

# THE ENGINEERING AND MINING JOURNAL.

VOL. XVIII.—No. 8.

NEW YORK, SATURDAY, AUGUST 22, 1874.

PRICE 10 CENTS PER COPY.

## On Rock-Drilling Machinery.\*

By E. GIBSON SPILSBURY.

It is not my purpose in this paper to describe all the different contrivances which have been devised, during the last quarter of a century, for the purpose of lessening the expense of mining and tunnelling operations; I wish merely to call your attention to the crying want of the Western miners for some cheap and effective machine, capable of economizing on the heavy item of hand-drilling, and to enumerate a few of the latest improvements which have been made in machines of this class.

This necessity for the introduction of some kind of labor-saving machinery in mining, especially in the West, begins to make itself felt more imperatively every day. No branch of industry has remained so conservative to the old customs and systems of working, as has mining; and yet no branch is so entirely dependent on economical working for a successful issue; and in very few is the proportion of cost of hand-labor to profits obtained so preponderantly heavy.

Perhaps the chief reason for this seeming apathy towards progress in this direction arises from the fact that nearly all mining operations, especially in this country, are carried on in regions more or less remote from the great centers of civilization, thereby rendering the carriage and erection of machinery extremely difficult and expensive. Another reason, however, exists in the fact that a large number of men in charge of mining operations are greatly prejudiced against the introduction of machinery underground, from the idea that it cannot be made to adapt itself to the various positions and work it would have to be placed in and perform. As, however, every year strides are being made towards placing mining on a scientific and systematic basis, we may hope soon to see these prejudices fade away, and, ere long, such improvements will have been made to the power-drills, that they will come into as general use in mines as the sewing-machine has in every household. Of course, before such an end can be attained, the expense of this class of machines must be considerably lessened, as at present but few can afford to invest the necessary capital for the air-compressing machinery and drills. Before entering into details of the machines, we will first investigate briefly the amount and kind of work these drills may be expected to perform.

Long and thorough investigations have proved that in Europe fully two-thirds, and in this country probably three-quarters, of the entire cost of mining is consumed by the expense of drilling holes for blasting purposes.

RZIBA, in his work on the building of tunnels ("Lehrbuch der Tunnelbaukunst"), gives some very good tables on this subject, from which I extract the following one:

Items of expense.	Tunneling in very hard rock.	Tunneling in middling hard rock.	Tunneling in soft rock.	Average.
	Per cent.	Per cent.	Per cent.	Per cent.
Wages of miners and laborers (calculating about 50 cents per shift of eight hours).....	71.6	72.3	73.9	72.6
Steel for drills and repairs on tools....	21.5	18.1	13.3	17.6
Powder used in blasting.....	5.9	8.2	11.1	8.4
Fuse and cartridge paper.....	1.0	1.4	1.7	1.4

Now, supposing that we allow that one-third of the labor is consumed in charging the holes, blasting, and removing the debris, we shall have, from the average column of the above table,  $72.6 \times \frac{2}{3} = 48.4 + 17.6$  for steel, etc. = 66 per cent. as the proportion consumed in drilling.

According to HENNEZEL (Annales des Mines, 1839, p. 513), the whole average cost of mining at Sourciaux and Gervais was distributed as follows:

Hand-labor.....	76.1 per cent.
Drills and repairs on tools.....	5.9 "
Oil.....	4.7 "
Cartridge paper and fuse.....	0.6 "
Powder.....	12.7 "

Deducting, as above, one-third of the labor, we have  $76.1 \times \frac{2}{3} + 5.9 + (4.7 \times \frac{2}{3}) = 59.71$  per cent. as the cost of drilling.

From my own experience at different mines in Germany, I find that the average proportion of cost was as follows:

Hand Labor.....	74.8 per cent.
Steel for drills and repairs.....	13.1 "
Powder.....	11.0 "
Cartridge paper and fuse.....	1.1 "

Thus giving  $74.8 \times \frac{2}{3} + 13.1 = 61.9$  per cent. as the cost of drilling.

Dr. F. M. STAFFE, in his work on Rock Drilling Machinery, gives numerous similar examples, all of which tend to show that the actual cost of drilling varies from 50 to 70 per cent. of the whole cost of mining. All the foregoing examples, taken from European sources, are based on the fact that wages were from 50 to 75 cents a day for miners, so that in this country it may be assumed that drilling will probably represent 75 per cent. of the entire expense of mining. From the foregoing, then, it will be seen that in order to lessen the expense of drilling, we must chiefly aim at cheapening hand labor, either by a cutting down of wages, or by raising the effective standard of the working power. The former method is, of course, out of the question, as the price of hand labor is gradually on the in-

crease all the world over, rather than on the decrease. Our whole attention, therefore, must be given to an increase of effective power, or in other words, to the introduction of a machine which will diminish the cost of hand labor.

The idea of fastening a drill to the piston rod of a cylinder engine, and causing it to strike the rock with the force brought to bear through the pressure of either steam, compressed air, or water, on the piston, is really as old as the invention of the steam hammer. A great many obstacles, however, arose in the practical carrying out of this idea, most of which have, until very recently, seemed almost unsurmountable. For instance, a drill not only requires the reciprocating motion of the engine, but must also rotate a certain amount at each stroke. The whole machine also must be gradually pushed forward as the depth of the hole increases. The valve gear must be so arranged that the function of the steam ports can be reversed even without the piston having travelled the whole length of the stroke. Further, the whole machine must be light, of great strength, and easily adjustable to any required position. The motive power having, in most cases, to be brought a great distance, it is requisite to obtain the utmost effective power; and lastly, to compete effectively with hand labor, the machine must be simple, solidly built, and not apt to get out of order. It should require but very little attendance, and that not of skilled labor.

As a proof of how very difficult it has been found to construct machines embodying the requisites of simplicity and solidity, I will here mention that in the Mont Cenis Tunnel, in 1864, it required seventy of the "Sommellier" drills to keep eight constantly at work, thus necessitating a staff of twenty-five men in the repair shops; and according to the report of the engineer in charge, for 1867, they required in all two hundred machines to keep sixteen constantly at work.

In 1865, I was present at a trial made in the mines of the Vieille Montagne Company at Moresnet, with a machine somewhat of the same construction as the "Döring" drill, and the result showed that it required at least three machines to keep one at work. In this country, at the Hoosac Tunnel, where the "Burleigh" drill is used, experience showed that the average life of each machine without repairs did not exceed fifty hours, and that it required four machines to keep one at work. Almost every new drill that is invented shows great improvement in this regard. Thus at Ausable Forks, N. Y., where the "Ingersoll" drill is being used, it is found that three machines will keep one at work; and at the Bethlehem tunnel (New Jersey), on the Easton and Amboy Railroad, where the same drills are used, the average has been lowered to two to one.

