130.	FeO ·91	118·95	·10	....	1·95	....	....	3·95	1·12	.....	3 02	....	....
L'mst'ne.	29·64	.....	3·49	{·77 ·29}		·27	....	....	(Si)·67	9·12	5·79	·24	....	..
Air	584·56	.....	.....	134·51	450·05									
Moisture in air	3·62	.....	.....	.....	.....	3·62	....	....	.....	.....	.....	.....	.....	...
Total	997·82	95·66	122·44	184·29	450·05	9·41	·12	·43	18·45	12·07	6·16	6·99	·64	·11
Subtract iron	100·00	94·75	4·15	.....	.....	.....	....	·43	(Si) ·67	.....	.....	.....	.....	...
Subtract slag	44·66	FeO ·91	.....	.....	.....	.....	....	....	17·78	12·07	6·16	6·99	·64	·11
Leaves gas	763·16	.....	118·29	184·29	450·05	9·41	·12	.....	.....	.....	.....	.....	.....	...
Composition of gas, per cent.		.....	15·50	24·15	58·97	·24	·14	.....	.....	.....	.....	.....	.....	...
Composition of slag, per cent.		FeO 2·04	.....	.....	.....	.....	.....	.....	39·81	·27	13·79	15·65	·43	·25

Percentage of carbonic acid $\left[CO_2 = \frac{11}{12}\left(3O - 4C\right)\right] = 9{\cdot}58$

" carbonic oxide $\left[CO = \frac{7}{12}\left(8C - 3O\right)\right] = 30{\cdot}07$

$\Big\}$ = C + O = 39·65 per cent.

Ratio $\frac{CO_2}{CO} = \frac{9{\cdot}58}{30{\cdot}07} = 0{\cdot}3186$

The above calculations assume the use of a mixture of ores of very good quality, containing 59·22 per cent. of metallic iron. Such ores could be obtained without difficulty from the regions in the vicinity of the proposed location, but for calculating the amount of air needed, etc., it is well to assume the use of ores of a poorer average quality, which will require more coal, limestone, and air to smelt them.

Another calculation has, therefore, been made, based upon the assumption of the use of ores from the same regions, of an average percentage of 48·23 of metallic iron. This is, probably, as lean an ore as will ever be used at the furnaces, as the richer ores exist in such abundance, and it is far more economical to use them.

The great loss of economy in using poor ores does not seem to be generally appreciated, but it is very plainly shown in the paper by E. S. MOFFAT, on the "Comparative Value of Iron Ores," which has already been referred to. According to that paper, the experience of Port Oram Furnace, using New Jersey magnetites, shows that if a 60 per cent. ore is worth $5.50 per ton, to give the same cost of a ton of pig iron, a 55 per cent. ore should be worth only $4.50; a 50 per cent. ore, $3.53; a 45 per cent. ore, $2.63, and a 40 per cent. ore, $1.81.

The ores assumed in the new calculation are one-half Ringwood, one-quarter Staten Island, and one-quarter Wanaque. The Ringwood ore is supposed to be a mixture of equal parts of Cannon No 1 and Hewitt. Subtracting the excess of analysis from the sesquioxide of iron, we have the following average analysis:

AVERAGE ANALYSIS—NO. 2.

Metallic iron	48·23	Magnesia	2·52
Oxygen with the iron	20·11	Alumina	4·51
Phosphoric acid {P = 64 / O = 82}	1·46	Silica and Insoluble	16·75
Titanic acid	·25	Water	2·95
Sulphur	1·36	Alkalies	·15
Lime	1·71		100·00

Assuming that the same coal and limestone are used as in the former calculation, and that 1 6-10 tons of coal are required for each ton of pig iron produced, we find that about 7-10 ton limestone per ton of iron is required to make a good slag. The following is the distribution of the solid materials of the charge:

DISTRIBUTION OF THE SOLID MATERIALS OF THE CHARGES—NO. 2.

Charge.			Iron.	Slag.	Gas.
Ore 200 lb.	Fe	96·46	94·46	2·00	.....
	O	41·86	.....	·57	41·29
	P	1·28	1·28	.....	.....
	S	2·72	.....	.....	2·72
	Ti O_2 CaO, MgO	8·96	.....	8·96	.....
	SiO_2 Al_2O_3, and Alk.	42·82	.....	42·82	.....
	Water	5·90	.....	.....	5·90
Coal 160 lb.	C	146·40	3·40	.....	143·00
	Vol. Mat.	2·40	.....	.....	2·40
	SiO_2	4·86	(Si) ·86	2·96	(O) 1·04
	Al_2O_3	3·72	.....	3·72	.....
	CaO	1·38	.....	1·38	.....
	Fe_2O_3	1·24	.....	FeO 1·12	(O) ·12
Limestone 69·16 lb.	CO_2	29·82	.....	.....	{C 8·13 / O 21·69}
	CaO, MgO	34·79	.....	34·79	.....
	Al_2O_3, SiO_2	3·92	.....	3·92	.....
	Water	·63	.....	.....	·63
Total		429·16	100·00	102·24	226·92

Carbon in gases, 143·00 + 8·13 = 151·13.

Assuming as before that the carbon is 15·5 per cent. of the total weight of the gases, we have for the latter—

$$151{\cdot}13 \div \frac{15{\cdot}5}{100} = 975{\cdot}03 \text{ pounds.}$$

Of this the charges contribute ..... 226·92 "

Weight of air, including moisture ..... 748·11 "

Or, air 743·50, moisture 4·61.

The following table gives the complete distribution of all the materials entering the furnace, including the air and moisture.

In all these tables of distribution there are a few arbitrary assumptions, which must be made when we have not the actual analysis of the pig iron. These are, that all the phosphorus enters the pig iron, that all the sulphur escapes in the gas, and that the pig iron contains the amount of carbon and silicon given in the tables.

DISTRIBUTION OF ALL THE MATERIALS OF THE CHARGE—NO. 2.

Charge.	Lb.	Fe.	C	O	N	H_2O and Vol.	S	P	SiO_2	CaO	MgO	Al_2O_3	TiO_2	Alkalies?
Ore	200.	96·46	.....	41·86	.....	5·90	2·72	1·28	33·50	3·42	5·04	9·02	·50	·30
Coal	160.	FeO 1·12	146·40	·12	.....	2·40	....	....	4·86	1·38	.....	3·72	....	....
L'mst'ne,	69·16	.....	8·13	21·69	.....	·63	....	....	3·36	21·29	13·50	·56	....	....
Air	743·50	.. ..	.....	171·08	572·42	.....	....	....	.....	..	.....	.....	...	....
Moisture in air	4·61	.....	.....	.....	.....	4·61	....	....	.....	.....	.....	.....	...	....
Total	1,177·27	97·58	154·53	234·75	572·42	13·54	2·72	1·28	41·72	26·09	18·54	13·30	·50	·30
Subtract iron	100·	94·46	3·40	.....	.....	.....	....	1·28	(Si) ·86	....	.....	.....	...	....
Subtract slag	102·24	3·12	.....	·57	.....	.....	....	....	39·82	26·09	18·54	13·30	·50	·30
Leaves gas	975·0	.....	151·13	234·18	572·42	13·54	2·72	.....	(O) 1·04	.....	.....	.....	...	....
Composition of gas, per cent.		.....	15·50	24·05	58·78	1·39	·28	.....	.....	.....	.....	.....	...	....
Composition of slag, per cent.		FeO 3·61	.....	.....	.....	.....	.....	..	38·05	25·52	18·13	13·01	·40	·29

Percentage of carbonic acid $\left[CO_2 = \frac{11}{12}\left(3O - 4C\right)\right] = 9{\cdot}30$

" carbonic oxide $\left[CO = \frac{7}{12}\left(8C - 3O\right)\right] = 30{\cdot}25$

$\Big\}$ C + O = 39·55

Ratio $\frac{CO_2}{CO} = \frac{9{\cdot}30}{30{\cdot}25} = 0{\cdot}3074.$

On comparing the analyses of the gases thus found, with those given under the head of furnace gases, we see that the hydrogen and volatile matter are in less, and the nitrogen in greater, proportions in the former than in the latter. This is accounted for by the use of such a small quantity of hydrous hematite, and of coal unusually free from moisture and other volatile constituents.

ENGINES.

Having found the amount of air necessary for the furnace, the next steps in the problems of the design are to calculate the size and power of engine necessary to furnish the blast, the boiler capacity to furnish steam to the engines, and the ovens to heat the air.

It has been found in practice that the waste gases from the furnace have abundant heating power, both to generate steam for the boilers and to heat the blast. There is often, in fact, a very large surplus of heat. The boilers, ovens, and engines, are not, therefore, designed, as would be the case if coal were used for fuel, with a view to produce steam and heat the blast with a maximum economy of fuel, but rather, as the waste gases are supposed to cost nothing, with a view to minimum first cost, and, more especially, minimum cost of at-

tendance and repairs. Durability is most essential, and every precaution is taken to prevent a break-down during the time that a furnace is in blast.

We find, therefore, that the engines are strong and massive, employ slow piston speed, long strokes, little or no cut-off, and have no steam jackets. Quick-running, short-stroke engines have been introduced in some places, and they have many advocates, but they are far from being in general favor, on account of their increased wear and tear, although their small size gives them an advantage in first cost.

There is great room for improvement in blast-furnace practice in this matter, as it surely cannot be a correct principle which assumes that the waste gas costs nothing, if the surplus might be employed for some useful purpose. It may be shown that the gases have a heating power sufficient, theoretically, even after making all proper allowances for inefficiency of apparatus to do nearly twice as much work as is required of them.

The heating power of the waste gases is derived from two sources—the sensible heat they contain, and the heat generated by the combustion of their carbonic oxide. Part of this heating power is utilized in the boilers and ovens, the remainder, which is nearly half of the whole amount, escapes through the chimneys.

This waste may be utilized in two ways—first, by decreasing their heating power, by such a construction of the furnace, that the sensible heat of the gases shall be abstracted as much as possible by the ore; and also, that the carbonic oxide be converted into carbonic acid, as much as possible, by the oxygen of the ore, before they leave the furnace. A limit in this direction is reached, however, when the proportion of carbonic acid is so great that the gases are thereby rendered incombustible. According to the experience of the West Virginia furnace, before mentioned, a gas containing 80 CO_2 to 100 CO, is lighted in the ovens with difficulty.

A second way to obtain increased economy is to apply the surplus heat to other uses. This has been done in an attempt to roast the ore before it goes into the furnace, as in the WESTMAN ore roasting kiln, which is employed in Sweden, but it is rarely, if ever, done in the United States.

As far as the writer is aware, no scientific determination of the heating power of the waste gases, nor of the laws which govern the transmission of heat from them to the boilers and ovens, has ever been made in this country. Analyses of the gases themselves may have been made (although none appear to be published), but none of the gases escaping from the chimneys of the boilers and ovens. In regard to the practical efficiency of the latter, we are almost entirely ignorant. Furnace managers rest content with the knowledge that the gases are an abundant source of fuel to meet all requirements, but never take any account of the enormous waste in only half utilizing them.

It may not be possible to cause any further reduction in the amount of coal needed in the furnace to produce a ton of pig iron, at all comparable with that attendant upon the introduction of the hot-blast; but some further economy is possible, by a better utilization of the gas. The boilers might then be designed to furnish the steam, and the ovens to heat the blast with a minimum amount of fuel, and the engines to give the power with a minimum amount of steam. The benefits of high piston speed, and high degrees of expansion, might then be taken advantage of, and the increased surplus of heat be applied to other uses.

But these considerations have but little to do with the present design, and a judicious conservatism warns us to make only slow and careful departures from well-approved practice.

TO BE CONTINUED.

THE GERMAN CONTINENTAL GAS-LIGHT COMPANY OF DESSAU.

THE Continental Gas-Light Company of Dessau, was organized on March 12th, 1855, with a capital paid up of $721,282. The object of the organization was to acquire, either by lease or purchase, a number of gas works, and to operate them under the administration of one organization, thus securing the advantages of economy, working, as far as possible, under the same system in all the works, and being able to compare the workings of one station with that of all the others.

THE GERMAN CONTINENTAL GAS-LIGHT COMPANY OF DESSAU.

WORKING RESULTS FOR TWENTY YEARS—1856 TO 1875.

Year.	Gas works in operation.	Gas produced. Cubic feet.	Unaccounted-for gas. Per cent.	No. of burners at end of year.	Consumpt'n per single burner.		Length of mains Prussian feet.	Coal.		Average selling price per M., c. ft.		Dividends, Per cent.
					Street lamps, cu. ft.	Private, cub. ft.		Tons carbonized.	Price per t'n at w'ks, Gold.	Street Gas.	Private, Gas.	
1856..	8	24,913,886	15·80	10,678	.....	.....	.....	.....	.....	.....	.....	5
1857..	10	64,470,753	9·68	26,097	.....	.....	.....	.....	.....	.....	.....	6
1858..	13	125,144,751	10·59	42,022	8,902	2,510	747,567	13,889	$5 84	$1 23	$1 92	6
1859..	....	143,630,880	6·48	48,177	8,023	2,388	758,419	14,791	5 51	1 22	1 87	6
1860..	....	159,077,359	5·50	54,459	7,984	2,414	777,736	15,404	4 93	1 15	1 81	6¾
1861..	....	172,639,772	6·00	60,391	8,277	2,332	803,107	17,368	4 55	1 13	1 77	7¼
1862..	....	183,610,396	5·45	66,451	8,136	2,267	821,066	18,313	4 18	1 16	1 78	8⅛
1863..	....	195,413,578	4·98	72,037	8,674	2,209	857,888	19,420	4 09	1 21	1 78	9⅛
1864..	....	216,427,870	6·00	79,690	9,079	2,246	929,765	21,829	4 62	1 15	1 71	9¾
1805..	14	251,809,057	6·85	87,771	8,968	2,383	985,290	25,418	3 96	1 13	1 66	11
1866..	....	274,999,846	5·47	94,881	9,174	2,420	1,042,996	27,853	3 96	1 09	1 56	11
1867..	....	297,616,784	5·23	102,960	8,904	2,458	1,105,654	30,078	3 91	1 05	1 48	11
1868..	....	324,852,146	5·61	109,339	9,079	2,496	1,152,714	32,377	3 79	1 08	1 43	11⅝
1869..	....	345,851,716	5·48	116,279	9,223	2,538	1,215,286	34,475	3 87	1 04	1 36	11⅛
1870..	....	371,157,124	5·46	123,914	9,296	2,544	1,246,605	40,128	4 13	0 98	1 33	11⅜
1871..	15	417,542,234	5·80	132,473	9,288	2,730	1,276,288	45 061	4 50	1 02	1 34	12½
1872..	....	479,098,136	5·56	143,171	9,997	2,936	1,317,937	52,787	5 04	1 03	1 33	14⅞
1873..	18	544,384,711	5·95	157,560	10,158	2,993	1,407,459	59,092	5 68	1 01	1 34	13⅝
1874..	....	604,586,741	6·65	169,260	10,446	3,116	1,496,556	64,746	5 75	1 01	1 35	13
1875..	...	653,905,637	6·78	181,781	10,704	3,133	1,614,541	68,958	4 87	1 01	1 32	13⅛

The company commenced with eight works in operation, with capital as stated above. In 1875 they were operating eighteen works, and two gas-meter manufactories, with a capital of $2,934,848. The table which we give above, translated and prepared by T. H. MULLER, is from "Dingler's Journal fur Gasbeleuchtung," and, we doubt not, will be deemed of value by all our readers who are interested in the manufacture of gas. Each man can, from the figures here given, figure out whatever points he pleases, so far as they are to be derived from the facts given.