The second requisite, that of compactness and simplicity, has also been found most difficult to comply with; so much so, that in this country there are only four drills which can come under the heading of practical mining drills. These are the "Burleigh," "Rand," "Ingersoll" and "Waring" drills. A fifth drill, the "Wood," has, so far as I can learn, never been practically tested. Of the above four machines, the first has so far been superseded by the others, that it is placed almost out of competition. The second drill, the "Rand," is a light, compact, and effective machine, but has the great objection of being simply a hand-feeding machine, instead of having an automatic feed, as the others have. This, of course, necessitates a very close attention on the part of the attendant, as its construction is such that any neglect on the part of the latter to feed regularly, invariably results in the blowing out of the cylinder-head.

Unfortunately, I have been unable to obtain sufficient reliable data by which I might have shown a fair comparison of the relative merits of these different machines. A few weeks ago, what might have been a very interesting competitive trial took place between the three last-named drills. This trial was instituted by the Post Henry Iron Ore Co., at their mines on Lake Champlain, and was under the supervision of Mr. Geo. H. REYNOLDS, the Company's Consulting Engineer.

Unfortunately, the results obtained were not so reliable as they should have been, owing to the partisan jealousies between the different competitors, which feelings were taken up even by the workmen and employes of the Company. Portions of Mr. REYNOLDS'S Report on the result of this trial have already been published in the ENGINEERING AND MINING JOURNAL, and I will not now repeat them. I will merely add, that from the Report it appears that, in drilling vertical holes, the result of the working of the three machines did not differ very materially. In a "side hole," inclined downwards, the "Waring" and the "Rand" drills were nearly equal, the latter being slightly ahead; whereas the "Ingersoll" drill in that position could perform, from some cause or other, but half the work of the others. On a dry hole, slightly upcast, the difference in the action of the three machines was very remarkable and almost unaccountable, unless we take into consideration the difference in the manner of their mounting. The "Ingersoll" drilled 4 ft. 9 in. in 62 minutes, or at the rate of 0.93 inches per minute.

The "Rand" machine drilled 4 ft. 9 in. in 46 minutes, 55 seconds, or at the rate of 1.22 inches per minute.

The "Waring" machine drilled 5 feet in 29.15 minutes, or at the rate of 2.05 inches per minute.

The rock on which these trials were made was a hard, compact, magnetic iron ore. The only conclusion that can be arrived at by this report is, that each of the machines was capable of doing, with more or less success, all ordinary mining work, but that the "Waring" drill showed a decided advantage in all breast-work and upcast boring; for Mr. REYNOLDS reports that one hole was bored by this latter machine which could not be reached by either of the others; and that undoubtedly the mounting of this drill for all purposes is far superior to

\*A paper read before the American Institute of Mining Engineers, at St. Louis, May, 1874.

either of the others. In order to show more completely the strength of the different machines, Mr. REYNOLDS should have gone more fully into the cost of repairs on the different machines, and reduced this cost to the foot bored. Such a table would show, more than all the rest, which of the drills was really the best for mining purposes. From inquiries I have made outside, and for the perfect accuracy of which I cannot vouch, although I know them to be approximately correct, I find that the cost of repairs on the "Rand" drill amounted to 7.89 cents per foot bored, and that of the "Waring" drill to 2.55 cents per foot. I have been unable to obtain the figures for the "Ingersoll" drill.

The two Drills most nearly approaching perfection at the present time, are, undoubtedly, the "Ingersoll" and the "Waring" machines. They are both so good that it would be difficult to determine which of the two is really superior to the other for every kind of work. They are both nearly the same sizes and weights, and both will drill at about the same rate. The "Waring" Drill must, however, be awarded the palm on two very important points, viz: first, on the fact that all the working parts are covered up, and thus protected from the dirt and grit of the mine, and secondly, the mounting of this latter machine on its tripod, and the tripod itself, far surpasses that of its rival. The attachment to the tripod is effected by one bolt only, and the machine can be taken off, or fixed into, the tripod without a moment's delay. The tripod itself is so constructed, that each of the two forward legs can describe an entire circle around its point of junction with the fork, and the third leg can be moved not only in a direction parallel to the axis of the fork, but also at right angles to the same. This construction of the tripod permits the drill to be placed in any conceivable position, and is of utmost importance to the introduction of power drills into ordinary mining operations, for without it, all the holes could not be drilled by the machine, and hand labor would have to be used, thus greatly reducing the economy of the drill.

It seems strange that so little study has been given to determining the actual mechanical requirements of this class of machines. At present no rules, either empirical or theoretical, can be established for the requisite strength or dimensions of their different parts, and little or nothing is known on the following points, which are of great importance to the future success of power drilling: Whether use of high or low pressure, air or steam is most economical? Whether a high or low rate of speed is most effective and advantageous? What is the most effective proportion of rotary motion to each stroke of the piston, and whether the reducing of the total weight of the machine greatly impairs the actual efficiency of the stroke? From the experience gained at the Mount Ceniz tunnel it was found, that when working in hard rock, most progress was made by striking light blows, whereas in soft rock, hard blows were requisite to perform the same amount of work, and, as in the use of similar machines the first condition is obtained by shortening the stroke, and the second by lengthening the stroke, we may conclude for hard rock, a machine running at a very high rate of speed, with a short stroke, is preferable, whereas in soft rock, a slower going machine, with a longer and more powerful stroke, would be requisite to accomplish the same amount of work.

**The Classification and Heating Power of Coals.**

Translated from the French of M. L. GRUNER, by R. P. ROTHWELL, Mining Engineer.

(CONTINUED FROM PAGE 83.)

The *Russ-kohle* is remarkable for the small proportion of hydrogen which it contains. This is often not more than 3 per cent. Its mean composition, according to Professor STEIN, is

C.....	76 to 82
H.....	3.50 to 3
O+Az.....	20.50 to 15

100.

With such proportion of hydrogen we can readily see that these coals cannot cask in the fire; the coke is quite pulverulent. Even when a bed is formed of about equal proportions of ordinary coking coals and *fusain mineral*, we have a mixture which acts in an anomalous manner when subjected to distillation; this circumstance explains several peculiarities which we find in Professor STEIN'S analysis of the coals of the Saxon basins. The dry coals of Louisenthal gave SCHEURER-KESTNER and MEUNIER 8,215 calories, and coal of Montceau 8,325 calories; but the extremes, as I have already said, may attain 8,000 and 8,500 calories.

We will recite the experiments on steam generation made by Dr. BRIX, in Berlin, to determine the industrial heating power, and the calorimetric experiments of SCHEURER-KESTNER (*Bulletin de la Société de Mulhouse*, 1868):—

Origin of the Coals.	Proportion of Water.	Proportion of Ashes.	Weight of water at 0° vaporized per kilog. of coal burned.		Remarks.
			Merch't. coal.	Pure coal.	
			In 100 of coal.		
Dry coal from the Louisa mine, Upper Silesia.....	3.65	6.83	6.28	7.02	Experiments of Dr. Brix, steam escaping at 112° C.
Slightly caking coal from the Gerhardt mine, Saarbrück...	5.10	6.84	6.85	7.78	
Dry coal from Leopold mine, Upper Silesia.....	4.10	5.10	6.10	6.72	id.
Dry coal from Louisenthal, Saarbrück.	3.57	12.28	6.06	7.29	Experiments of Scheurer-Kestner. id.
Dry coal from Montceau, Saône et Loire	4.97	10.28	6.20	7.41	

Thus the dry coals, properly so called, vaporize scarcely more than 6 kilog. to 6.30 k. of water at the temperature of 112° C., or 6.70 k. to 7.50 k., taking the coals as pure and dry; while in the same condition good short-flaming caking coals vaporize, as we shall see, 8 k. to 8½ k., assuming them dry and without

ash. If we wish to pass from these figures to calories, we have but to multiply by 640, which is the number of calories absorbed by water, when it is heated from 0° to steam at 112° C.

These conditions agree with the data found by numerous experiments made by the English and French navies. These establish the superiority of short flaming coal, and, generally, an increase in heating power proportional to the coke furnished in carbonization.

The industrial heating power of dry coals is consequently three-quarters of the useful heating power of short-flaming caking coals. It is the same proportion that exists for the coke: 55 to 75, and 60 to 80. This result confirms the conclusions already arrived at by SCHEURER-KESTNER and MEUNIER from their calorimetric tests.

**II. Long-Flaming Fat or Caking Coals, or Gas Coals.**

This type differs from the preceding in the nature of its coke. In carbonizing these coals, the pieces change their form and melt, sticking together, and forming a more or less porous mass.

Between the first two types come those coals which yield coke slightly glassy, German *Sinter Kohlen*.

The long-flaming fat coals are, in general, hard and tenacious, though less so than the dry coals. The fracture is foliated rather than conchoidal or fibrous. The specific gravity of pieces containing but little ash is generally from 1.28 to 1.30. The cubic metre weighs from 700 to 750 kilos. The color is blacker and more brilliant than that of the dry coals. The coals of this class, as the name indicates, burn with an abundant flame and smoke; they are flaming coals, easy to ignite, burning rapidly, which makes them sought after where a strong and quick fire is desired rather than a moderate, uniform and continuous heat.

The elementary composition of long-flaming fat coal is as follows:

Carbon.....	80 to 85
Hydrogen.....	5.8 to 5
Oxygen and azote.....	14, 2 to 10

O+Az  
H  
Or, the ratio  $\frac{O+Az}{H}$  is from 3 to 2.

Slow distillation gives:

Consistent coke.....	60 to 68	} Volatile matter, 40 to 32.
Ammoniacal water.....	5 to 3	
Bitumen.....	15 to 12	
Gas.....	20 to 17	

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The proportion of gas is rather inferior to that of the dry coals, but it has a higher illuminating power, and as its coke, by reason of its greater strength, has a higher value than that of the dry coals, this class of coal is generally used for gas making; it is, therefore, often called *Gas Coals* in commerce, and yields on a large scale in the gas works, 240 to 260 litres per kilog. of coal, and even on a small scale, by a more rapid calcination, 300 to 350 litres. It is seldom used for the manufacture of coke for metallurgical purposes, 1st. because, from the abundance of volatile matter, it yields less coke than the two following classes, and 2d, this coke is always light, friable, and porous.

From the experiments of SCHEURER-KESTNER and MEUNIER, the heating power of long-flaming fat coals is, on an average, 8,500 to 8,800 calories. The table on page 34 gives as the heating power of the three long-flaming caking coals of Duttweiler, Sultzbach and Von der Heydt (Saarbrück), the numbers 8,724, 8,603, and 8,462 calories.

The long-flaming (fat) caking coals in France are much more abundant than dry coals. In the Pas-de-Calais, and the Loire, they form the upper beds. The coals of Commentry, and a portion of those of Blanzj, are also gas coals. At Mons, in Belgium, they are known as *flenus gras*, while those which contain less carbon, but yield a coke which is scarcely glassy, are called *flenus secs*. The Newcastle is also a gas coal, and at Saarbrück, as in Silesia, the gas coals replace the dry coals as we go from the upper to the middle and lower coal measures.

The following table gives the analysis of a certain number of long-flaming caking coals:

Origin of the Coals.	Composition of Coals after deducting the Ash.			Vol. matter in pure coal without ash per 100	Nature and appearance of the Coke.	Remarks.
	O	H	O+Az			
Coal from Commentry...	82.92	5.30	11.78	36.7	Coke melted, metallic ring. Coke melted but not swelled up.	Analysis of M. REINAULT.
" " Epinac.....	83.22	5.23	11.55	37.3		
" " Sultzbach....	82.57	5.02	12.41	36.0	Coke melted, slightly swelled up.	M. GASCH'S ANALYSES. (*)
" " Duttweiler....	82.90	5.10	11.97	36.2		
" " Helnitz.....	81.32	4.97	13.71	38.0		
Mean average of the lower series of Saarbrück.	82.08	5.04	12.88	38.3		
Average of seven lower beds of Friedrichsthal.	80.25	5.23	14.52	40.0	id.	The coal from the lower beds is at the limit of the gas coals.
Average of 3 beds of Bruay, Marines, Bally (Pas de Calais).	83.42	5.82	10.76	36 to 39	Coke well melted and light.	Analysis by M. DE MARSELLY.
Gas coal from Mons, average of 4 beds.	85.20	5.66	9.14	31 to 32.8	Coke light and well melted.	Do. This coal forms the transition to the common caking coals.

(\*) The analysis of some coals of the same district by SCHEURER-KESTNER, is given page 34, this agrees with those of M. GASCH.

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**Mining on the Pacific Coast.**

We are indebted to the San Francisco *Commercial Herald* for the following interesting Quarterly Mining Review :

Considered as a whole, the past has been one of the most prosperous quarters ever experienced by the miners on this coast, the remark applying equally to every branch of the business. The winter had been severe, retarding operations in many sections of the country through the interference caused by the deep snows, bad roads, and intensely cold weather. With the opening of spring these obstacles disappeared, and for the past three months, water being abundant, the roads good, and the weather extremely favorable, the product of the precious metals has been unusually large. Owing to the improvements and economies lately introduced into mining, the profits on this production have been liberal. But with all this thrift, and with money cheaper than ever before, investments in mining enterprises have been much restricted of late, the losses heretofore incurred on money so expended having rendered investigators exceedingly cautious, and wholly deterred many from further ventures in this direction. Even in the matter of buying stocks, such circumspection has been observed as to defeat the customary "spring rise," the market, with some unimportant exceptions, having escaped extreme fluctuations. This state of affairs, though working to the prejudice of the speculative classes, is, nevertheless, one that should meet with general welcome, as tending to discourage visionary enterprises and the spirit of gambling, while it fosters legitimate mining, and places it on a permanent basis.