The average amount of fuel consumed in 1875 was 21·86 lb. of coke per 100 lb. of coal carbonized. The retorts gave an average production of four and a-half millions cubic feet before they were worn out and removed.

The highest average production per retort, per day, was 8,314 cubic feet.

The average production of tar was 5·67 lb. per 100 lb. of coal.

One hundred and ten lb. of coal produced, on an average, 467·85 cubic feet of 15·9 candle-gas.

The following is a list of the eighteen works operated by this company:

1.	Frankfort-on-the-Oder	Dec. 1855	9.	Erfurt	Oct. 1857
2.	Mulheim-on-the-Ruhr	Jan. 1856	10.	Krakau	Dec. 1857
3.	Potsdam, Neuendorf (2 works.)	Oct. 1856 / Nov. 1865	11.	Nordhausen	May 1858
			12.	Lemberg*	May 1858
4.	Dessau	Oct. 1856	13.	Gotha, leased / " bought	July 1858 / " 1872
5.	Luckenwald	" 1856			
6.	Gladback, Rheydt (2 works.)	" 1856 / Nov 1865	14.	Ruhrort	" 1873
			15.	Eupen	" 1873
7.	Hagen	Dec. 1856	16.	Herbesthal	" 1873
8.	Warschaw	Dec. 1856			

—*American Gas-Light Journal.*

ANTHRACITE BLAST FURNACE PRACTICE.

TO THE EDITOR: SIR—Although I agree with Mr. CHURCH in many things which he says in his paper, published in your number for Sept. 2, I must differ from him, when he hints that improvements in the smelting of magnetites with anthracite are probably to be sought in other directions than those which have led to the best results elsewhere—in English coke practice, for example.

No one, indeed, has yet succeeded in making a ton of iron with so small an average consumption of anthracite, as of coke; but it is certain that by the adoption of high furnaces and hotter blast, we have effected an absolute saving of fuel, not very different from that which has resulted from the same improvements in the North of England, although as we were worse off when we started, we are still considerably behind that part of the world.

Moreover, in at least one instance which has come under the writer's observation, that which was known to work well with anthracite was found, when applied to coke, to give very good results. Mr. CHURCH's opinion, therefore, does not seem to me to be well founded.

When comparing anthracite with coke having the same percentage of carbon, it should be remembered, that the anthracite will contain some 5 per cent. of volatile matter, the expulsion of which, in a blast furnace, will absorb an unknown and probably considerable portion of the heat produced by the combustion of the fixed carbon.

That the average consumption of coal is high in spite of isolated examples of good work is true. The best results have generally been attained by the *new* furnaces at the *old* works; but a majority of the new furnaces put up in the last eight years, have been built under the stimulus of high prices, and have been owned and managed by persons of little or no experience. Good policy dictated to the established works, that they should not lose a profit of several dollars a ton, on the product of even their worst furnaces, for the sake of carrying out improvements which could at most result in a saving, in coal, of a dollar or less on the ton of iron. For some time to come, only the best furnaces will be kept in blast, and I think if we had complete statistics we should see a marked diminution in the fuel consumed per ton of iron. F.

A DISSERTATION ON THE THEORY AND PRACTICE OF WINDMILLS.

By Alfred R. Wolff, M.E.

(Continued from page 204.)

[ERRATA.—Our readers will please make the following corrections in the table of pressures of wind, published on page 203, in the last number of the ENGINEERING AND MINING JOURNAL:

Column 30° F., line 2. For ·c20105, read ·02165.
" " " 3. " ·055372, " ·045372.

Also insert the denominator t in equation I., giving the value of d.]

VERTICAL WINDMILLS.

A. European Windmills.—The building of a vertical windmill is an ordinary tower of wood or stone, the latter commonly in the form of a frustrum of a cone. The principal parts of the mill are: 1st. An axle in the top of the building, inclined (as observation has shown that the impulse of the wind is very commonly exerted in lines descending at such angles) to the horizontal, at angles from 10° to 15°, and on which are the sails. 2d. The sails, consisting of frames with canvas stretched upon them, which, if four in number, are fixed in positions at right angles to each other, and are generally 30 to 40, and sometimes 50 feet in length. 3d. A large toothed wheel upon the horizontal axle, the teeth of which engage with those of a pinion upon 4th, a vertical shaft, from which motion is imparted to the machinery. The first named, or nearly horizontal shaft, is supported at its innermost end, near the center of the base of a dome or cone surmounting the mill, while its opposite extremity passes through a perforation in one side of the dome, and projects far enough to receive the ends of the long timbers or 'whips.' The neck is the journal or principal point of support of the shaft, the pivot at the lower end taking up but a small part of the weight and counter-pressure. The axle should always be parallel to the direction of the wind—the suddenly varying and often extreme pressure of the wind upon the sails, rendering it necessary that the supports of the horizontal shaft, and all parts of the sail projecting from it, should have great strength. The axle is often constructed of some hard wood, like oak, but it is better practice to employ wrought iron shafts, with cast iron flanges of large diameter keyed on their front, and furnished with recesses for receiving the arms of the sails. The diameter of a wooden neck being 1½ to 2 feet, that of an iron one substituted need not be more than 6 to 9 inches, the friction being, therefore, greatly decreased by the use of the latter material. The four timbers or 'whips' have their inner ends let into the outer extremity of the horizontal axle, being somewhat thicker near the shaft than at the extremity. When 30 feet in length, they are made 1 foot thick by 9 inches broad at the shaft, and 6 inches by 4½ inches at the extremity. Against the rim of the principal wheel, upon the shaft, a brake can be brought to act so as to stop the motion of the machine at the pleasure of the operator. In the ordinary kind of windmill, beginning from about one-sixth to one-seventh of the length, and continuing to the extremity, the whip is pierced with holes 15 to 18 inches apart (usually 20 in number), in which wooden pieces or staves, about 5 to 6 feet long, are placed at right angles to the whip; the whip not forming the center line of the sail, but the crossbars projecting much more from one side than from the other. The narrow side (=about one-fifth to one-sixth breadth of sail) is covered with the so-called wind-board, while the broader side, which is strengthened by connecting the ends of the cross-bars by light rods or laths, forms a sort of lattice upon which the canvas is to be stretched. If the surface of this lattice, and hence of the canvas forming the sail when stretched upon, were a plane at right angles to the direction of the wind, the whole impulse of the wind would act to produce

* Changed from wood to coal in 1870.

a strain upon the whips, and no revolution would result.* The lattice and canvas are accordingly inclined to the line of the axis and of the wind, at such angles that the force of the wind is resolved into components, a considerable part of which acts in the proper direction to produce rotation of the shaft. No angles of weather are given here, as it will be seen further on under 'Mathematical Considerations,' upon what these angles depend.

Several methods are in use for bringing the axis of the windmill in the line of the wind, so that the sails may receive the most direct impulse from whatever point of the compass it may come. The early mills were immovable, and could only work when the wind was in one quarter. The first improvement was made by setting them on a float which could be turned around so as to catch every wind. German or post mills were formerly employed when the mill was of timber and of small size. The tower was fixed upon a strong column entering its base, which was sufficiently elevated to allow the turning of the tower as desired, by means of a long and stout lever projecting from it below, and pushed by a person on the ground. On account of the manual labor required, and the superiority and automatic action of the Dutch mill, the former kind has now gone out of service in Europe. In Dutch mills the dome only is turned, carring the axle and sails with it into the required position, while the vertical toothed wheel merely travels about the pinion, and the connection is not broken. In order to allow the dome to turn, and at the same time to secure it in position, it is most usual to construct the tower open at the top, this opening being strengthened by a wooden rim running completely around it; and on the upper surface thus exposed, is a groove in which small circular metallic castors or rollers are placed to turn on horizontal axes. The dome is made with a corresponding groove on its under side, so as to rest upon the rollers and turn on them; while it has also a flange projecting downward, surrounding the rim of the tower, small vertical rollers being here also usually fixed between the two. Thus the dome can be turned with a slight effort into any required position, and by appropriate means can be fixed if desired. The turning of the dome was formerly done by the employment of a toothed wheel, engaging in a rack on its inner side, and turned by means of an endless cord, but at the present time, either of the following methods is employed: 1. CUBITT's method consists of a set of small vanes placed in an upright position, upon a long arm or frame projecting in the same line with the horizontal axis, but on the opposite side of the dome, the vanes nearly in the direction of the axis at right angles to t e plane of the sails. By their revolution, the vanes turn a shaft and pinion, and finally act upon teeth surrounding the exterior of the dome, moving it until the wind no longer strikes the set of vanes, when the sails will be exactly in their best position to receive the impulse of the wind. 2. A method much more simple and just as effective, is found in the use of large, strong, and flexible vane or 'rudder,' projecting opposite the axis and sails, the plane of the rudder being vertical so that the wind, however shifting, acts directly upon this to bring the sails into the required position. The variations in the intensity of the wind being considerable, often so within a brief time, and sudden and extreme, it becomes necessary to have means provided for regulation, as the motion of the machinery must be uniform to perform a constant quantity of work. One method formerly employed, was the use of a friction strap applied to the outside of the wheel on the horizontal shaft, but this has entirely given way to the means of regulation, by change of extent of surface offered to the wind, by increase or decrease of the amount of cloth of the sail. The latter was formerly effected by having a rope attached to each sail, or having the canvas made in three portions, controlled by separate ropes, and much trouble and delay were occasioned, as the mill required to be stopped, and a man had to ascend the sails separately to take in or let out canvass. In 1780, Mr. ANDREW MEIKLE devised, for reefing the sails when the mill was in motion, a most ingenious application of the centrifugal governor, namely, a sliding piece which operated upon rollers placed transversely with the arms, and wound up or reefed the canvas sails when the sails attained too great a velocity; and the unfurling of the sails or increasing their speed was accomplished by a weight, which actuated a rod passing through the center of the main axle, operated centrifugally on the sliding frames, and then unwound the canvas when the motion of the sails was too much retarded. This automatic reefing apparatus imparted to the windmill a precision of motion little inferior to some of our modern steam engines, and by varying the weights for unfolding the sail, the power of the mill could be increased or diminished with facility. In the early part of the present century, Sir WM. CUBITT devised a mode of reefing the sails of windmills by introducing movable shutters on the sails of the mill, which shutters were closed by a governor, like that of a steam engine, operating upon a rod passing through the center of the main axle. These shutters were suspended on pivots fixed about one-third of their breadth from one side, and when the wind was blowing too strong, it opened the shutters and allowed a portion of the wind to pass through them, and so checked the velocity of the mill.

B. The American Windmill consists usually of a hollow casting bolted to the top of a tower, upon which sits the turn-table furnished with rollers. The turn-table is provided with Babbitt-lined boxes forming the support for the wrought iron shaft. To one extremity of the shaft is keyed the "spider," a cast iron ring with radial arms, into the recesses of which are bolted the arms of the wheel. The other extremity of the shaft, terminating at the center of the turn-table, carries the crank-plate, to which is attached the connecting-rod which works the pump. The wheel receiving the impulse of the wind is constructed of radial, wooden slats, increasing in breadth as the distance from the center increases (see SMEATON's "Maxims"), and which are either fixed or movable about iron tires connecting the arms. The axle is brought into the direction of the wind by the use of a rudder. When the slats are fixed, the extent of surface offered to the wind is regulated by means of a "side" vane, which is nearly in the plane of, and directly behind, the wheel, and attached to the same casting as the shaft. As the wind increases in pressure, this vane turns the casting supporting the wheel, and the slats therefore offer less surface to the wind; when the velocity of the wind decreases, the wheel is brought back into proper position by means of a weighted lever raised while the pressure was great. When the slats are movable, the principle of the centrifugal governor is employed with success. It is an advantage to have the slats fixed; but the side vane, although found to be very effective, is not quite as reliable a means of regulation as the centrifugal governor. For the same diameter the surface offered to the wind in the American mill is greater than that in the European; but this excess of surface is nearly compensated by the greater effect per square foot of surface due to the better angles of impulse of the latter. On the whole, however, the American windmill will be found to compare very favorably with the European, being just as reliable, lighter in weight, and much cheaper in cost.

TO BE CONTINUED.

* See "Mathematical Considerations," which will be given in a subsequent number of the JOURNAL.

BLOWING AND VENTILATING MACHINES AT THE PHILADELPHIA EXHIBITION.

Special Correspondence of the Engineering and Mining Journal.

THE MURPHY OR CHAMPION VENTILATOR.

A LARGE working ventilator constructed on the MURPHY system, is located in the Hydraulic Annex to Machinery Hall. Although belonging to the general class of centrifugal fan blowers, it differs from all others which are shown in several important particulars. A double fan working one shaft, is used, and the casing is so arranged that the machine is convertible from an exhauster to a blower or vice versa, without stopping or changing the motion of the fans. This casing is made of wood, and embodies several novel features in the details of its construction. The apparatus as designed, is intended to be placed immediately over the ventilating shaft of a mine.

The casing consists of three vertical box-like compartments, two of which are placed on opposite sides of the central one. The two side compartments are of equal size, and are considerably narrower than the central one. The latter acts as receiver chambers, through which all the air moved passes on its way to the fans. The two side compartments contain the fans, and are arranged so that the air forced into them can be led either into the open air or down the mine shaft at will.

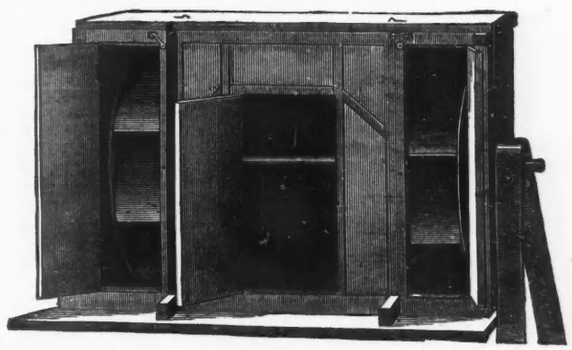


FIG. 1.

The arrangement for effecting a change in the direction of the blast can be partially understood by inspecting Fig. 1. As will be seen, there are doors opening outward on the sides of the air-receiving chambers, and the two side chambers. Besides those which are shown, there are doors hinged along the lower edge of the partition walls, between the central and side chambers, which, when raised, close all communication between the air shaft and the central chamber, and at the same time open a passage from the fan chambers to the air shaft. By changing the position of these doors, the air chamber is thrown in communication with the shaft, and the passages from the fan chambers are closed. Weighed counterbalances are used to make the doors move freely, which also serve to catch and hold them when in position.