For this increased bullion production during the past quarter, we are mainly indebted to the hydraulic mines of California, the outturn from which has been large beyond all previous examples. This result has been due to a variety of causes, prominent among which is the unusual length of the water season, which, having set in early, is likely to continue late. Then, the preceding summer, having been one of great draught, left the miners with much unemployed time on their hands, which the most of them availed to put their claims in good condition for the next ensuing working season, thereby insuring larger returns than they otherwise could have counted upon. Many new claims have been opened up, while additional ditches have been built, enlarging the water supply, and new apparatus introduced into numerous localities, increasing the quantity of gold saved, and the efficiency of the methods before employed in washing. The gains effected through these several agencies have amounted in some districts to twenty or thirty, and even as high as fifty, per cent. on the average product for ordinary years, the increase being most apparent in Trinity County and other remote localities where these improved appliances had not before been much in use. The shipments of gold from Nevada County, for the first half of the present year, will, it is estimated, exceed those for a corresponding period last year by nearly half a million dollars, while the disparity for the remainder of the season will be still larger. The yield of Trinity County will this year be fifty per cent. larger than last; while the increase in Sierra, Placer, Amador, and Calaveras will range from thirty to forty per cent., and be scarcely less in several other mining counties. The press of Nevada predicts for that State a bullion increase on the production of any former year equivalent to sixty or seventy per cent. within the next twelve months, while it seems probable that the advance for Utah and Arizona will meantime be very considerable.

The outlook for the mines on the entire Pacific coast is incomparably better now than ever before, both as regards returns and accruing profits. To whatever quarter we direct our attention, we find the condition of this industry flourishing and the prospect flattering. With every passing quarter we have some important improvements to note or gains to record. The business, while undergoing rapid expansion, is growing constantly safer, the risk incurred in carrying it on being every year less and less. Conducted with prudence, it is now about the most certain pursuit in which our people can engage. Almost every day some chronic trouble is overcome, some important invention announced, or valuable discovery made. In every department of the business, science, system, and economy are being introduced, while a willingness to accept steady and moderate profits is superseding the former desire to realize immediate and inordinate gains. Our miners are but little moved by wild stories of distant wealth, and even the business of prospecting is conducted with order and system. Engaging in any ordinary mining enterprise in California need involve no more hazard now than embarking in manufacturing or farming, and, as a general thing, scarcely so much.

The following may be recorded as a few of the most noteworthy mining events occurring on this coast during the past quarter. The imminent danger to which this industry was exposed through the threatened hostile legislation of Congress acting in the interest of the Sutro Tunnel Company has, by the indefinite postponement of these various measures, been averted. Now that the nefarious character of this scheme has been exposed, it is not likely that anything more will be heard of it or its advocates in the halls of the national legislature. An entirely successful method has at length been devised for working the auriferous sand found on the ancient sea beaches along our northwestern coast, after the same had been the subject of innumerable fruitless trials conducted through more than twenty years. This process is in the hands of the Perseverance Black Sand Mining Company, who own several tracts of these gold-bearing beaches, and having now tested both their material and the process for working it with the most satisfactory results, will proceed at once to operate on an extensive scale, and with every guarantee of effecting a large success. In rendering this class of deposits available, an extended and profitable gold field will be opened up to the enterprise of the mining community. The mines in the Panamint District, Inyo County, have lately been brought into prominence through the purchase of several of the best ledges there by Hon. JOHN P. JONES, who will at once proceed with their energetic development, and put up a mill for crushing the ore. These mines are a late discovery, and possess, according to well-authenticated accounts, capacity for turning out immense quantities of gold and silver bullion of comparatively small expense. They lie 65 miles southeast of Cerro Gordo, on the western verge of Death Valley—a gloomy and arid waste, noted alike for its sterility and its traditional wealth. So dry and barren is this region, that it has hitherto baffled every effort made to gain a foothold within its fatal borders. But that every obstacle will now be made to yield, and its resources be rendered subservient to the uses of man, we may well believe, seeing the hands into which so large a portion of its wealth has at length fallen. All needed surveys and other preliminary labors having been completed, work upon the great tunnel through the divide between the American Fork and Bear River, designed to carry the tailings from the latter and empty them into the former, is likely soon to be inaugurated, the owners being now in negotiation with foreign capitalists for funds to commence and carry the same forward to completion. Many minor works, such as the construction of lengthy water ditches, capacious reservoirs, the driving of bed rock tunnels, the laying down of tailing flumes, the erection of crushing mills and hoisting works, the opening up of hydraulic and drift claims, and the exploration of vein mines, are being prosecuted with energy and on an extended

scale throughout all parts of our Pacific States and Territories, denoting the very rapid growth and the great confidence reposed by our people in this industry.

Prospecting for coal and quicksilver continues to be followed up with diligence and success in many parts of the country, the developments made on some of the deposits lately found, both of this mineral and metal, being of the most extraordinary kind; and were it not that the consumption of these substances is increasing at such a rapid rate, these discoveries might lead us to hope for an early and material reduction in the prices for which they are now selling. As it is, they will likely be considerably cheapened in the course of a year or two, or so soon as the newly discovered mines can be brought into a largely productive condition. Even our petroleum deposits, after the entire subsidence of the excitement created by them, nine years ago, are again beginning to attract some attention in certain of the southern counties; and it is not improbable that they will yet become a source of considerable wealth, as the crude material is very abundant in many localities, and can be gathered with little trouble, the flow from the springs that contain it being natural.

During the last spring some five or six hundred men left California, Oregon, and Nevada, for the Cassiar mines, in the Stickeen country, having been lured to that region by the flattering accounts of placer mines having been found there last year. It is hardly necessary to say that most of these men have been sorely disappointed, and are now on their way back, or at least as many as had the means to retrace their steps, a few having already reached their former homes. They report the mines as being exceedingly difficult to reach, and of very limited extent, what little ground there is being already taken up. The working season, between deep snow at first and high water afterward, is confined to two or three months, while the cost of living and transportation is enormous. Of course, these discouraging accounts have checked any further emigration to these mines, nor is it likely that we shall hear much more of them hereafter, though there is no doubt but the few men who got in first and secured the choice spots may succeed in taking out a good deal of money. This, with the ill luck of our miners who last year visited French Guiana, South America, and the San Juan country in New Mexico, should suffice to prevent the people being allured from home by these rumored rich discoveries at a distance.

**Notes.**

**Weather Waste of Coals.**—It is a well-known fact that coals, when exposed for a long time to the influence of air, sun, or moisture, lose a certain quantity of their heating value, by changes which take place in their principal component parts, viz., carbon and hydrogen. This is done by the action of atmospheric oxygen, which penetrates the structure of the coal and combines with it, thus forming carbonic acid and water; in fact, the coal, to a certain extent, undergoes a slow but constant combustion. Highly bituminous coal also loses a part of its carburetted hydrogen, which escapes as gas and very often causes explosions in coal ships, when the hold has been held closed for a long time and is incautiously approached with a burning candle. The alteration of exposed coals differs, of course, very much according to their original quality. Gas coals, for instance, yield a much greater quantity of illuminating gas, as they come fresh from the mine, while after an unusually long exposure they may even lose all their hydrated carbon and become anthracitic. It was therefore of great importance to try by actual experiment to what extent such deterioration really takes place, as in case that this did not occur to a very great extent it would be convenient to large coal consumers, such as railway companies, gas works, or coke makers, to buy their supply from the mines in summer, when there is less demand and better transport accommodation, and to lay in a large stock for the winter. The German Railway Association had, therefore, certain quantities of different coals exposed for twelve months, and re-examined, when the following losses were determined:—

	Weight per cent.	Caloric per cent.	Yield of Coke per cent.
Pease's West Hartley coking.....	0.0	0.0	0.0
Glücksburg seam, Ibbenbüren.....	1.4	6.0	4.6
Carl Mine, near Dortmund.....	—	2.6	2.1
Hibernia Mine, Gelsenkirchen.....	0.4	0.6	2.1
Constantin Mine, Bochum.....	0.4	0.4	0.0
Borglohe Mine, Osnabrück.....	2.0	6.0	0.5

These figures would prove that the losses which were sustained in weight, caloric power, and yield of coke, though appreciable after one year's exposure, are, in most instances, not so great as to counterbalance the profit arising out of laying in stocks at a convenient time.—[*Engineering*.

**The Isabella Furnace No 1 at Pittsburgh, Pa.** is the champion blast furnace of this country; though only 18 feet bosh, it has made the following remarkable runs:

	Tons.	Lb.
Week ending July 18.....	555	1,150
Week ending July 25.....	556	240
Week ending August 1.....	587	1,530
Week ending August 8.....	612	1,140
<b>Total.....</b>	<b>2,311</b>	<b>2,090</b>
No 1 foundry iron.....	624	960
No 1 grey mill iron.....	1,687	1,130
<b>Total.....</b>	<b>2,311</b>	<b>2,090</b>
Average per week.....	578	.....
Largest run in one day.....	102	630

**Tariff on Pig Lead.**—The following important decision under the United States Revised Statutes has just been promulgated:—

"Pig lead imported from and after the 22d of June, 1874, is entitled to the reduction of 10 per cent. off the duties under the provision in Section 2,503 of the Revised Statutes of 1874, which makes such reduction on 'all metals not herein otherwise provided for;' the Department holding that the word 'herein,' in such provision, refers to said section only."

**THE ENGINEERING AND MINING JOURNAL.**

NEW YORK, SATURDAY, AUGUST 22, 1874.

ROSSITER W. RAYMOND, Ph. D., Editor.  
RICHARD P. ROTHWELL, C. E., M. E.,  
Editor of the Coal and Iron Department.

The Engineering and Mining Journal, is devoted to Mining, Metallurgy and Engineering. Communications on these subjects will always be welcome. It is the Official Organ of the American Institute of Mining Engineers, and it alone publishes the valuable papers read before that influential society.

Correspondence and general communications and books for review should be addressed to the Editors. Business communications should be addressed to the Secretary.

Remittances should always be made by Post-Office Orders or Bank Drafts, made payable to Wm. VENTZ, Secretary.

Subscription \$4 per annum; \$2.25 for six months, in advance.

Advertising Rates. Inside pages 25 cents per line each insertion. Outside pages 40 cents per line. Special reduced rates will be given on application for advertisements extending over a long time or occupying a large space.

The legal rate of Postage on the ENGINEERING AND MINING JOURNAL addressed to its regular subscribers, is 30 cents per annum, or 5 cents per quarter, PAYABLE IN ADVANCE. Subscribers who receive their copies by letter-carriers will please hand the annual or quarterly postage to the carriers, taking their receipts. If any higher rates are demanded, report the facts to the local Postmaster. The postage on copies directed to subscribers in New York City has been prepaid by the publishers.

**THE SCIENTIFIC PUBLISHING COMPANY.**

WILLIAM VENTZ, Secretary,  
37 Park Place, New York.

P. O. Box 4404.

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**Hartford Meeting of the American Association.**

EACH succeeding year appears to add interest to the meetings of the Association for the Advancement of Science, and to increase the field covered in its discussions. This year the meeting at Hartford has been a great success, and a number of valuable contributions have been made to the public store of knowledge. We regret that our limited space will not allow us to give even a brief report of these interesting papers. The most directly interesting to the readers of THE ENGINEERING AND MINING JOURNAL was a paper "On the Wet Treatment of Copper Ores" by Dr. T. STERRY HUNT. This subject has already been discussed in this journal, and its substance was given by Dr. HUNT, in a recent letter (see E. and M. J. for August 1), describing the application of the process at the Ore Knob mine, North Carolina. Among others, the following papers were read: "On the Equivalence of the Coal Measures of the United States and Europe," by Prof. C. A. WHITE; "On Some Localities of Contact of Trap and Sandstone in the Connecticut Valley," by Prof. Wm. N. RICE; "On the Disintegration of Rocks and its Geological Significance," by Prof. T. STERRY HUNT; "On the Physical History of New Hampshire," by Prof. C. H. HITCHCOCK; "On the Geological Map of the United States," by Profs. HITCHCOCK and BLAKE.

**The Mineral Industry of Belgium.**

HAVING been favored by Dr. BURKART, of Bonn, with a paper on the "Mineral Industry" of Belgium, compiled from some recent publications on the subject, we give our readers an extract of it.

A paper was read before the Iron and Steel Institute at Liege last year, on the Mineral Resources of Belgium, by RENIER MALHERBE, who made a brief resumé of the "Mineral Industry" of that country in saying that it would be more easy to name those underground substances which are not utilized, than to give a list of those raised by the Belgian miner.

MALHERBE classifies the mineral substances of Belgium under three geological conditions: in beds, in masses, and in veins. Besides sand, clay, chalk, sandstone, marble, and some other building material, he names as products employed in the metallurgical and chemical arts: 1st, in the condition of beds, iron and manganese ores, peat, lignite, and coal; 2d, in the condition of masses, some ores of iron, of zinc, of lead, and of manganese; and 3d, in the condition of veins, iron ores, blende, calamine, galena, more or less argentiferous, carbonate of lead and pyrites.

The most important of all these minerals, not only for the mining industry of Belgium, but also for its industry in general, are the coal deposits, which occupy the principal parts of the three provinces of Hainaut, Liege and Namur, forming by the upheaval of the underlying limestone, geologically speaking, two basins, and are found also in a little basin in the province of Luxembourg.

The coal deposits comprise fifty coal seams, not including the series of Fleme

in Hainaut, varying in thickness from 0.50-1.80 met., the corresponding thickness of the formation being 1200 met. This carboniferous zone is much prolonged towards the South-West and North-East, from Aix-la-Chapelle to Valenciennes, passing between those points, Liege, Namur, Charleroi and Mons, branching near Valenciennes to the coal deposits of France. The portions explored in transverse direction show only a comparatively slight width, double in breadth at some points to that of others. If the southern part of the coal formation is uniform throughout Belgium, it is different on the northern limit. In this region, the limestone underlying the coal beds is only accidentally known. The northern seams do not crop out upon the surface, but are hidden by deposits of the secondary and tertiary formation, sometimes of formidable thickness.