Very simply constructed right-angled catches, hinged at the angle, hold the doors when they are in a horizontal position and are closing the mouth of the shaft. Without considering now the special construction of the fans, let it be supposed that air is being drawn in through two circular holes cut in either partition between the central and side chambers, the central openings in the fans corresponding with these holes. Now if it is desired to exhaust air from the mine shaft, the doors at the bottom side of the casing are thrown down in a vertical position, so as to open communication between the shaft and the air receiving chamber, and at the same time shut off communication between the side chambers and the shaft. The other doors to the central chamber are then closed, while those of the side chambers, which are seen in the figure, as well as passages on the lower sides of the fans, which are not shown are opened to the air. The current being outward through the before-mentioned openings in the partitions, the machine draws air from the shaft, and freely discharges it at all points from the fan chambers. When it is desired to force air down the same shaft, the position of the doors in the shaft is reversed and the outside doors on the air-receiving chambers opened, while those on the fan chambers are all closed. The air now passing into these chambers is carried down through the side passages, under the casing, into the shaft.

It will be seen that such large openings for the passage of the air are provided that very little compression or friction during its passage can exist. By changing the arrangement of the chambers and passages the whole casing can be put at one side of a shaft instead of directly over it, as has been designed with the machine shown.

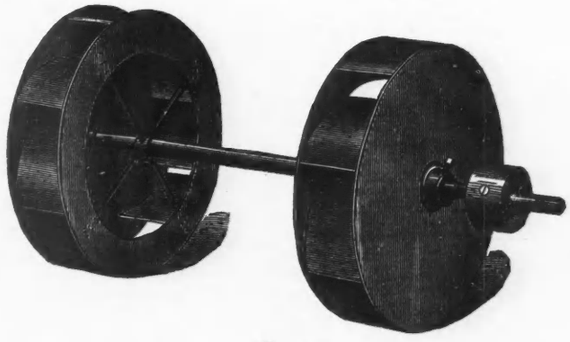


FIG. 2.

The two fans which give motion to the air are shown separately in Fig. 2, and can also be seen in position in Fig. 1. Each wheel consists, as will be seen, of an outer disk of iron and an inner annulus, between which the blades or, more properly speaking, perhaps, guides, are placed. These guides at their origin have plain surfaces which gradually curve round

so as to become more nearly concentric with the curves of the disks as they extend outward. A radial line, drawn from the center of the disk through the origin of one of these buckets, cuts the curve of the succeeding one a short distance from its termination.

The revolution of the fans takes place from left to right as the spectator faces the figure, the air being lifted outward as it were by the inclined planes of the buckets.

To facilitate the entrance of the air into the central openings of the fans the four radial arms which hold the annuli are made several inches wide, and are set at an angle of 45° with the axis of the fan shaft. The inner edge of the annuli are made to fit quite closely to the openings in the casings in order to prevent as much back leakage of air as possible.

The two fans being fastened to the same shaft, and taking in air in opposite directions, cause them to balance each other perfectly, as regards the pressure of air against the disks.

The diameter of the fans in the machine, which is exhibited in Machinery Hall, is six feet, and the diameter of the opening for the admission of the air is 51 inches. The width between the disk and annuli is 9 inches. Some experiments made by W. S. KAUFMAN, Sergt. U. S. Signal Service, resulted in the following manner, as per his report:

The machine used was the same one which is at the Exhibition. The opening from the air-shaft having an area of 22½ square feet, and the fan making 410 revolutions per minute, the air had a velocity of 40 miles per hour, or at the rate of 79,200 cubic feet per minute. The fans have been tried at a number of coal mines in Illinois, where they seem to have given good satisfaction. The simplicity of their construction, their small size in proportion to the amount of air which they move, recommend them strongly for the uses for which they are intended. No accurate experiments have yet been made to determine the amount of power consumed in operating the machine.

SOME POINTS IN THE TREATMENT OF LEAD ORES IN MISSOURI.*

By C. P. Williams, Ph. D.

(*Continued from page* 201.)

THE wastage of lead must be greatly increased, through greater volatilization and by increased weight of residue or slag and by a higher tenure of lead in the latter, but how far the system prejudices the yield of lead from the ore is difficult to ascertain, when operations are not controlled by laboratory work. It is known that a very large proportion of the ores of the central region are of the character of No. 1 Block mineral, and that much of that produced in the South-west is of the same description; further, that the careful method of hand sorting and of washing is practiced on the South-eastern ores. From these considerations it may safely be assumed that the average assay yield of the ores run through the Missouri furnaces is not less than 78 per cent. lead. The furnace yield, from the results of nine reverberatories, I find to be an average of 66·5 per cent. metal, showing a waste in residue, and by volatilization, of 16 per cent. of the metallic contents of the ore, against 7·7 per cent. in the English and the Bleiberg furnaces.

The commercial effect of this wastage may be counterbalanced to some extent by the fact that the ores are abundant and of high grade, and that the lead in this manner would doubtless be of greater purity and softer than that mixed with the press lead, but it would appear that even with these off-sets the interests of the furnace-owners would be better served by a lengthening of the time of treatment. For further illustration of the ordinary reverberatory process, I may select from among the list of furnaces two, representing respectively the Central and the South-eastern regions.

BOND'S Furnace (No. 9 of the table) gives among the lowest rate of fuel consumption with, therefore, the highest rate of labor, as a consequence of the small weight of ore passed through in the twenty-four hours. The charge produces, usually, twelve pigs of ninety pounds each, or 1,080 pounds of metal, equivalent to 72 per cent. of the ore treated. The grate and hearth areas are to each other as one to four; the consumption of fuel is about 13·5 lb. wood † per square foot of grate per hour. The furnace is operated from four to six months in the year; the fire-brick (of St. Louis manufacture) last two such campaigns. The residues contain:

	Per cent.		Per cent.
SiO_2	20·211	ZnO	·417
CaO	7·791	PbS	26·152
MgO	1·641	$PbSO_4$	1·932
Fe_2O_3	4·459	PbO (by difference)	36·708
Al_2O_3	·557		
SbO_4	·132		100·000

The St. Joe Mines (in St. Francois County) have eight reverberatories of the largest size in use in the State. The areas of the hearth and grate are as 2·6 to 1; the charge is two thousand pounds run through in eight hours, consuming 0·75 cords of wood and requiring two days' labor.

The furnace yield ranges between 65 and 70 per cent., say 67·5. The fuel consumed is 16·1 lb. per square foot of grate surface per hour.

The residues have the following composition:

	Per cent.		Per cent.
SiO_2	26.252	Cu_2S	0·981
CaO	9·908	NiS	·777
MgO	3·704	Pb	37·792
Fe_2O_3	11·533	$PbSO_4$	3·455
Al_2O_3	3·223	PbO (by difference)	4·793
AsO_4	·059		
SbO_4	trace.		100·000
ZnO	trace.		

These residues are put aside for treatment in the future. As a general rule, finding its exceptions only in the cases indicated in the South-western and South-eastern regions, the so-called slags are discarded. When sold, as at Joplin, their market rate is $10.50 per miner's thousand (1,120 lb.), while ores rate, at the same time, at $23 per thousand, lead selling at seven cents per pound. There are no condensing chambers or other apparatus looking to fume or dust collection at any of the reverberatories.

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

† One cord wood (128 cubic feet)=86 solid cubic feet; a cubic foot of average wood in use at the furnaces weighs 40 lb.; a cord=3,440 lb.

The character of the lead produced from the ores by the reverberatory methods will be sufficiently indicated by the results of analyses given below. These results were reached by following the method of FRESENIUS [*Zeitschr. Anal. Chem.* VIII., 148; *Jahrsbericht fur Chemie*, 1870, 906] for soft leads, with the exceptions of using 100 grammes and estimating the silver by cupellation in a second portion also of 100 grammes weight. In this manner my assistant, Mr. A. W. HARE, and myself, have carried through analyses of all the brands of lead produced in Missouri, for the forthcoming Industrial Report A. of the Geological Survey, in which the metallurgy of lead will be examined in greater detail.

At the present I select only the brands produced at the furnaces more particularly described in this report:

	I.	II.	III.	IV.	V.
Arsenic	0·01640	0·01122	nil	0·00183	0·00101
Antimony	0·00077	0·00077	0·00495	0·00675	0·04975
Silver	0·00029	0·00080	0·00084	0·00405	0·00029
Copper	0·01210	0·05091	0·00556	0·06394	0·02963
Iron	0·01711	0·01582	0·04111	0·00137	0·00718
Zinc	0·00066	0·00090	0·00181	0·00082	0·00180
Nickel	trace.	0·00281	0·00195	trace Cd	0·00276
Lead by difference	99·95267	99·91677	99·98078	99·93124	99·90756
	100·0000	100·0000	100·0000	100·0000	100·0000

No. I. From Granby Flintshire Furnace, sample represents 10 pigs of metal; II. Granby ordinary furnace, representing 16 pigs; III. BOND'S Air Furnace, brand "Gravois;" IV. From the St. Joe Reverberatories; V. Slag lead from furnace at Granby, refined by re-melting in the Flintshire furnace with poling. The other leads are not refined beyond simple poling in the kettle before casting.

HEARTH TREATMENT.

The modified hearth, with the water back (or double-walled sides with circulation of water) and with three tuyeres, is that in most general use in the South-western region. At the Granby works there are six such, each treating 3,000 lb. of high grade ore, per eight hour shift, with two smelters and one helper, the latter serving two hearths with ore and coal. Two shifts per day are usually worked, for six days, equivalent to 216,000 lb. mineral, yielding 181,200 lb. or 70 per cent., consuming 660 bushels hard-wood charcoal and 60 bushels of lime for so-called flux. At Lone Elm, about the same amount of ore is put in treatment to each hearth, the yield being 66·6 per cent., and the fuel, 15 bushels of coal per 3,000 lb. of mineral. There are twenty-one such hearths in operation in the South-western region.

In the Central region there is but one hearth, which is of the older form, with single tuyere. It treats 6,000 pounds mineral daily in three eight-hour shifts; the yield is sixty pigs of lead, weighing 67 lb. each, or 4,020 lb., equivalent to 67 per cent. of the mineral treated.

The residue contains a small amount of shot lead (0·07 per cent.), and yields, after separation of this, the following:

	Per cent.		Per cent.
SiO_2 (with a little $BaSO_4$)	43·065	ZnO	·450
CaO	5·226	PbS	28·934
MgO	1·345	$PbsO_4$	·432
Fe_2O_3	3·021	PbO	17·219
Al_2O_3	trace.		
SbO_4	·334		99·935

At the Perry Furnace, Washington County, a single tuyere hearth of the older style, three thousand pounds of ore are worked by the same set of smelters, for the production of 30 pigs of 70 lb. each, giving a yield of 70 per cent., and consuming ten bushels coal. The residues are crushed and washed, and passed to treatment in the same hearth.

At the Vallé Mines are two of the same description of hearths, each treating 3,500 lb. raw ore in eight hours, consuming four bushels coal and about one-twentieth cord of wood, and producing 33 pigs of 75 lb. each (for the Rozier brand) or 2,475 lb., or 30 pigs of eighty pounds each (of the Vallé brand), or 2,400 lb. metal. There is a difference in the character and preliminary preparation of the ore used for the two brands of lead. The residues are passed to a small cupola, in which 5,000 lb. are treated in twelve hours by the labor of two smelters and one helper, producing 18 pigs of 60 lb. each, or 1,080 pounds, or 21 per cent. The slag lead is branded "Phœnix."

At Mine La Motte, two of the improved hearths are in use, the duty of each being the treatment of 3,200 lb. mineral in six hours. The yield is about 70 per cent. The amount of labor required per ton of mineral treated on the hearth averages 1·66 days, and the charcoal 5·2 bushels per ton of mineral in either form of hearth, the advantage of the improved form being chiefly in its greater durability. It is, however, a more costly form of apparatus. The consumption of fuel indicated does not include that required for the blowing apparatus, nor is the time of the engineer included in the labor. A four ounce pressure is commonly used for the blast.

To further illustrate the character of the hearth residues I select here an analysis of that produced at Mine La Motte, made in my laboratory by Mr. W. C. MINGER. The empirical result is given (A), together with the rational result (B) calculated from the same;

A. EMPIRICAL COMPOSITION.		B. RATIONAL COMPOSITION.	
SiO_2	17·465	SiO_2	17·465
Al_2O_3	4·349	Al_2O_3	4·349
CaO	10·309	CaO	9·242
MgO	3·413	MgO	3·413
BaO	0·469	$CaSO_4$	2·580
Co	0·438	$BaSO_4$	0·714
Ni	0·852	$PbSO_4$	4·174
Zn	0·327	CoS	0·675
Fe	4·114	NiS	1·242
Pb	45·977	ZnS	0·488
S	7·341	Fe_2O_3	5·877
SO_3	2·863	PbS	45·758
O (by calculation)	2·049	PbO	0·990
	99·966		99·966

The following are the characters of the leads produced at some of the hearths named;

	I.	II.	III.	IV.
Arsenic	0·00583	0·00825	trace	0·00034
Antimony	0·00803	0·00184	0·00214	0·00119
Silver	0·00219	0·00615	0·00326	0·00345
Copper	0·00585	0·03742	0·04165	0·01999
Iron	0·00145	0.02497	0·00453	0·00248
Zinc	0·00156	0·00118	0·00294	0·00164
Nickel	trace	none	none	0·00095
Lead (by difference)	99·97408	99·91019	99 94548	99·96996
	100·00000	100·00000	100·00000	100·00000

I. Lead from Hopewell hearth ; II. From Vallé hearth, Rozier brand ; III. From same, Vallé brand ; IV. Mine La Motte.

By comparison of the hearth and the reverberatory methods it will be seen that in the former the consumption of fuel and labor per ton of ore is less. On the other hand, the residues are not so clean, and the loss by volatilization is greater, and consequently the yield of lead is less in the hearth than in reverberatories. Further, the hearths are much more costly at the outset ; besides, the accessory apparatus for the blast requires labor and fuel, which items, as before noted, have not been taken into account in the expenses given above. I am inclined, however, to the opinion that, other things being equal, the hearth lead will be purer than that run from the reverberatories.

The residue treatment at Mine La Motte is of interest in connection with the production of nickel. The residues from the hearths, mixed with roasted ores, which are notably nickel-bearing, are treated in a cupola of trapezoidal section, and with three tuyeres of 2⅜ inch nozzle, delivering a blast under a pressure of 10 ounces. The fuel is coke, and the flux, hematite from the Iron Mountain region. The products are slag, frost matte and lead. The compositions of the slag and matte are shown by MINGER's analyses, to be as follows :

SLAG.

EMPIRICAL COMPOSITION. Per cent.		RATIONAL COMPCSITION. Per cent.	
SiO_2	53·435	SiO_2	53·435
Al_2O_3	6·219	Al_2O_3	6·219
CaO	15 056	CaO	15·046
MgO	8·653	MgO	8·633
Co+Ni	0·514	K_2O	0·708
Zn	0·291	FeO	0·988
K_2O	0·708	(Co+Ni) S	0·793
Fe	11 328	Zn S	0 436
S	3·441	Fe_2S	13 576
O (by calculation)	0 219		99·834
	99 834		

MATTE.