Amongst the other minerals, the iron ores are of most importance. They present themselves as hematites, limonites and carbonates of iron. The hematites and carbonates of iron are found in the primary formation in beds below the schistose layers, while the limonites occur generally in masses associated with the carbonate ores, and sometimes in true veins, formed by the decomposition of pyrites.

The production of these ores has been largely increased, and great quantities are exported to France and Germany.

Next in importance to the iron ore comes the zinc ore, its principal deposit in Belgium being that of Moresnet, an immense mass of calamine deposited in a narrow band of limestone. The deposit of Welkenraedt, also forming a mass, comprises oxide as well as sulphate of zinc, associated with galena and pyrites in contact with the shale of the coal measures.

The richest deposit of lead ore in Belgium is, to-day, that of Bleyberg, a vein of galena and blende, traversing the coal measures as far as their contact with the limestone. Besides this deposit, there is an analogous one at Engis, where sulphates are in part transformed into oxides above the natural bed of the water. At the mines of Velanie and Rona, combinations of galena and blende are found and certain of the sulphates contain pyrites in varying proportions.

The mines of Rocheux and Oneux have obtained a special reputation in England and in Germany for their production of pyrites deposited in mighty veins, assuming sometimes the conditions of large masses.

The production of the Belgian coal mines is uninterruptedly increasing. In 1836, they produced only 3,056,000 tons (of 1000 kgs.), but in 1840, they raised 3,930,000 tons; in 1850, 5,820,000 tons, and in 1866, 9,611,000 tons; they had trebled, therefore, after twenty-four years, their production of 1836.

The product of the Belgian coal mines during the ten years 1861-1870 is exhibited by the annexed table:

Years.	Coal raised.	Average.			Number of Miners employed.	Produce of Coal by each Miner.
		Sale price per ton.	Cost of Mining per ton.	Gain per ton.		
	Tons of 1000 kgs.	francs.	francs.	francs.		tons.
1861.	10,057,163	10.95	9.95	1.0	81,775	123
1862.	9,935,625	10.51	9.75	0.76	80,302	123
1863.	10,345,330	10.12	9.42	0.70	79,187	130
1864.	11,158,336	9.91	8.75	1.16	79,779	139
1865.	11,840,603	10.46	9.31	1.15	82,986	145
1866.	12,774,662	11.82	10.32	1.50	86,721	147
1867.	12,755,882	12.40	10.79	1.61	93,339	137
1868.	12,298,589	10.88	9.91	0.97	89,382	136
1869.	12,943,994	10.51	9.89	0.62	89,928	143
1870.	13,697,110	10.85	9.94	0.91	91,193	148

The reports of the Belgium mining engineer, E. LAGUESSE, BEROHEM, and VAN SCHERPENZEEL-THIM contain the following data respecting the mining industry of Belgium in 1871 and 1872:

Year.	Coal raised.		Average.			Miners employed.	Produce of coal by each miner.
	Quantity.	Value.	Sale price per ton.	Mine costs per ton.	Gain.		
	tons.	francs.	francs.	francs.	francs.		
1871.	13,733,176	153,803,241	11.20	10.16	1.04	94,286	146
1872.	15,658,948	208,559,408	13.32	11.05	2.27	98,863	159

The number of mines working profitably was.....in 1871, .....	in 1872, .....	128
Their profits amounted to .....	.....	37,633,208 frcs.
The number of mines working at a loss was.....	.....	39
Their loss was .....	.....	2,104,344 frcs.
Leaving a total net profit, or gain.....	.....	14,289,980 frcs.
The imports of foreign coal were.....	.....	200,789 tons,
" " " coke " .....	.....	3,193 "
The exportation of Belgian coal was.....	.....	3,669,227 "
" " " coke " .....	.....	489,342 "

**IRON ORE RETURNS.**

In 1872, the mines produced 625,329 tons of iron ore of the value of 6,668,651 francs, employing 3 649 miners, without those of the mines worked in the province of Liege, which raised 41,050 tons of ore. The production of 1872 exceeded that of the previous year in the province of Luxembourg by 26 per cent. (giving 60,970 tons instead of 48,272 tons), and in the province of Namur by 53 per cent. (amounting to 401,567, instead of 380,000 tons).

The imports of iron ore and scrap into Belgium amounted, in 1872: from the Grand-duchy of Luxembourg to.....425,596 tons.  
" France.....180,421 "  
" Prussia.....164,440 "  
" Sundry countries.....33,302 "

Total imports.....803,759 tons.  
The exports of iron ore and scrap from Belgium were, in 1872: to France.....107,642 tons.  
" Holland.....50,295 "  
" Prussia.....21,789 "  
" Sundry countries.....12,737 "

Total exports.....192,163 tons.

Summary of the iron manufacture of Belgium in 1871 and 1872 :

	Number of works in activity.	Number of Workmen.	Produce, Quantity.	Produce, Value.
Blast Furnaces, in 1871.....	22	4,919	606,237 tons.	44,863,820 francs.
" " 1872.....	22	5,285	652,505 "	65,420,580 "
Foundries, 1871.....	166	3,667	67,689 "	13,004,047 "
" " 1872.....	166	4,005	76,503 "	20,278,129 "
Forges, 1871.....	.....	13,376	442,739 "	79,934,663 "
" " 1872.....	.....	15,351	477,377 "	117,459,361 "
Iron Manufactories, 1871.....	.....	1,128	30,604 "	10,053,841 "
" " 1872.....	.....	1,329	25,779 "	10,674,164 "
Steel Manufactories, 1871.....	.....	528	8,900 "	3,170,000 "
" " 1872.....	3	600	15,284 "	5,781,000 "

METALLIFEROUS MINERALS.

Their produce is indicated only for the year 1872 by the following table :

Lead ores.....	11,187 Tons,	at the value of.....	Francs.
Zinc ores.....	55,537 "	" " "	3,766,088 "
Manganese ores....	500 Cub. met. "	" " "	3,000 "
Pyrites.....	40,931 Tons,	" " "	" "

In the quarries of Belgium were employed in 1872, 20,633 workmen, giving a produce of 33,974,479 francs.

The glass, crystal glass and plate glass produced in the year 1872 had a value of 41,652,240 francs.

In the same year 6,251 steam engines, with 191,660 horse-power, were in activity at the Belgian mines and metallurgical establishments.

The following statement will show the number of accidents, killed and wounded at the mines and metallurgical works of Belgium, during the year 1872 :

By 57 accidents in shafts there were.....	killed, 81 ;	wounded, 8.
" 89 " by fall of roof, stones, etc....	" 86 ;	" 11.
" 10 " by blasting.....	" 33 ;	" 7.
" 3 " by eruption of water.....	" 29 ;	" 1.
" 7 " by explosion of powder.....	" 6 ;	" 3.
" 86 " by miscellaneous causes....	" 79 ;	" 18.

Total 252 accidents of all kind.....killed, 314 ; wounded, 48.

Obituary.

SIR WILLIAM FAIRBAIRN, LL.D.