EMPIRICAL COMPOSITION. Per cent.		RATIONAL COMPOSITION. Per cent.	
SiO^2	20·827	SiO	20·827
Al_2O_3	8·434	Al_2O_3	8·434
CaO	7·867	CaO	7 867
MgO	3·442	MgO	3·442
Cu	0·192	Cu_2S	0·241
Zn	0·139	ZnS	0·208
Co	1·195	CoS	1·843
Ni	2·486	NiS	3·828
Pb	5·762	PbS	6·659
Fe	36·345	Fe_2S	33·359
S	10·418	FeO	13·370
O (by calculation)	2·971		100·078
	100·078		

The result of the analysis of the lead is as follows :

	Per cent.		Per cent.
Arsenic	0·00125	Zinc	0·00458
Antimony	0·00119	Nickel	0·00519
Silver	0·00564	Lead (by difference)	99·89337
Copper	0·08544		100.00000
Iron	0·00334		

The slags are thrown aside. After deducting the sulphides (regarded as mechanically mixed) they show an oxygen ratio of 4.5 : 16 (nearly).

The matte is roasted and the product passed to second treatment in the same furnace, yielding a concentrated matte and slag. The roasted and concentrated mattes have been analyzed by MINGER, under my direction, with the annexed results :

ROASTED MATTE.

EMPIRICAL COMPOSITION. Per cent.		RATIONAL COMPOSITION Per cent.	
SiO_2	7·804	$NiSO_4$	0·186
Al_2O	2·221	$CaSO_4$	5·442
CaO	2·241	FeSO	1·338
Ni	3·721	SiO_2	7 804
Co	2·203	Al_2O_3	2·221
Cu	1·523	NiS	5 631
Fe	56 591	CoS	3·398
SO_4 (soluble in water)	3·979	Cu_2S	1·908
O (by difference)	9·796	Fe_2S	31·041
	100·000	Fe_4S	1·154
		Fe_2O_3	39 877
			100·000

CONCENTRATED MATTE.

EMPIRICAL COMP. SITION. Per cent.		RATIONAL COMPOSITION. Pe cent.	
SiO_2	1·436	SiO_2	1·436
Al_2O_3	2·659	CaO	4·653
CaO	4·653	Al_2O_3	2·659
MgO	0·776	MgO	0·776
Ni	5 685	NiS	8 769
Co	2·05	CoS	3·092
Cu	0·608	Cu_2S	0·762
Zn	0·282	ZnS	0.421
Fe	63·819	Fe_4S	36·976
S	16·317	Fe_2S	32·536
O (by difference)	1·760	FeO	7·920
	100·000		100·000

That a large number of the leads produced by the Missouri furnaces, more especially by those in the Central and South-western regions, are excellently well adapted for purposes of corrosion into white lead, has long been known by Western manufacturers. The corroders of the Eastern cities have, of late, realized the value of the furnaces of these regions as a source of supply of lead, and during the past year a large amount of Missouri soft metal has found its way eastward, giving satisfactory results in respect both to the degree of corrodibility and the color, and other characters of the resulting white lead. I have compared, side by side, a corrosion of South-western Missouri lead with one of Tarnowitz, both by the same manufacture, and while the trained eye could perhaps distinguish under such circumstances that the creamy tint of the white lead from the Tarnowitz was wanting in that from the Missouri lead, yet the difference was not sufficient to warrant any choice for practical use, beyond such an one as might be founded in prejudice.

Such slight differences in properties of the white lead, as well as variations in the amounts of corrosion, I am satisfied, from a somewhat extended experience, are chargeable, not so much to differences in quality of lead, as to variations in the temperature and other internal conditions of the stack in which the leads are corroded, and these conditions are too little understood to be under the control of the manufacturer, in spite of the long time during which the so-called Dutch method has been in use. As a matter of some interest in this connection, I reproduce here some analyses which I have already published,* which bear on this subject, and have placed side by side HAMPE'S† results in a similar direction with some of the white leads from European leads :

	I.	II.	III.	IV.	V.	VI.
Arsenic	0·00019	nil.	nil.	nil.	nil.	0·00217
Bismuth	nil.	nil.	0·004841	0·006276	trace.	nil.
Copper	0·00479	0·03926	0·001708	0·000431	0·000556	0.01381
Antimony	0·00198	0·00076	0·001236	0·000903	0 000444	0·00158
Silver	0·00045	0·00034	0·000500	0·000500	0·000130	0·00050
Iron	0 00220	0·00085	0·002100	0·000728	0·000903	0·00315
Zinc	0·00142	0·00025	0·000305	0·000128	0·000257	0·00770
Nickel	0·00047	0·00007	trace.	trace.	nil.	0·00055
Cadmium	nil.	nil.	nil.	nil.	0·000360	nil.

I. is pig lead used in the production of II. ; II., unwashed white lead from preceding ; III., ordinary Hartz white lead (HAMPE) ; IV., white lead from Lautenthal lead (ib.) ; V., white lead from Silesian lead (ib.) ; VI., residual blue lead or kernel from II.

ROLLA, Phelps County, Mo., April 13, 1876.

REVIEW OF THE PETROLEUM TRADE FOR AUGUST.—The month of August was one of great interest in the region of production in many respects. The activity displayed in the drilling well department for the past three or four previous months has been increased. The number of wells completed in August was 270, against 195 in July. Daily average production per well, 12 barrels, against 14 barrels in July. Drilling wells 374, against 353 last month. Rigs being erected 382, against 232. The daily production for the month has increased about 600 barrels. The greatest increase was in the Scrubgrass District, by the strike of PHILLIPS BROS.' Bullion Run Well, which has added 275 barrels daily to that district. Butler and Parker District has fallen off, while Clarion has more than made their loss good by about 100 barrels. The balance of the old districts have maintained their production by drilling new wells and starting up old ones. Warren District increased 125 barrels, and Bradford District made a small increase. With the unprecedented number of wells drilling and rigs starting we must look for a steady increase in the production while the warm weather continues ; but as we have no new or fresh territory to look to for large wells, the increase cannot be rapid in the old territory where the new wells average only 12 and 15 barrels per day. The advance in price of oil has created a great excitement in the Oil Regions, and many dealers and tankers have made large amounts of money on the advance. The sales of immediate shipment at Parkers on the 1st day of August, ranged from $2.50 and $2.60, without any great fluctuations, until the 10th, when sales were made at $2.60 and $2.65, and on the 12th, the price advanced to $2.80, and on the 17th it reached $3.00, with a rapidly-increasing market until it reached $4.07½, on the 28th, closing the month at $3.80. Fluctuating between $2.47½ and $4.07½, maintaining an advance of $1.30 for the month. The guaging of iron tanks in the region of production has been an event of interest, the result of which we give below as reported by the committee. We adopt their report as being correct, which is in excess of the amount of stock that our balances call for. The difference is accounted for in the fact that our estimate of the outages (water, B. S. and sediment) has been 13 per cent., based on the best knowledge we could obtain from examinations of various parties of their own tanks at different times and seasons of the year. The gaugers' report make the percentage of the outages as follows : B. S., 6 85 ; water, c.90 ; total outage, 7·25 per cent.

SUMMARY.

Total merchantable oil	3,164,384.44
Total B. S	235,067.70
Total water	30,740.58
Total fluid	3,430,192.72

The foregoing is a true and correct statement of the gauge report, showing oil in tanks September 1st, 1876, obtained from the various sworn gaugers, in pursuance of the action of the Oil Exchanges.

With regard to the outlook for the future, *Stowell's Reporter* says: There are other things than the stocks on hand that affect prices, and these will tend from time to time to unsettle the market. One thing that would have this tendency would be large strikes in new territory, but while "we know not what a day may bring forth," it is very generally accepted as a fact that no such strikes will be likely to be made. The producing territory is quite well defined. Operators don't "shoo" at Warren, and Bullion Run don't alarm them, and it will require the most prolific "gusher' in virgin territory to depress the market. But while this is true of new territory, the production of old territory can be very largely increased by reopening old wells and drilling of new ones. There are scores and hundreds of wells not only in Pennsylvania, but in Ohio and West Virginia, that $3 oil will set pumping, and territory that has been producing can be made to largely increase its product by sinking new wells. Speaking of these old wells and their production, the Titusville *Herald* says : "It is claimed that there are about 500 women in the Oil Region who, in the absence of their husbands and brothers, pump small wells by heads, thus adding materially to the production. Some of these wells yield only half a barrel, others five barrels a day, and the average is claimed to be about two barrels." When it is remembered that the average production of wells is some five or six barrels per day, it will be seen that the production can be very largely increased in this way. The same is true of Ohio. The Geological Reports of that State speak of wells in a number of counties that could be made profitable on $3 oil. The largest yearly production of this State, of which we have a record, was in 1872, when it reached 2,150,960 gallons. In 1874, it had fallen to 1,082,908 gallons. On the other hand, as the season advances, the production of the wells fell off materially. The effect of cold weather on production is well known. Some wells will freeze up entirely, and in others the production will be very much reduced. Last Winter was a very open one and should not be taken as a criterion of the effect of cold, but we think it safe to put this reduction at a barrel per well on the average, or 20 per cent. To this must be added the fact that foreign markets are nearly bare of oil, and the season of its greatest use is at hand, and oil must be had. And when the present fight between refiners and exporters is at an end, as it must be soon, the effect of the demand must be to strengthen if not to advance prices. These facts seem to us to indicate that, for the present, prices of oil will be sustained.

*Report of the University, State of Missouri, year ending June 24, 1875 ; pp. 203 *seq.*

†HAMPE, *Berg und Hüttenmänische Zeitung.*

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 Sept. 23.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co.	53,098	1,301,721	52,410	2,288,536
D. L. and W. RR. Co.	60,745	1,118,625	50,964	2,261,692
Penn. Coal Co	28,729	705,831	25,232	980,072
L. V. RR. Co.	15,182	671,548	24,665	682,290
P. and N. Y. RR. Co.	—	17,488	923	78,303
C. RR. of N. J.	37,327	871,872	56,982	886,052
Penn. Canal	14,870	279,739	10,426	187,235
	209,951	4,966,824	221,602	7,364,180
Lehigh Region.				
L. V. RR. Co	74,162	1,764,013	92,254	1,193,291
C. RR. of N. J.	39,648	918,325	34,388	387,357
D. H. and W. B. RR.	742	30,357	—	55,226
	114,552	2,712,695	126,642	1,635,874
Schuylkill Region.				
P. and R. R. RR. Co.	147 874	3,009,794	170,694	2,910,621
Shamokin & Lykens Va.	27,144	585,497	25,780	887,184
	175,018	3,595,291	196,474	3,797,805
Sullivan Region.				
Sul. and Erie RR. Co.	—	27,663	—	5,557
Total	490,521	11,302,473	544,718	12,803,416
Increase	—	—	—	—
Decrease	45,197	1,500,943	—	—

* 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.

Perth Amboy business :

	Tons.
Received for the week	19,158
Shipped for the week	22,168
On hand Sept. 23	73,200

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 428,654 tons, as compared with the corresponding period in 1875.

Belvedere Delaware RR. report.	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	8,488	188,118	101,693
" " " South Amboy	9,757	308,987	161,837
Shipments at Coal Port (Trenton)	8,742	186,149	98,907
" " South Amboy	9,392	336,026	213,412

Receipts of Coal at Boston, for the week ending Sept. 22, and years from Sept. 1, 1875 and 1876.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	1,402	1,360	12,934
Philadelphia	16,195	23,084	77,199
Baltimore	1,692	8 901	16,952
Other places	7,837	11,145	28,367
Great Britain	..	..	604
Nova Scotia	2,101	2 269	3,868

The Production of Bituminous Coal for the week ending Sept. 22, was as follows :

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb	14,424	1,278,607
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	6,857	241,234
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	2,475	113,538
*East Broad Top	1,256	50,292
Clearfield Region, Pa.		
*Snow Shoe	921	37,460
*Tyrone and Clearfield	22,867	824,777
Allegheny Region, Pa.		
*Pennsylvania RR	3,674	148,750
Pittsburgh Region, Pa.		
*West Penn. RR	4,150	142.875
*Southwest Penn. RR	1,016	41.471
*Penn. & Westmoreland gas coal, Pa. RR.	20,643	575,454
*Pennsylvania RR	9,045	197,095

* For the week ending Sept. 14.

The Production of Coke for the week ending Sept. 14.

Tons of 2000 lb.	Week.	Year.
West Penn. RR	534	33,356
Southwest Penn. RR	9,441	364,077
Penn. & Westmoreland Region, Penn. RR.	1,383	37,100
Pittsburgh, Penn. RR.	2,360	117,617
Total	13,718	552,150

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Sept. 29, 1876

Anthracite.

THERE has been considerable business done during the past week, but the auction sales were of course the principal features.

In six weeks or two months, many of the northern ports will be closed, so that there is much anxiety on the part of buyers at these ports to put in coal as early as possible. This has undoubtedly contributed to the activity which has been noticeable in the market for a few weeks past.

On Wednesday, the Delaware, Lackawanna, and Western Railroad Company offered for sale 100,000 tons of coal as follows :

	Tons.
Steamer coal	8,000
Grate "	25,000
Egg "	15,000
Stove "	40,000
Chestnut "	12,000
Total	100,000

The average prices realized were as follows, as compared with those of August 29th :

	Aug. 29.	Sept. 27.	Increase Sept. 27.
Steamer	$2.74¾	$2.90½	.15¾
Grate	2.70¼	2.97½	.27¼
Egg	2.77	3.18¼	.41¼
Stove	3.60¼	3.96½	.36¼
Chestnut	2.73¼	3.28	.55¾

The Delaware and Hudson Canal Company offered for sale yesterday, 100,000 tons of coal as follows :

	Tons.
Steamer	5,000
Grate	30,000
Egg	20,000
Stove	45,000
Total	100,000

The average prices realized were as follows, compared with those obtained for this company's coal at the sale August 29th :

	Aug. 29.	Sept. 28.	Increase Sept. 28.
Steamer	$2.814	$3.13 1-6	.31¾
Grate	3.227	3.20 Dec.	.02¾
Egg	3.144	3.28⅝	.14
Stove	3.865	4.10	.23½

The following is a comparison of prices received by the Delaware Lackawanna and Western Railroad, the Delaware and Hudson Canal Company, and the Pennsylvania Coal Company :

	Pennsylvania Coal Co. at Newburg Sept. 20.	D. L. & W. R. R. Sept. 27.	D. & H. Canal Co. Sept. 28.
Lump	2.918	....	....
Steamer	2.934	2.90½	3.13 1-6
Grate	2.917	2 97½	3.20
Egg	3.125	3.18¼	3.28⅝
Store	3.639	3.96½	4.10
Chest	3.20	3.28	....

The average advances in prices over those of Aug. 29, were 14c. for Pennsylvania Coal Company, 35c. for Delaware Lackawanna and Western Railroad Company, and 17c. for Delaware and Hudson Canal Company.

The Delaware and Hudson Canal Company, tows boats to and from New York harbor, thereby putting its coal on the same basis as the Delaware Lackawanna and Western Railroad Company, on coal for New York or Eastern delivery, while the Pennsylvania Coal Company sells at Newburg, charging 65c. for delivery to New York, or 15c. to 30c. per ton more than is charged on other coals. Upon this basis it will be observed that the Delaware and Hudson coal brought more than either of the other coals while the Pennsylvania Coal Company's coal stood second.

After the Scranton auction sale there was a mild expression of belief that prices had been "bolstered." The Lehigh Coal Exchange held a meeting the same day, and resolved to continue, for October, the prices that have ruled this month. Although these prices were well known before the Delaware and Hudson Canal Company's auction took place, yet nearly 30,000 tons of the Lackawanna stove coal sold at $4.15, or the regular circular price for this month, and 15 cents *in advance* of the Lehigh circular for October. The whole 100,000 tons of coal was sold in fifteen minutes, which is very lively work, and the sale had been started but a few minutes before the countenances of a great majority of those present indicated that they "smelt a rat." All eyes were centered on "WARD," who did not appear to be particular, to 2⅛c., what point prices did reach. As the sale continued, two other buyers attracted attention, and when one of these had taken what appeared, for him, an extraordinary quantity and at a high price, some one remarked that it was "too thin," and there seemed to be some little ground for the inference. After the sale there was a very decided expression of opinion that "Peter Funk" had been present. Of course people will talk, but no positive evidence was given us for the statement; we must, therefore, assume that the sale was *bona fide*, as it appeared. It is remarked that two-thirds of the coal went to three parties who would be most likely to protect the company—well, what if it did? There was considerable coal sold previous to the auction sales, based upon the average of prices to be realized by the two Lackawanna coals, while again, there is a very large quantity that will have to be sold at private sale, all of which would tend to create a strong interest, bent on giving tone to the market.

If it becomes generally credited that the sales of this week were *bona fide*, it will encourage producers and tend to a continuation of a very large production of coal, even though an average of the prices realized would scarcely pay the cost of putting coal at tide-water. It will be observed by examining our production tables that the production of anthracite coal last week was 499,521 tons, as against 544,718 tons for the corresponding week of 1875, and 460,773 tons for the week ending September 16th, this year. The total decrease in production since January 1st, as compared with the corresponding period of 1875, has been 1,500,943 tons.

We are now producing coal at the rate of 27,500,000 tons per annum, with prospects of even increasing, for a time, the output per week. As we had predicted, the low prices of coal have greatly increased the demand. To our knowledge, three furnaces have blown in since the Combination broke, and there are prospects that others will follow, while there has certainly been quite a number of manufacturing establishments that have been permitted to resume operations, owing to the reduction in the price of coal; but all of these cannot warrant the continuance for a great length of time of a production double the average of what ruled from the beginning of of the year up to the break of the Combination.

The pressing demand for vessels during the early part of this month greatly increased the rates of freights, but during the past week there has been a slight decline.

Circular No. 11.

PHILADELPHIA AND READING RAILROAD COMPANY,
General Office, 227 South Fourth Street.
PHILADELPHIA Sept. 21, 1876.

On and after Monday, September 25th, 1876, a charge of fifty cents per four-wheel car and one dollar per eight-wheel car per day will be made on all cars of Anthracite coal not unloaded on the day of delivery at Port Richmond, and, in addition to this charge, the number of cars so standing unloaded will be deducted from the pro-rata distribution of empty cars to the colliery from which said unloaded cars were shipped.

The above fine of fifty cents per four-wheel car and one dollar per eight-wheel car per day will apply also to all points on the line, including the city of Philadelphia.

A charge of one dollar per four-wheel and two dollars per eight-wheel car per day will be made on all coal cars loaded without any *consignment*; or loaded and consigned by any colliery to a point where said colliery has received notice of coal shipments having been stopped—in the latter case the shipper will be immediately notified, and asked for another consignment; and said charge will continue until said coal is reconsigned and sent forward.

FRANKLIN B. GOWEN, President.

Bituminous.

This coal is almost lost to sight in the activity that has ruled in anthracite. We learn of no business worthy of note, although the Clearfield Region continues to do a very fair business. It is said that freights on this coal on the Pennsylvania Railroad have been reduced 25 cents per ton, to take effect October 1. There is also talk of a 20 per cent. reduction of wages in that region. There is no doubt that this coal intends to maintain its position in the market, and lose as little of its trade as possible, while Cumberland coal stands, so far as cost at mines, and charges on lateral roads are concerned, where it did before the panic of 1873. Unless the companies in this region succeed in reducing the cost of putting coal in cars, and the Consolidation Coal Company's exhorbitant rates of transportation, their business must come to a perfect standstill, or at best to supplying only a local demand. The shipments of Cumberland coal last week were 41,226 tons less than for the corresponding week of 1875, making the total decrease this year, as compared with the corresponding period of last year, 428,654 tons. The break in the Chesapeake and Ohio Canal was to have been repaired yesterday, and shipments will be resumed by that route.

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

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Rondout	3 25	3 25	3 50	3 50	4 15	3 75
Pittston at Newburg	3 10	3 10	3 35	3 35	4 00	3 60
Wilkesbarre at Port Johnston	3 25	3 25	3 50	3 50	4 00	3 30
Plymouth, R. A.	....	....	3 50	3 50	4 15	3 30
Susque. Coal Co. at Amboy W.A.	3 25	3 25	3 50	3 50	4 00	3 40
Kingston at Hoboken	3 25	3 25	3 50	3 50	4 00	3 30
Lehigh Coals.						
Old Company at Port Johnston	4 00	....	3 60	3 60	4 00	3 30
Old Company's Room Run "	4 00	....	3 60	3 60	4 00	3 30
Sugar Loaf, Hobok. & Amb. "	4 00	....	3 60	3 60	4 00	3 30
Lehigh Coal Exchange "	4 00	....	3 60	3 60	4 00	3 30
Honey Brook Lehigh	4 00	....	3 60	3 60	4 00	3 30
Beaver Meadow at South Amboy	4 00	....	3 60	3 60	4 00	3 30
Schuylkill Coals at Philadelphia.						
Schuylkill white ash	3 00	3 00	3 00	3 00	3 50	3 00
Schuylkill red ash	....	....	....	3 10	3 00	3 00
Lorberry	....	....	4 00	4 00	4 00	3 05
Lykens Valley	....	....	4 50	4 50	4 50	3 50
North Franklin red ash	....	....	4 00	4 00	4 00	3 05

‡ 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.... 40c.
" " Elizabethport & Port Johnston to N. York. 40c
" " South Amboy to New York.... .... 35c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

The prices of Susquehanna coal at Philadelphia are, on lump and steamer, 25 cents per ton less; broken, egg, and stove, 50 cents per ton less; chestnut, 30 cents per ton less than at South Amboy.

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

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	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
" " South Amboy..	8 50	....
" Orrel.....	6 00	6 50
Youghiogheny, Waverly Co., at Balt....	4 25	5 75
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.....	..	10 00
" Splint, " at Richmond	5 50	7 00
" Gas Coal at Richmond.....	4 15	5 65
Peytona Cannel W. Va at Richmond...	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va ...	3 50@3 75	4 90
Cumberland, at Baltimore	3 65@3 80	5 10
Clearfield f.o.b. Canton, Baltimore....	3 75@....	5 25

Rockhill Semi-Bituminous and Broad Top, at the mine, per 2,000 lb., 95, f. o. b. Greenwich, Philadelphia, per 2240 lb., $3 60@3 95, according to destination; at South Amboy, N.J., 4 60; New York, 5 00.

Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 95; at Greenwich, Phil., per 2240 lb., 3 50@4 25, according to destination; f.o.b South Amboy, N. J., 4 75; New York, 5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle, at Newcastle-on-Tyne	9/0@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool....	26/	13 00
Ince Hall Cannel " ...	42/	18 00
" Gas Cannel " .	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/ Gold.	7 50
Block House, at Cow Bay, N. S	2 00	4 75
Caledonia, at Port Caledonia.....	1 50	4 25
Glace Bay, at Glace Bay.....	1 50	4 25
Lingan, at Lingan Bay....	1 75	...
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove. Chestnut.
Pittston coal, in yard.....	$4 20	$4 50 $3 80
Lackawanna coal, in yard.....	4 20	4 50 3 80
Wilkes-Barre, delivered.....	5 00	5 30 4 60
Lehigh & Locust Mountain, del'd..	5 50	5 50 5 00
Schuylkill Red Ash, del'd	6 00	6 00 5 50

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb....	$18 00
Liverpool House Cannel " " " "	.... 22 00
American " " " "	.... 13 00
Cannelton splint, " " " "	.... 10 00
Cannelton Block, " " " "	.... 10 00
American Orrel " " " "	....11@14
Red Bank Cannel " " " "	.... 10 00
Cumberland " " "	.... 7 00

Baltimore, Md. Sept. 25, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat.....	$3 85	$3 55
Broken.....	3 85	3 55
Egg.....	3 85	3 55
Stove.....	4 35	4 05
Nut.....	3 85	3 55
Shamokin, (red or white ash), and "Boston," free burning white ash,		
Egg.....	4 10	3 80
Stove.....	4 35	4 05
Lykens Valley, red ash,		
Egg and stove.....	5 35	5 05

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. .....$6 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point.	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point.....	4 50
Swanton	4 00

Boston. Sept. 23, 1876.

THE auction sale in New York on Wednesday stimulated an inquiry for cargoes of anthracite at the old prices, and the r sults are that this market has been sold clean of the pool auction lots bought last month. There are about 12,000 tons yet to be delivered here, but the scarcity of tonnage makes the anxieties for getting away their supplies rather oppressive.

FREIGHTS are up to $2 at Philadelphia and to $1 35 at New York. The week has been so very stormy that few vessels could come around the Cape, hence on Friday morning the reports show about 98 coal sails at Holmes and Woods Holes waiting for the lull.

Chicago, Ill. Sept. 26, 1876.

Lackawanna Stove.....	$7 50
" Chestnut.....	7 25
" Grate and Egg.....	7 00
Erie and Brier Hill.....	5 50
Wilmington and Illinois.....	4 75@ 4 25
Blossburgh	7 00

Cincinnati, O. Sept. 25, 1876.

Reported by our Special Correspondent.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat.....	@6½c.	—
Pomeroy coal..... "	@5c.	—
Kanawha " ..... "	7 c.	—
Cannel coal, according to quality "	11 @16c.	—
The following are the retail prices delivered		
Youghiogheny	8c.	—
Pomeroy	8c.	—
Cannel	14@20c.	—
Kanawha.....	10c.	—
Anthracite, per ton.....		10 50
Coke, at yard.....	7c.	—
Coke, hard and soft, delivered.....	—@10c.	—

Louisville, Ky. Sept. 26, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburgh	12c.	Pine Hill....	—
Raymond City.....	9c.	Kentucky.....	8c.

RETAIL.

	per bushel		per bushel
Pittsburgh.....	12c.	Peytona Cannel	20@22c.
Raymond City.....	11c.	Buckeye "	20c.
Pine Hill.....	13c.	City-made Coke.....	10c.
Kentucky.....	10c.	Anth., per ton, $10 00 to	10 50
Screened Pittsburgh per load.....			$3 00
Screened Raymond City.			2 75
Pine Hill (Kentucky).....			2 75
Cannel.....			$5 to 5 50

Milwaukee, Wis. Sept. 26, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Trade is quiet. Our prices for coal are:

Retail price per ton of 2000 lb.

Lehigh Lump	$ 9 00	Briar Hill, select	$7 00
Lehigh Prepared.....	9 50	Blossburgh	7 00
Lackawanna (all sizes)..	8 50	Cannel	8 00
Pittston.....	8 50	Pittsburgh.....	6 50
Scranton	8 50	Steam coal.....	5 50

New Orleans, La. Sept. 24, 1876.

Reported by C. A. MILTEBERGER & Co.

Pittsburg coal, retail, per bbl	50c.
" wholesale	30c.
" steamboats, per box.....	40c.
" to manufacturers.....	45c.
" shipments, per hhd.....	$5 50
Anthracite, wholesale, per ton.....	....
" retail, "	12 00
Virginia Cannel, per bbl.....	80c.
Scotch " "	80c.
Mt. Carbon, wholesale, per bbl.....	....
" " retail, "	50c.
St. Bernard wholesale, per bbl	30c.
" retail, "	45c.

Pittston, Pa. Sept. 26, 1876.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut...	2 00

Delivered, fifty cents per ton additional.

Richmond, Va. Sept. 25, 1876.

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

Prices are now as follows:

Per ton of 2240 lb., f.o.b.

Kanawha Cannel.....	$9 00	New River Bituminous,	$4 00
" semi-Cannel..	4 00	Clover Hill Coal.....	3 50
Coalburgh Splint.....	4 00	James River Bitum ..	3 30
Lewiston "	4 00	" " Carbonite,	5 00
Kanawha Gas coal.....	3 90		

San Francisco, Cal.

From the *Commercial Herald*, Sept. 21, 1876.

Imports from Jan. 1st to Sept. 16:

	tons.		tons.
Anthracite.....	10,241	Vancouver Island...	74,832
Australian.....	84,755	Rocky Mountain....	152
Coos Bay.....	27,889	Seattle	69,064
Cumberland.....	9,251	Bellingham Bay....	16.395
English.....	53,126	Chili.....	2.076
Mt. Diablo.....	76,860		

The supply of Bituminous is very great, causing a large stock accumulation, and enabling the Gas Company and other large consumers to purchase heavily at low prices—say at $8, or even at a less price. Several large cargoes of Ardrossan recently sold on time at $8, while some new (outside) mines have been sold at $6 50@7 per ton. We have before noted a sale of Wallsend at Portland, Oregon, at $5. These low prices of foreign coals brought here as ballast and paying a duty of 75c. per ton entail a heavy loss upon the shipper, compelling him to look for a high return wheat freight in order to make the round voyage at all profitable. Nanaimo sells at $8. The Seattle mines contracted early with the railroads at $9, while other coast companies less fortunate with their contracts are compelled to lessen their production and to seek local buyers on the best terms they can get. The arrivals for the week past embrace the following: *Amethyst*, 500 tons Bellingham Bay; *Arkwright*, 2,000 tons Nanaimo; *Montana*, 1,100 tons Seattle; *Osmyn*, 800 tons Seattle; *Ellen Munroe*, 234 tons from London; *City of Panama*, 1,039 tons Nanaimo; *Deux Amis*, 625 tons Wellington; ship *Two Brothers*, 1,500 tons Liverpool; *British General*, 2,432 tons Newcastle, Eng.; *Oberon*, 400 tons Otago, N. Z.; *Hudson*, 1,182 tons Newcastle, N. S. W.; *Jason*, 1,600 tons same; *Benan*, from Adelaide, 500 tons. The extremely low rates at which Scotch Steam and other Bituminous coals are now sold are reducing greatly the production from the Mt. Diablo mines, as well as from the Bellingham Bay and Coos Bay mines of Washington Territory. We heard of a cargo of Wallsend being offered this week at $8 50, while other kinds have been placed as low as $6 50.

St. Louis. Sept. 26, 1876.