WILLIAM FAIRBAIRN, LL.D., the noted British civil engineer, died on the 18th of August, in England, at the age of 85. This remarkable man, to whom the iron industry owes so much, rose from humble circumstances to a position of great eminence by the force of his own ability. He was born at Kelso, Scotland, in 1789. Having learned the rudiments of education at a parish school, and received some instruction from an uncle, he was apprenticed to an engine-wright at a British colliery. When his apprenticeship terminated he wrought two years in London, and then visited many places in England, Wales, and Ireland, working a short time in each, in order to acquire a general knowledge of mechanical engineering. Eventually he began business on his own account at Manchester, in 1817, and persevered in it despite many discouraging circumstances. The first important improvement which he introduced was the general substitution of iron for wood in the shafting of cotton mills, and the use of lighter shafting where metal was already in use. This change reduced the cost of machinery, and enabled the motion to be speeded from 40 to 100 revolutions per minute. Mr. FAIRBAIRN afterward directed his attention to iron ship building, and was the first in England to construct an iron ship. The construction of iron vessels eventually became one of the principal branches of his business, his firm having built more than 100, varying from the smallest size to the war frigate of 2,600 tons. In 1834-35, Mr. FAIRBAIRN and Mr. E. HODGKINSON were invited by the British Association to seek out the cause of certain supposed defects in the iron produced by hot blast furnaces. He and his associate accordingly investigated the subject and submitted a valuable report thereon, printed in the Transactions of the Association. He also, at the instance of scientific bodies, or for his own information, tested the strength of various kinds of British iron, determined the tenacity of boiler plates of different thicknesses, and made a long series of experiments on the resistance of hollow tubes or cylinders to outside pressure, leading to valuable practical results.

Mr. FAIRBAIRN co-operated with ROBERT STEPHENSON in designing and constructing the great tubular bridge across the Menai Strait, the success of which led to the building of many others on the same principle. STEPHENSON suggested a circular tube supported by chains, but this plan was modified at the instance of Mr. FAIRBAIRN, who made a long series of experiments upon model tubes, and found that a rectangular structure, strengthened by a series of cells at the top and bottom, and suspended without chains or any other support from pier to pier, was best adapted to the stipulated conditions. Mr. FAIRBAIRN, who was one of the founders of the British Association, wrote many able papers on subjects connected with his profession, and published several important works, among which may be noticed (1852) "Cast and Wrought Iron for Building Purposes ;" (1856) "Useful Information for Engineers ;" (1863) "Iron : its History and Manufacture ;" (1864-5) "Mills and Mill Work ;" and (1865) his great work on "Iron Ship Building." He was a Fellow of the Royal Society, a Corresponding Member of the National Institute of France and of the Royal Academy of Turin, a Chevalier of the Legion of Honor, and has been President of the British Association for the Advancement of Science. He was made a Baronet in October, 1869.

CORRESPONDENCE.

WILKES-BARRE, August 18, 1874.

TO THE EDITOR : SIR—The Lehigh and Wilkes-Barre Coal Co. are sinking a shaft 24x12 ft. It is located between the Diamond slope and Hollenback shaft, and will be used to ventilate these mines. There will be a hoistway which will be used to lower and hoist all the workmen of these collieries, and will remove what has heretofore been a serious loss of time. The work is not far advanced, and as they anticipate that they will have to go down 425 ft., it will be some time before it is completed. A Burleigh drill is being used, with compressed air as power.

The Hollenback shaft, which reached the Baltimore seam several months ago, is also the property of this company. Its dimensions are 48x13 ft., giving 4 hoistways, 1 airway, and 1 pumpway. The Baltimore seam was reached at a distance of a little over 600 feet, and was found to be 18 ft. thick. The permanent machinery has not been located. The shaft is being timbered, and when that is complete they will begin to drive the gangways. A Burleigh drill, driven by compressed air, was used to do this work. The coal taken from this shaft will be prepared by the "Diamond Breaker," at the present time the largest and most perfect one in this valley.

This company is also building 64 new houses at Sugar Notch, where they have had some trouble relating to establishing the prices per yard for working their seam with a strong dip. I am informed that the men have accepted the company's terms.

The bridge across the Susquehanna at Nanticoke is ready for carrying coal, but there is a rumor of some trouble being caused by an injunction procured by some railroad company, holding a charter to build a road along the bank of the river, with which the bridge in some way interferes. G.

Magnetic Iron Ore Mining in New Jersey.

TO THE EDITOR : SIR—The development of the rich beds of magnetic iron ore in the south-western portion of Bethlehem Township, Hunterdon Co., N. J., is of quite recent date. One, of excellent quality, was supposed to exist in the Musconetcong Mountains, extending south-west from where it has been worked at the Swesey mines ; and while considerable prospecting had been done along this range to the South-West, very little had been accomplished more than to satisfy the prospectors that iron ore was there. How much, or of how good quality, and whether it would pay to develop and work, remained unanswered until Messrs. BRODRICK & Co, some two years ago, commenced developing the ore about one and a half miles from Valley Station, on the C. R. R. of N. J., and two miles south-west of where it is being worked. They have it opened in two beds, by a shaft and two slopes. One slope is sunk on the ore about seventy-five feet. It has been worked very little, and is at present idle, waiting until such times as the iron trade revives. Directly in front of this, another slope has been sunk seventy-five feet through rock. It has just struck the ore, which, from appearances, will be about fifteen feet thick and of excellent quality. This slope is to be continued in the ore. It was driven through rock under the vein for the purpose of landing the ore at nearly the same level as from the other slope, and use the same engine for hoisting out of either as occasion requires. At the shaft and slope the ore is hoisted in iron buckets by a twenty-five horse power Bacon engine. The shaft is thirty feet deep through rock, where it strikes the ore ; from here it continues on the dip of the bed, which is from 70° to 80°, a distance of one hundred feet further. The ore is worked in two lifts ; that from the upper lift is run to the foot of the slope and loaded there. On the lower lift the ore has been opened to the North-East, about fifty feet, and on the South-West, thirty feet. The bed is divided here by seven feet of rock, which will probably disappear at a greater depth, and the two seams come together and form one bed ; for at the foot of the shaft, where the slope commences, they are separated by thirteen feet of rock, while at the foot of the slope it is only seven feet thick, and about three hundred feet to the South-West it has disappeared entirely, as is proved by a shaft and slope worked by A. H. HARRIS & Co., where the bed is said to be from twenty to twenty-seven feet thick with no rock dividing it. BRODRICK & Co's slope is sunk on the lower division of the bed, which is from seven to twelve feet thick ; cross cuts are driven through the rock to the upper division, which is from six to ten feet in thickness. The ore is of uniform and excellent quality, containing as impurities manganese, alumina, silica and lime, being free from sulphur and phosphorus, as is shown by the following analyses made by Prof. H. B. NASON :

No. 1.	No. 2.
Fe <sub>2</sub> O <sub>3</sub> — 76.56.	Fe <sub>2</sub> O <sub>3</sub> — 76.33.
Si O <sub>2</sub> — 6.96.	Si O <sub>2</sub> — 10.61.
Sulphur— 0.00141.	Sulphur— 0.00229.
P O <sub>5</sub> — only a trace.	P O <sub>5</sub> — only a trace.