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

The following is a correct list of prices of coal here to-day:

Retail prices, delivered.

ANTHRACITE.	per ton.
Lackawanna.....	$9 00@10 00
Wilkes-Barre.....	9 00@10 00
Schuylkill.....	9 00@10 00
Lehigh.....	11 00@12 00
BITUMINOUS.	
Blossburg.....	9 00
Pittsburg	4 50
Indiana Block.....	4 00
Big Meadow.....	3 00
Illinois Coals.....	2 50@3 00
Connellsville Coke.....	9 00

Toledo, Ohio. Sept. 21, 1876.

Specially reported by GOSLINE & BARBOUR.

The following are the present prices at Toledo for coal.

We quote as follows for retail delivery:

Lackawanna lump.....	$6 75	Lehigh lump	$7 75
" egg.....	6 75	" egg.....	7 75
" stove... ..	7 00	" stove.....	8 00
" chestnut..	6 75	" chestnut	7 75
Soft Coal.			
Hocking lump.....	4 00	Brier Hill.....	5 75
" nut.....	4 00	Blossburg.....	8 00
Willow Bank lump.....	4 50	Cumberland.....	8 00
" " nut.....	4 00		

Montreal. Sept. 25, 187 6.

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

Wholesale per ton of 2240 lb.

Scotch Steam.....	$4 25	Cape Breton Steam.....	$3 75
Pictou "	4 25	Newcastle Smiths.	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg.....	$6 25	Chestnut.....	6 25
Stove.....	6 75		

Hamilton, Ont. Sept. 25, 1876.

Specially reported by H. BARNARD, Dealer in Coal.

Grate.....	$5 85
Egg	5 85
Stove.....	6 25
Nut.....	6 00
Lehigh Lump.....	6 75
Smithing.....	6 00
Bituminous, retail.....	5 50
" steam.....	5 00
Coke.....	6 25

Freights

Representing the latest actual charters up to Sept. 29, 1876.

Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me.....	....	....	....	....
Albany	....	....	...	....
Alexandria.....	....	1 00	....	....
Amesbury, Mass.....	....	....	....	1 50
Bangor, Me.	....	....	....	1 50
Bath, Me.....	....	1 60	1 75	1 50
Baltimore.....	....	....	....	....
Boston, Mass.....	1 80@2 00	1 60	1 80	1 50
Bridgeport, Ct.....	1 05†	1 40	....	80
Bristol, R. I.....	....	....	....	1 00
Cambridgeport, Mass.	2 00@2 10	....	....	1 50
Derby.....	....	....	....	....
Dighton	....	....	....	....
East Cambridge.....	2 00@2 10	....	....	1 85
Fall River.....	1 50@1 75	1 40	1 60	1 00
Hackensack.....	....	....	....	....
Hallowell, Me.....	....	....	....	....
Hartford	....	....	1 85	1 00
Hoboken.....	†95	....	1 35	45
Hudson	....	....	1 60	....
Jersey City.....	†95	....	1 35	45
Lynn, Mass.....	....	....	....	‡1 50
Middletown.....	....	....	....	1 00
Mystic.....	....	....	....	....
Newark.....	†96	....	1 50	....
New Bedford.....	....	1 45	1 65	1 10
Newburyport.....	....	1 75	2 00	1 65
New Haven.....	1 05*	1 40	....	70
New London.....	1 50@1 75	1 40	....	80
Newport.....	1 50@1 75	....	....	1 00
New York.....	†95	1 35	1 40	45
Norfolk.....	....	....	....	75
Norwalk.....	1 05†	1 40	....	80
Norwich.....	1 50@1 75	....	....	90
Pawtucket.....	1 75	....	....	‡1 10
Philadelphia.....	....	....	....	....
Portland.....	....	1 60	1 80	1 35
Portsmouth, N. H....	2 00@2 10	1 75	2 00	1 60
Providence.....	1 50@1 75	1 40	1 60	1 00
Poughkeepsie, N. Y...	1 10†	....	....	....
Rockport.	....	....	....	....
Saco.....	....	....	2 25	....
Sag Harbor.....	....	....	....	....
Salem, Mass.....	2 10@2 15	1 60	1 85	1 50
Salisbury Pt., Mass...	....	....	....	....
Stamford.....	1 05†	....	....	....
Stonington.....	....	....	....	....
Taunton.....	....	....	....	....
Troy	1 15†	....	....	....
Warren, R. I.....	....	....	....	1 00
Wareham	....	....	....	....
Washington.....	....	1 00	....	....
Weymouth.....	....	....	....	....
Wilmington, Del.....	....	....	....	....

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

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Sept. 29, 1876.

American Pig.—The business of the past week was very limited, the improved demand noticeable for two weeks previous having entirely disappeared. Our Philadelphia correspondent says that the break in Philadelphia and Reading Railroad stock has thoroughly demoralized the iron market of that city, it being expected that the financial necessities of the company may force them to dispose of a large quantity of iron which they are reported to hold. It is reported that our regular quotations have been shaded during the past week. Several additional furnaces have gone into blast, or are expected to do so at a very early day. We note sales of 600 tons of Thomas iron at quotations. We quote No. 1 foundry at $22 ; No. 2, $20, and forge at $19@$20.

Scotch Pig.—There is but very little doing in this article. Prices are as follows : Coltness, $28 50 ; Glengarnock, $27.50 ; and Eglinton, $27.

Rails.—There is a rumor of a sale of 1,000 tons of iron rails. We quote iron rails at mill at $36@$41 ; and steel at $52@$54.

Old Rails.—There is nothing doing in these. They are quoted at $20.50@$21.

Scrap is very quiet at $26, nominal.

Philadelphia Iron Trade.

Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & CO., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Sept. 28, 1876.

The market this week is void of interest. This being Pennsylvania week, and many, if not all, the works in this neighborhood being closed on Thursday, (which will hardly get fairly under way this week again), makes buyers undesirous of business. The heavy break in Reading Stock makes the timid more timid, fearing that the large lots of iron held by the Reading Company would be thrown on the market at this time ; in fact, everything this week tends to depress the market, just as it was getting a good set-off ; this week was the dullest in sales for at least six weeks. Prices are firm, with no desire to cut. We report sales of 1,000 tons Crane, 100 tons Montgomery, 100 tons Chickies, Reading Brands of about 100 tons in small lots. We quote : $22@$22.50 for No. 1 ; $20@$20.50 for No. 2 ; $19.50@$20 for Gray Forge. Manufactured iron continues the dullest thing on the iron list ; but as all kinds of merchandize—dry goods, drugs, etc.—have taken a start, hopes are entertained for bars at no distant day. We quote: 2.2-10@2.3-10c,

RAILS—Nothing new to report.

IRON is quoted at $38@$42.

STEEL, $56@$58.

OLD RAILS are quiet, $21@$22.50. No sales Scrap.

WROUGHT SCRAP is quiet, at $24@$27; Cast, $14@$19.

Baltimore. Sept. 27, 1876.

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

The market for pig iron remains dull and depressed—sales very light, and no prospect of any early improvement. We quote :

Baltimore Charcoal	$30@34	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@34	Mottled and White	17@19 00
Anthracite No. 1	24@25	Charcoal C B.Blooms	63@65 00
" No. 2	22@23	Refined Blooms	50@55 00

Boston. Sept. 23, 1876.

PIG sells in a quiet way to no inconsiderable aggregate. The improvement in inquiries previously noted has settled into actual business, both buyers and sellers having a more chipper feeling. Prices are very difficult to quote, the value depending almost wholly upon what the buyer can use, so that the heretofore importance of a brand and a price is to a large degree lost. This business occurs wholly in American irons, Scotch pig being unsought for at present. Offers of lots to near-by store men, however, may yet lead to transactions.

BAR continues selling freely, with just a perceptibly steadier tone to the market, a feature characteristic of short supplies of desirable sizes, and the frequent necessities the dealers have of keeping one another out on some specification or orders. The demand is from all directions, interior dealers, retailers, blacksmiths, and machinists being in want of stock. Noticeably the sales to the latter class attract the most interest, as machinery people have for a year past been very quiet. Prices may be quoted from $49 upward, the figure given being now the bottom. Common iron is slow at $40.

STEEL is selling in a moderate way at steady prices, the inquiry leading from machinery and sleigh builders.

We quote American tool, 14c.@15c.; American machinery, 8c.@9¼c ; Bessemer tires 5¾c. ; Sweet's Excelsior tire, 7½c. ; English tool, 15½c. gold.—*Commercial Bulletin.*

Chattanooga, Tenn. Sept. 26, 1876.

Specially reported by J. F. JAMES, pig iron broker, etc., 233 Market Street.

The market here is fairly active, though stocks are very light. Considerable shipments of mill grades to the West from the furnaces below have been made during the past week. Prices as before.

Tenn. Ala. and Ga. Charcoal,	No. 1 foundry		$21@ 22
" " " "	No. 2 foundry		20@ 21
" " " "	gray forge		17@ 18
" and Georgia coke,	No. 1 foundry		18@ 19
" " " "	No. 2 foundry		17@ 18
" " " "	gray forge		15@ 16
White and Mottled			14@ —
Tennessee and Georgia cold-blast car wheel			23@ 24
Alabama " "			23@ 24
Old Rails		cash	22 00
Cast Scrap			" 12
Wrought Scrap			" 18@ 20

Cincinnati. Sept. 26, 1876.

Specially reported by Messrs. TRABER & AUBERY, 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	$24 00@25 00	—4 mos
" No 2, "	23 00@	—4 mos
" Mill	20 00@21 00	—4 mos
Tennessee, No. 1, Foundry	23 00@	—4 mos
Tennessee, No. 2, "	22 00@	—4 mos
" Mill	20 00@	—4 mos
Missouri, No. 1, Foundry	.... @	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 00@22 50	—4 mos
" No. 2, "	20 50@21 00	—4 mos
Ohio Mill	19 00@19 50	—4 mos
Missouri, No. 1 Foundry	25 00@	—4 mos
" No. 2, "	24 00@	—4 mos
" Mill	23 00@	—4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	—4 mos
Tennessee "	25 00@32 00	—4 mos
Missouri "	32 00@35 00	—4 mos
Alabama "	25 00@32 00	—4 mos

BLOOMS.

Charcoal	60 00@ 75 00	—cash

SCRAP IRON.

Cast	50c.@ 85	—cash
Wrought	1 00@1 40	—cash

Cleveland, Ohio. Sept. 26, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows :

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	27 00@....
No. 2, " " "	26 00@....
No. 1, Anthracite	25 00@....
No 2, "	23 00@....
No. 1, Bituminous	24 50@ ...
No. 2, "	23 00@....
American Scotch, No. 1, Cherry Valley	.... @....
" " B—1, " "	.... @....
" " No. 2, " "	.... @....
No. 1, Massillon	25 50@....
B—1, "	24 00@....
No. 2, "	21 00@....

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	27 00@....
No. 4 " " "	27 50@....
Nos. 5 and 6 "	27 00@....

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	27 00@....

FORGE IRON.

No. 1, Gray	22 00@....
White and Mottled	21 00@....

Louisville. Sept. 26, 1876.

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

The market is without change in tone or price.

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

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$23 00@25 00
No. 2 " " "	21 00@22 00
No. 1, Mill, from " "	19 00@20 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	21 00@22 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	20 00@21 00
No. 1, Mill, from " " " " "	19 00@20 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	21 00@23 00
No. 2, " " " " "	20 00@21 00
No. 1, Mill, " " " " "	19 00@20 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	20 00@22 00
No. 2, " " " " "	19 00@20 00
No. 1, Mill, " " " " "	18 00@19 00
No. 1 Foundry, from Missouri Ores	— @ —
No. 2 " " " "	— @ —
No. 1 Mill, from Missouri Ores	23 00@24 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@43 00
" " Tennessee "	25 00@30 00
" " Alabama and Georgia Ores	28 00@40 00
" " Kentucky Ores	28 00@42 00

Milwaukee. Sept. 26, 1876.

Iron remains much the same—sales small.

per ton of 2,240 lb.

Frankfort L. S. Charcoal,	No. 1	$28 00
" " "	No. 2	27 00
" " "	No. 3, 4 & 5	25 00
" " "	No. 6	25 00
Mil. Anthracite L. S.,	No. 1	27 00
" " "	No. 2	26 00
Wisconsin Iron,	No. 1	26 00
Mahoning Valley Bit's	No. 1	32 00
" " "	No. 2	30 00

Pittsburg, Pa. Sept. 26, 1876.

Specially reported by A. H. CHILDS.

There is a fair demand at ruling rates for forge iron of good standard brands, as such metal is not in excessive supply. That of poorer quality is pressing on the market, and in some instances considerable concessions granted to effect sales.

Demand for foundry iron is improving.

No. 1 Foundry	23 50@25—4 mos	
" 2 "	23 00@— "	
Gray Forge	21 00@22 00	"
White and Mottled	19 00@20	"
Warm blast Charcoal	23 00@29	"
Cold blast Charcoal Western	40 00@45	"

Richmond, Va. Sept. 25, 1876.

Reported by ASA SNYDER, Esq.

No material change in charcoal pig iron. There is a reasonable active inquiry, and sales continue at quotations.

Virginia Cold Blast Charcoal Pig Iron		$27 to $33
" Warm " " "		24 to 28
" " " Coke " "	1 X	23 to 24
" " " " "	2 X	21 to 22
" " " " "	3	20 to 21
" Anthracite 1 X		— to —
" " 2 X		— to —
" " 3		— to —

San Francisco, Cal.

From the *Commercial Herald*, Sept. 21, 1876.

Our foundries are comparatively idle, doing very little work at present ; consequently the demand for pig iron is much restricted, and with a large stock prices are more or less nominal. The brig *Hazard*, from Oregon, brought us 30 tons from the Oswego mine. The steamer *South Carolina*, for Panama, carried en route for New York 360,000 lb. pig lead. We quote Sydney tin at 18c.

St. Louis. Sept. 27, 1876.

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

Our market shows a little more activity and prices are very firm at quotations, with the prospect of a light advance soon.

Mo. Stone Coal No. 1 Fy.	$25@26	Massillon iron, A No	1.20@30
" " " 2 "	23@24	" " B "	1.3.@—
" " Gray Mill,	22½@23	" " "	2.28@—
" Charcoal No. 1, Fy.	23@24	Cold Bl. Car Wheel, Mo.	30@33
" " " 2, "	22@23	" " " Tenn.	30@33
" " Gray Mill,	22@23	" " " Ala.	30@33
Tenn. " No. 1, Fdy	23@24	" " " H. R.	33@35
" " " 2, "	22@23	Mo. Charcoal Blooms	50@65
" " Gray Mill	22@23	" Scrap "	45@55
Va. Coke, No. 1, Fdy.	24@25	" " hammered Billets	75@80
" " " 2, "	23@24	Assorted Bar Iron	2 50, 60 days
" "Gray Mill,	21@23	No. 1 Wrought Scrap	90c. cwt.
H. R. Char. No. 1, Fdy.	25@26	Heavy cast	" 70 "
" " " 2, "	24@25	Light	" 50 "
" " Gray Mill,	24@25		

Montreal. Sept. 19, 1876.

We continue to quote: Pig iron, Eglinton and Clyde; $18@19.00 ; Carnbroe $19@20 ; American $19@20 ; Summerlee and Calder $20@21 ; Langloan and Gartsherrie $21@22 ; Coltness $22@23 ; Hematite, $30@31. Bar, per 100 lb., Scotch and Staffordshire, $2.00@2.10 ; best do., $2.25@2.35. Swedes and Norway, $4.75@5.50 ; Low Moor and Bowling, $6@7.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Sept. 29, 1876;

ALTHOUGH a marked improvement is noticeable in many branches of business it does not appear to have reached the metal trade, on the contrary the amount of business doing is very small and prices in nearly all cases are weak.

Gold Goin.—During the week under review the price of gold has ranged from 109¾ to 110¼ and closed at 110¼.

Bullion.—Fine silver bar is quoted at 114 in the city ; 13 per cent. discount in San Francisco ; and 52½d. in London, showing considerable of an advance since our last.

Copper.—There has been but very little business done in this article. We quote at 20½c.@21c. The sale of Wallaroo copper, which took place in England on the 26th inst., averaged £77 10/.

Tin.—Straits is quoted in London at £71 10/, and in this market at 17¼c., gold. L. & F. is quoted at 16⅝c., gold ; Banca, 19½c. ; and Refined at 16¾c., gold. There is but very little business doing.

Tin Plates are quiet and unchanged, in prices which are as follows, gold, per box : Charcoal tins, $7.12½@$7.25, and ternes, $6.50@$6.62½ ; coke tins, $6.25, and ternes, $5.87½@$6.

MESSRS. ROBT. CROOKS & Co., of Liverpool under date of September 14, says of Tin Plates :—"The demand has almost fallen off from America, and some makers are rapidly getting to the end of their order sheets. The market may be considered quite 6d down during the past fortnight for Charcoals, and 3d for Cokes. It seems probable now, that before long, we may again reach the lowest range of prices, unless an inquiry springs up at present not expected. During the recent improvement the works have in many cases been turning out their full production, and now stocks are accumulating and cannot be sold unless at a reduction upon present prices, the views of buyers being of a downward tendency."

Lead.—The business of the week has only been in a small way, at prices ranging from 6·50c.@6 60c., currency, for ordinary domestic lead.

Spelter and Zinc.—Domestic spelter is dull of sale, at 7c currency. Sheet zinc is quoted at 8c.@8½c., gold.

Antimony is quiet at 14¾c., gold.

Quicksilver is quoted in this market at 46c.@48c. ; in San Francisco at 44c.@45c. ; and in London at £8.

The San Francisco *Commercial Herald*, of the 21st inst., says of Quicksilver : "The export demand thus far in September has been of considerable magnitude with free sales at 44@45c. Our latest London quotation is £8 10/ per bottle. The *Gaelic*, for China and Japan, carried 573 flasks. The Panama steamer *South Carolina* carried en route to New York 200 flasks ; the same for Callao 250 flasks ; to Valparaiso 30 flasks ; to Mexican ports, 275 flasks, etc."

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Sept. 29, 1876.

THE week closes on a decidedly lower market for all the stocks quoted by us. In some instances we note a range of nearly 10 per cent. between the extreme prices, the final quotation being within a fraction of the lowest attained during the week. Several reasons may be given to explain this. The passing of the dividends by the Delaware, Lackawanna, and Western Railroad Company, and the large decline of the Reading Railroad shares at Philadelphia, no doubt had an influence on their general decline. It is but another proof that coal stocks must come down to hard pan like other values. The sales for the week aggregate nearly 226,000 shares, a decrease of 60,000 shares from our last.

Delaware, Lackawanna, and Western Railroad.—153,547 shares of this stock have sold during the week at from 77¾ to 68¼, closing at 69, a decline of 8⅜ per cent.

Delaware and Hudson Canal Company.—This stock closes about 5 per cent lower. 7,295 shares equal the transactions. The stock has sold down to 62⅞, which would make about 7 per cent. between the extreme prices of the week. The company has completed its new piece of road on the Champlain Division, from Chazy to Rouse's Point, and regular trains are running over it. This gives the company a direct line from Albany to Rouse's Point, and shortens the time between New York and Montreal nearly one hour.

New Jersey Central Railroad—Over 64,000 shares of this stock have changed hands between 28 and 23¾, closing 2 per cent. above the lowest price.

Bonds are not so active, prices, however, have materially advanced in nearly all instances.

Thomas Iron Company.—At a recent meeting of this company, held in Hokendaqua, the following directors were elected to serve for the ensuing year: DAVID THOMAS, BENJAMIN G. CLARKE, SAMUEL THOMAS, WM. W. MARSH, JOHN T. KNIGHT, CHARLES STEWART, DANIEL RUNKLE.

Pennsylvania Steel Company will hold its annual meeting in Philadelphia on the 4th of October.

The Cumberland Valley Railroad Company will hold its annual meeting in Harrisburg, Pa., on the 2d of Oct.

Cincinnati, Ohio River, and Virginia Railroad.—This company has filed a certificate of incorporation in Ohio. The line is to run from Cincinnati eastward through Hamilton, Clermont, Brown, Adams, Sciota, and Lawrence Counties, to a point on the Ohio River opposite Huntington, West Virginia. The distance is about 150 miles, and the capital stock is fixed at $1,000,000. The road is intended to form an extension of the Chesapeake and Ohio to Cincinnati.

Coupons and interest are due and payable on the bonds of the following companies during the month of October:

Albany and Susquehanna Railroad Company.—First consolidated mortgage bonds, and second mortgage bonds, coupons and registered; interest paid by the Delaware and Hudson Canal Company.

Chesapeake and Ohio Canal Company.—Maryland loan, coupons paid in Baltimore.

Delaware and Hudson Canal Company.—Debenture loan of 1878. Bonds of 1894, coupons and registered; coupons and interest.

Delaware, Lackawanna and Western Railroad Company. Bonds of the Morris and Essex Railroad, Newark and Bloomfield Railroad, and the first mortgage bonds of Syracuse, Binghamton, and New York Railroad, coupons and interest.

Oxford Iron Company—Coupons.

Vulcan Iron Works Company.—Coupons.

Quotations and Sales of Stocks and Bonds,

For the week ending Sept. 29, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	210	—
Consolidation Coal Co	—	—	32	—
Spring Mt. Coal Co	—	—	*55	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	10	500
Del., Lack., and West. RR. Co	77¾	68¼	69	153,547
New Jersey Central RR. Co	28	23¾	25⅜	64,031
Delaware and Hudson Canal Co	69	62⅜	63¾	7,295
Quicksilver Mining Co. pref'd	19	17	17	100
" " Common	—	—	13	—
Mariposa Land & Min. Co. pref'd	4½	3¼	3⅜	850
St. Louis & Iron Mountain RR	—	—	15½	27
Total Shares sold				226,320
Sales for the week previous				287,748
Decrease				61,428

* Nominal.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M	M. & S.	.....	.... @106
" " " 7's Con'ble	J. & D.	.....	.... @100
Cent'l RR. of N.J., 1st M., New	F. & A.	23,000	106½@109
" " " 1st Cons	.....	43,000	84 @ 92½
" " " Convert'le	M. & N.	98,000	79½@ 86
Lehigh & W.-B'e, Con. Guar'd	.....	74,000	54½@ 63¾
Am. Dock & Imp. Mt. Bonds	J. & J.	2,000	69½@ 73
Del. & Hud. Can., 1st M., 1891	.....	6 000	105 @107½
" " " 1884	.....	21,000	102¾@104
" " " 1877	.....	.....	.... @103½
" " " Coup. 7's, 1894	.....	.....	.... @103½
" " " Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain, 1st M	F. & A.	2,000	97 @ ....
" " " 2d M	M. & N.	.....	.... @ 75
Chesapeake & Ohio 6's, 1st M	.....	6,000	24¾@ 25
" " Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s	.....	.....	.... @100⅝
Total sales		$275,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, Sept. 29, 1876.

Yesterday being a public holiday in this city, there was no board meeting; our quotations are, therefore, for Wednesday and this morning.

The principal feature of the week has been the break in the Philadelphia and Reading Stock, and in proportion to the stiffness with which it was held during the past few weeks, at 44, seller 60 days, is the relapse, now that the McCalmont-Borie combination has given up the fight.

There are several more or less impossible theories circulated to account for the stock being held up to 44, at which price it is said 60,000 shares have been recently purchased on English account. It has all along been confidently maintained by those who understand the bottom facts in the coal trade, and the condition of this company, that no artificial bolstering of the stock at 44 could be maintained for any length of time. The break has not, therefore, been a surprise, though there is some uneasiness about the point at which it will reach bottom. It is to-day (Friday) quoted at 27, a decline of $17 per share, or nearly 39 per cent. of its market value a week ago. In sympathy with this decline we note a falling off to-day (Friday) of $2½ from the quotations a week ago of Pennsylvania Railroad stock. Lehigh Valley declined about $2 per share, and Lehigh Coal and Navigation fell about $1½. The bottom does not appear to have been yet attained in coal stocks generally, and we shall not be surprised to have to note still further declines in both the Philadelphia and New York stocks.

Coupons and Interest are due and payable on the bonds of the following companies during the month of October:

Cumberland Valley Railroad.—This company will pay a dividend on its stock and interest on the bonds.

Huntingdon and Broad Top Railroad and Coal Company.—1st mortgage gold bonds, coupons, and interest on scrip.

Lehigh Coal and Navigation Company.—Loan of 1884. Interest.

Little Schuylkill Railroad.—7 per cent. bonds of 1877. Interest.

Locust Dale Coal Company.—Coupons paid in New York.

Morris Canal and Banking Company.—Boat loan. Interest paid by the Lehigh Valley Railroad Company.

North Pennsylvania Railroad.—Chattel mortgage. Coupons.

Oil Creek and Allegheny River Railroad.—The interest on the 1st mortgage bonds of this company will be due during the month of October.

Pennsylvania and Delaware Railroad.—Coupons.

Philadelphia and Reading Railroad.—Coupons on the loan mortgage bonds.

Sunbury and Lewiston Railroad Company.—The mortgages on the bonds of this company have been foreclosed.

United New Jersey Railroad and Canal Company.—Interest on the registered bonds of 1894.

Auction Sales of Stocks and Bonds for the week have been as follows:

Schuylkill Iron Company.—1st mortgage 7 per cent. bonds, principal and interest guaranteed by the Philadelphia and Reading Railroad Company, $40,000 at from 86 to 87¼ per cent.

Ringold Iron and Coal Company.—1st mortgage 7 per cent. bonds, principal and interest guaranteed by the Philadelphia and Reading Railroad Company, $39,000 at 85 per cent.

Keystone Furnace Company.—1st mortgage 7 per cent. bonds, $75,000 at 67 per cent.

Danville, Hazelton, and Wilkes-Barre Railroad Company.—7 per cent. bonds, $4,000 at 31 per cent.

Reading and Columbia Railroad Company.—1st mortgage 7 per cent. bonds, $500 at 94⅛ per cent.

Buck Mountain Coal Company.—70 shares at $22 per share.

Cambria Iron Company.—100 shares at $15 per share.

Chesapeake and Delaware Canal Company.—11 shares at $23 per share.

Quotations and Sales of Stocks and Bonds,

For the week ending Sept. 28, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares
Lehigh Valley RR. Co	51⅜	48	48½	1,352
Pennsylvania RR.	49¼	46⅞	47⅜	55,863
Reading RR.	44⅛	32½	32¼	16,790
Lehigh Coal and Nav. Co	34	29⅛	31	17,967
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co	—	—	*25	—
Fulton Coal Co	—	—	*3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co	—	—	*1	—
Cambria Iron Co	—	—	*16	—
Crane Iron Co	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co	68⅛	68	68	40
Total shares sold				91,958
Sales for the week previous				99 866
Decrease				7,908

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	—	— @107
" " " 2d " "	—	— @102
" " " 3d " cons	—	— @ 38
Lehigh Valley RR. Con. mtg. 6s	10,000	97¾@ 98¼
" " " 7s, 1910	—	111 @—
" " " 6s Reg	—	108½@—
" " " 1st M. 6s coup	8,000	— @107
Pennsylvania RR., 1st mtge. 6s	....	106½@—
" " gen. " con. 1910	2,000	107 @—
" " gen. " 6s, reg	2,000	— @108¼
" " Cons. M. 6s reg	2,000	— @100
Phil. & Reading RR. Con. M. 7s Reg	1,000	— @107¼
" " " G. M. 7s, reg.	2,000	107 @107¼
" " " Con. M. 7s con.	4,000	— @108¼
" " " new convertible 7s	7,000	— @ 95
" " " 6s 44–80	2,000	— @104
" " " 7s '93	6,000	— @111
" " debenture 6s	1,000	— @ 74
Phil. & Reading C. & I. Co. Deb. 7s	2,000	69½@ 70
" " Tamaqua & Swatara tract.	—	— @ 80
Lehigh Coal & Nav. Co., 6s '84	9,000	— @ 99¼
" " " RR. 6s, '97	1,300	100¼@101
" " " Con. M. 7s	—	— @ 90
" " " 6s gold loan	11,500	97 @ 98
" " " Con. gold loan	—	— @102
Penn. Canal, 6s	—	— @ 71
Penn. and N. Y. Canal, 7s	4,000	— @110¼
Ches. and Del. Canal, 6s	—	— @ 85
Susquehanna Canal, 6s	—	— @ 70
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	—	— @ 77
Buck Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s	—	— @—
Total amount of sales	$74,800	

Closing quotations, in the absence of sales, represent the latest prices bid.

Gold and Silver Stocks,

NEW YORK, FRIDAY EVENING, Sept. 29, 1876.

California, Consolidated Virginia, Hale and Norcross, Yellow Jacket, and Caledonia exhibit an advance, ranging from $1 to $2 per share. With these exceptions the list continues to decline, the extreme range being in Chollar Potosi, which is $5 per share below our last.

Justice has been a bone of contention for some time past. The recent assessment of $5 per share, equal to a call of over $500,000, was the heaviest assessment ever levied on any mining property. The stock is declining. The reports from the mine are very favorable, but the stock is somewhat deranged.

The Bank of California has levied the seventh assessment of $10 per share (500,000), which will be delinquent October 16th. During the past year $3,000,000 have been collected in this way, and so well are matters managed by this institution at the present time, that sales of its stock have been made at 72½ and it is now held at 75.

California.—Daily yield 550 tons, from 1,500, 1,550, and 1,600-feet levels. The various ore breasts and stopes continue looking and yielding finely, as usual, at all points. The 1,600-feet level is looking especially well in the south drift, and also in the drift or cross-cut from the main south drift. A little over 300 tons per day are being hoisted through the C. and C. shaft, and the balance through the Consolidated Virginia shaft; none through the Ophir at present. The new mill of the company is doing excellent work. The winze from cross-cut No. 5, at the 1,500 to the 1,600-feet level is completed and will ultimately connect with the cross-cut east at the last mentioned level which is running to meet it. The drifts and winzes at the 1,400-feet level are being put in good repair for active ore production service. The C. and C. shaft is sinking at the rate of two feet per day, and is now 112 feet below the 1,500-feet station. The flow of water continues very strong, keeping the pumps pretty busy. Another station for a pump bob is being cut out below the 1,500-feet station, and a branch from the side track of the Virginia and Truckee Railroad is being completed to the the shaft in order to bring in requisite supplies of timber, lumber, etc., and transport the ore to the mill. The machinery works most excellently in every respect.

Consolidated Virginia.—Daily yield about 450 tons. It comes from the 1,400, 1,500, and 1,550-ft. levels, and keeps the Bacon, Trenc , and Brunswick mills steadily running. The Consolidated mill has not started working on ore from the mine, but will do so in about two weeks. It is needed, as the water supply of the Brunswick as well as other mills on Carson River is getting rather short. The various ore producing sections of the mine are looking finely, and opening up more extensive resources. At the 1,550-feet level this is especially the case, the eastern workings showing decided improvement, and considerable ore is now being hoisted from that level, the repairs to the station and shaft being completed. Nothing is being done at the 1,700-feet level owing to the retimbering of the double winze above that level.

Hale and Norcross.—Water reduced 145 feet. Owing to breakage of compressor, have had to bale or raise the water up the incline to the pump tank with the giraffe. At the 400-feet station a large balance bob for the pump is being put in. The incline is found to be in excellent order, notwithstanding its being so long submerged. The heat is very great at present, but the 1,900-feet level will soon be reached, when a good air circulation will be established through the main drift at that point.

Crown Point.—Daily yield, 60 tons, keeping the Rhode Island Mill steadily running. The main south drift at the 1,700-feet level has completed its connection with the Belcher and Crown Point air and pump-shaft, giving a valuable and much-needed resource in the way of ventilation. The main drift north at the same level, to connect with the Yellow Jacket, has less than 100 feet further to go in order to effect the connection. The main incline is getting down finely, and is now ten feet below the 1,800-feet station. Bottom in favorable working ground.

Yellow Jacket.—At the 2,040-feet level the south drift is in 126 feet from the east winze; face of same in quartz and porphyry. The east cross-cut on the same level is in 84 feet, the face of same in gray porphyry with quartz seams carrying some ore; the south drift on the 1,740-feet level is in 75 feet over on the Crown Point ground. Are running it to connect with the Crown Point drift at the same level.

Belcher.—Daily yield, 300 tons of ore from the old ore sections. South drift at the 1,500-feet level steadily going ahead, with no new features of interest to report. At the 1,600-feet level the north drift, and also the drift east, are being pushed ahead, showing no particular

change worth relating. The new air shaft is making good progress downward, and the 1,700-feet level drift of the Crown Point Mine has connected with it.

Gould and Curry.—The re-timbering and repairing of the shaft goes forward slowly, owing to the caving nature of the ground, and the care necessary to be exercised in consequence. The joint winze below the 1,600-feet level, at the Savage line, is down 345 feet and getting along finely in good sinking ground. The south drift at the 1,700-feet level is also advancing well in favorable working material.

Savage.—The water is gradually being reduced, although occasional interruptions and delays occur, owing to repairs found necessary in the incline.

Imperial Consolidated.—Everything running all right again. The new shaft to replace the broken one of the pump engine is put in place; it operates finely, and reduces the water at a lively rate. Owing to the energetic efforts brought to bear in the case, the water was kept from rising high enough to do any particular damage. It did not get into the winze below the 2,000-feet level. The bulkheads which were put up to defend against the water have been taken down, and everything is now going ahead regularly as before the accident. No damage was done to the mine, aad the only serious detriment was, of course, the delay and stoppage of production and development.—*Gold Hill News*, Sept. 21.

INCORPORATIONS.

We note the recent organization of the following mining companies in addition to the announcements in our issue of the 26th ultimo:

Name of Company.	Location.	Cap. Stock.
Bangor Blue Lead Hydraulic Mining Co.	California,	$5,000,000
Arizona & Cal. Mineral Prospecting Co.	"	5,000,00
Mechanics' Mining Co., Amador Co....	"	3,300,000
Crandall Gold, Silver, Iron and Copper Mining Company....	"	60,000,000
Oakland Coal Mining Company.....	"	250,000
New England Gold Mining Co, near Nevada City.....	"	10,000,000
North Gravel Mining Co., Mendocino Co	"	10,000,000
Bangor Gold and Silver Mining Co	"	10,000,000
Centennial Gold Mining Co., Sierra Co.	"	150,000
Powers Company	"	600,000
Lucky Rock Gold Mining Co	"	10,000,000
Palisade Gold Mining Co., Tuolumne Co	"	5,000,000
Nash Deep Gravel Mining Co	"	10,000,000
Steptoe Consolidated Mining Co.....	"	10,000,000
Hazard Gravel Mining Co., Placer Co....	"	6,400,000
Swiss Mining Co	"	50,000
Crown Point Mining Co., Amador Co....	"	6,000,000
New Ophir Gold and Silver Mining Co..	"	10,000,000
Atlanta Gold and Silver Mining Company, Eldorado County.....	"	500,000
Bell Gold Mining Co., Plumas County..	"	16,000
Allison Ranch Ford Quartz Gold Min. Co	"	2,500,000
Delhi Mining Company, Mariposa Co .	"	5,000,000
Madras Mining Co., Mariposa County..	"	5,000,000
North Gover Mining Co., Amador Co...	"	60,000
North Modoc Consol. Min. Co., Inyo Co.	"	10,000,000
Grand Prize Mining Co., Elko County.	Nevada,	10,000,000
Swiss Mining Company, Nye County....	"	5,000,000
Surprise Mining Co , Nye County.....	"	7,000,000
Sclavonian Gold and Silver Mining Co., Esmeralda County	"	10,000,000
Hasson Consolidated Mining Co....	"	10,000,000
Spanish Consolidated Min. Co., Nye Co.	"	7,500,000
Tallahassee Mining Co.....	"	5,000,000
Prospect Mountain Tunnel Co., Eureka	"	1,120,000
Pontiac Mining Co., Lyon Co	"	10,000,000
Corona Mining Co., California and	Nevada,	10,000,000
Arizona Mining Co	Arizona,	100,000
Wheatfield Gold and Silver Mining Co .	"	24,000
Idaho Mining and Smelting Co., South Mountain....	Idaho,	10,000,000
Ontario Silver Mining Co., 40 miles from Salt Lake	Utah,	10,000,000
Centennial Tunnel Mining Co	Colorado,	100,000
Montana Reduction Works, Jefferson City.....	Montana,	1,000,000

QUOTATIONS:

	No. of feet on Vein.	No. of shares.	Sept. 22.	Sept. 29.
Sierra Nevada ...	3,300	100,000	$13	$13
Union Consol'd	600	100,000	14	13
Mexican.	600	105,000	32	30
Ophir.....	675	108,000	56	55
California.....	600	540,000	60	61
Consol'd. Virginia	710	540,000	51	56
Best & Belcher.	540	100,800	46	46
Gould & Curry..	612	100,800	15	14
Savage	771	112,000	18	16
Hale & Norcross.	400	112,000	10	11
Chollar Potosi	1,400	28,000	88	83
Alpha Consol'd...	306	30,000	46	43
Imperial Con.. .	468	50,000	3	3½
Yellow Jacket ..	957	120,000	25	26
Kentuck . .	95	30,000	13	11
Crown Point ...	541	105,000	11	11
Belcher	1,040	104,000	21	21
Overman	1,200	38,400	75	78
Caledonia	2,188	100,000	8	13
Justice	2,100	105,000	18	18
Raymond & Ely.	5,000	30,000	6	0
Meadow Valley...	4,400	60,000	1	1
Eureka Consolid.	....	50,000	13	13
Eureka G. V....	1,680	20,000	*	*
Silver Hill.	5,400	54,000	8	8
Julia..... ...	3,000	110,000	7	7

* We have no quotations of these stocks for the dates given above.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & CO., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Sept. 28, 1876.

Merrimack, Mass., Silver Mining Company.—50 shares of this stock recently sold at $43¾ per share.

QUOTATIONS:

DESCRIPTION.	Par Value.	No. of Shares.	CLOSING. Bid.	Asked.
Copper Stocks.				
Allouez.....	$50	20,000	$10 50	$17 00
Calumet and Hecla....	25	80,000	165 00	167 50
Central.....	25	20,000	30 00	35 00
Copper Falls.	50	20,000	5 00	6 00
Dana.....	25	20,000	15	25
Franklin	25	20,000	15 00	15 12½
Humboldt	25	20,000	12⅜	16
Madison.....	25	20,000	30	35
Mesuard.....	25	20,000	45	50
Minnesota	25	20,000	1 25	2 00
National	15	20,000		2 00
Osceola	25	40,000	22 00	25 00
Petherick	25	20,000	62½	
Pewabic	25	20,000	4 50	4 75
Phenix	25	20,000	12 50	13 00
Quincy.....	25	20,000	46 00	47 50
Ridge.....	25	20,000	5 50	6 25
Rockland	25	20,000		30
Star	25	20,000	50	55
Superior.....	25	20,000		30
Silver Stocks.				
Duncan Silver	20	60,000	9 75	9 87½
Dawson Silver.....				45
International Silver	20	60,000	1 75	

Gas Stocks.

NEW YORK, FRIDAY EVENING, Sept. 29, 1876.

The general market for gas stocks continues dull. A slight improvement is noticeable in some of the quotations of the Brooklyn companies and we are reported a few transactions at slightly advanced figures. Beyond this, however, we observe no change from the continued stagnant condition noted here so frequently.

Metropolitan, New York, Gas Company.—We note a recent auction sale of 48 shares of this stock at $145¼ per share, also $1,920 of the scrip stock at 103¼ per cent.

Williamsburgh, New York, Gas Company.—We note a recent auction sale of $16,000 of the reg. 7 per cent. certificates of this company at 99¼ per cent.

The Suburban Gas Company has declared a semi-annual dividend of 3½ per cent. payable at Tremont, N.Y., on the 1st of October.

The National Gas Company of Philadelphia has declared a quarterly dividend of 5 per cent. payabe October 1st.

San Francisco Gas Company.—We note recent sales of this stock aggregating about 600 shares at 105⅛, including 15 shares at the same rate ex-monthly dividend of ¾ per cent.

Pottsville, Pa., Gas Company.—The Common Council of this place have decided to burn the street lamps all night hereafter.

Louisville Ky., Gas Company.—The *Manufacturers' and Merchants' Advertiser* of the 23d inst. says with regard to this company: "The most conclusive argument to prove that the people of Louisville have been paying immense profits to the gas company is the simple fact that in thirty-five years the dividends on the stock first held by the city has paid for all the street lamps, and the stock has augmented to $850,000, its present market value, which is about 20 per cent. above its par value, and, in addition, the surplus (accrued from dividends) after paying for public light, all these many years is about $150,000 more. Therefore it can not be rightfully maintained that the gas company would have to increase the cost of lighting the city if they reduced the price of gas to the citizens, and hence that the citizens would have to make up any deficiency that might occur in the cost of the public lights. In other words that the people would pay, in the shape of taxes, for public lights, what they now pay in excessive gas bills. This argument has been used, but it is untenable. It would be well for the City Council and the people to ponder these facts, especially as now the season of heavy gas bills is at hand, and there is also a movement being made to organize another gas company."

The first Gas used in New York was in the house of SAMUEL LEGGETT, the same that has been recently torn down at No. 7 Cherry Street to make room for the anchorage of the East River Bridge. This was in 1825, and in that year gas was charged for at the rate of $10 per 1 000 feet. Since that date the prices have been as follows: In 1828, $9; 1829, $8; 1830, $7; in 1849 it went down from $6 to $4; in 1850 it was $3 50 and in 1852 $3; in 1856 it reached the present price, $2 50; in 1804 it went up to $3 again; in 1865 to $3.50; in 1870 it fell to $3, and in 1872 to $2 75; this year the price is $2.50, or the same as it was in 1850. Five years ago the cost of lighting the street lamps averaged $53 per lamp, the average per year now is about $23, or a saving of $30 per lamp, equal to an annual saving of about $524,940 to the city.

Oakland, California, Gas Company.—This company will reduce the price of gas to $4 per 1,000 feet on the 1st of October.

Coupons and Interest are due on the bonds of the following during the month of October:

Clinton Gas Light and Coke Company. Coupons.

Citizen's Gas Company of Brooklyn. Interest an certificates.

Hyde Park Gas Company of Chicago. Coupons.

Memphis, Tenn., Gas Company. Coupons.

Metropolitan Gas Company. Coupons.

Nebraska City Gas Company. Coupons.

Northern Gas Light and Coke Company. Coupons on the bonds of this company will be due during the coming month.

Yonkers, N. Y., Gas Company. Coupons.

People's Gas Company of Norristown, Pa. Interest.

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

Companies in New York and Vicinity	Cap Stk.	Par.	last Div.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.....	$5,000,000	$ 100	2½	Jan. '76	111	113
" " Bonds	90,000	1,000	3½	Feb. '76	106	110
NewYork, "	4,000,000		5	Jan. '76	138	143
Metropol. "	2,500,000	100	5	Mar. '76	145½	148
" " Certf.	1,000,000	....	3½	" "	102	104½
" " Bonds	500,000	1,000	3½	Jan. "	102	102½
Harlem "	1,850,000	50	4	Feb. '76	100	107
Manhattan"	4,000,000	50	10	July "	235	240
Brooklyn, B'klyn	2,000,000	25	5	June '76	180	185
Nassau "	1,000,000	25	4	Jan. '76	75	80
" " Certf.	700,000	1,000	3½	Nov. '76	95	98
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	Jan. '76	85	90
" " Bds	325,000	....	3½	Feb. "		95
Metropol. "	1,000,000	10	3½	Nov. '75	73	74
Wmsburgh "	1,000,000	50	5	Jan. '76	130	135
" " Certf.	1,000,000	....	3½	Jan. "	101	102½
Citizen's "	1,200,000	20	2½	Jan. '76	92½	95
" " Certf.	320,000	1,000	3½	April "	110	102
J. C. N.J.....	386,000	20	5	July,'75	160	—
Centl. Westch. N.Y.	466,000	50	4	July, "	95	100
Subur'n " "	390,000	50				95

† Gold.

COMPANIES OUT OF TOWN.

We refer to our issue of the 9th inst. for a list of the above.

THE SALT LAKE CITY SILVER ORE MARKET.

MR. J. B. MEADER, assayer, reports no change in the ore and metal market for the week ending September the 23d.

THE AMERICAN MINING BOARD WILL hold its first session for the calling of Stocks, on MONDAY, October 2, at 11 o'clock. The list will embrace the more prominent San Francisco shares, as well as the securities of all duly approved mining, petroleum, manufacturing, and quarrying companies. Applications for membership, or for placing securities on the regular list, may be made at the temporary offices in the Drexel Building.

Candidates for membership, whose nominations shall be made prior to October First, will, when duly elected, come in as pr prietary members. Nominations received after that date will be for operating memberships only.

WILLIAM WARD, President.