It is well adapted for making Bessemer steel, and is used by the Bethlehem Iron Company, and the Pennsylvania Steel Works at Harrisburg. These mines are now shipping about one thousand tons of ore per month, and will soon be able to double their present production. IRVING A. STERNS.

WILKES-BARRE, August 12, 1874.

Some of the Questions we hear most frequently asked among iron men, are, "Where are there ores suitable for making Bessemer pig, and what amount of Phosphorus may be allowed in Bessemer iron?" The last question our correspondents, Messrs. A. L. HOLLEY & DUFFEE, answered in the JOURNAL some time ago. We are glad to be able to place on record one answer to the former question by referring to an advertisement in another column of an excellent quality of Bessemer pig iron made by the Fletcherville Furnace at Port Henry, N. Y.

Assurance of Colliery Owners Against Strikes, etc.

The great strike of the colliers in the North of England has led the coal masters to unite in an association with a capital of £200,000, to afford relief to members subjected to losses by strikes of workmen, as well in respect of the expenses of the pits as of the failure of profits during the strike.

The capital of the company is divided into £10 shares, and a person wishing to join it shall state in writing the name of the colliery to be admitted, the number and names of the pits worked, with the name and residence of the person by whom the firm is to be represented; also the total number of tons of coal raised in each pit during the previous year, and the profit per ton which it is sought to assure.

As the compensation clauses are of the greatest importance, we give the principal ones in full.

CLAUSE II. "Each firm shall assure its profits at such a rate, not being less than 1s. nor exceeding 2s. 6d. per ton, as may be agreed upon with the Finance Committee after considering the special circumstances of the colliery.

made on each firm in due proportion after this rate. Each firm shall be at liberty from time to time to amend its returns of quantities being actually worked by giving one month's previous notice in writing.

Another clause says:

"No advance in the rate of wages payable to workmen, or concession or variation in the terms of their contracts, occasioning additional payment to them, or any advantage in the rate of wages, or an alteration in the number of their hours, shall be made or agreed to be made by any member without the previous consent of the board, except in the case of growing boys; provided that nothing in this rule contained shall prevent such a modification of the wages payable, or an allowance being made to any workman in respect of any peculiar condition of a seam, or of his working place therein, as under the circumstances may be reasonable to meet the exceptional state of things; but no modification or allowance shall be made with the intention of making any advance in the general rate of wages payable to any class of workmen."

RULE 18 "A lock-out shall not be determined upon unless at least a week's notice has been sent to each member that the subject will be considered at a time and place to be stated in such notice; nor if members holding one-fourth in number of votes determine against it at a meeting then held, or at some adjournment thereof. In case of such lock-out being determined upon each firm shall, from the day of the lock-out, pay all its own expenses. No claims shall be made on the Association for such expenses."

There are heavy penalties for contravention of any of the rules, for it is enacted that—

"Any member of the Association acting, either by himself or his agent, in contravention of any of the rules of this Association, shall, after full enquiry made into the matter, and after the member concerned has had full opportunity of being heard, be, at the discretion of the Association, fined in a penalty not exceeding £103; and in case of continued contravention, in such further daily penalty, not exceeding £50, as may be determined."

Answers to Questions in our Last Number.

- 1. Georgia Manganite is a native ore. It is simply dressed by washing up to about 80 per cent. of sesquioxide of manganese, and is dried in the sun. It is considered better than the Virginia, but not as good as the Nova Scotia or New Brunswick mineral.
2. A fall of about 1 in 500, say 20 ft to the mile, will carry off the water where the ditches are kept clear. In town sewers a fall of 1 in 1000, say 5 ft. to a mile, will give a velocity of 175 feet per minute in sewers of not less than 60 inches diameter, but in the mine we usually give a much greater fall, because the drains are often obstructed.

COAL TRADE REVIEW.

Import Duty on Coal.

Anthracite free. Bituminous, per ton of 28 bushels, 80 lb. to the bushel, 75c., gold. All slack, or culm, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel, 40c., gold.

The Production of Anthracite Coal for the week ending Aug. 15, 1874, was as follows:

Table with columns: Region, Tons of 2240 lb., WEEK TONS, YEAR\* TONS. Includes Wyoming Region, Delaware and Hudson Canal Co, Pennsylvania Coal Co, Lehigh Valley R.R., etc.

Table with columns: Region, Tons of 2240 lb., WEEK TONS, YEAR\* TONS. Includes Lehigh Region, Schuylkill Region, Sullivan Region, etc.

Table with columns: Region, Tons of 2240 lb., WEEK TONS, YEAR\* TONS. Includes Pittsburg Region, Indiana, N. and S. R.R., etc.

The following table does not give the entire production of our bituminous mines, but it is by far the fullest reported.

The Production of Bituminous Coal for the week ending Aug. 8, was as follows:

Table with columns: Region, Tons of 2000 lb., WEEK TONS, YEAR TONS. Includes Cumberland Region, Md., Cumberland and Pennsylvania R.R., etc.

Table with columns: Region, Tons of 2000 lb., WEEK TONS, YEAR TONS. Includes Barclay Region, Pa., Broad Top Region, Pa., etc.

Table with columns: Region, Tons of 2000 lb., WEEK TONS, YEAR TONS. Includes Clearfield Region, Pa., Snow Shoe, Tyrone and Clearfield, Allegheny Region, Pa., etc.

Table with columns: Region, Tons of 2000 lb., WEEK TONS, YEAR TONS. Includes Chesapeake and Ohio R.R., Block House Region, Nova Scotia, etc.

Table with columns: Region, Tons of 2000 lb., WEEK TONS, YEAR TONS. Includes Picton Region, Nova Scotia, Consigned to the United States, etc.

Table with columns: Region, Tons of 2000 lb., WEEK TONS, YEAR TONS. Includes Warrior Region, Ala., South and North Alabama Railroad for July, etc.

The production of Anthracite for the week ending August 15th was as follows: Wyoming Region 175,129 tons, being 19,929 tons more than the preceding week. In the Lehigh region, 85,072 tons, or 2,591 tons more than the week before, and in the Schuylkill region, 152,178 tons, being 16,462 tons less than the preceding week.

year. From January 1st to August 15th there were produced 11,375,884 tons, as against 13,804,068 tons for the same period last year.

The Delaware and Hudson Canal Company has at Honesdale 217,000 tons, at Rondout 40,000, at Weehawken 15,000 tons. The receipts at Port Richmond were 52,000 tons; shipments, 48,000 tons; and balance on hand 106,000!! Last week the balance was 129,000 tons.

The receipts at Greenwich, Philadelphia, were: bituminous 1831 tons, and gas coals 3335 tons; shipments: bituminous 2028 tons, and gas coals 5032 tons; balance on hand: bituminous 3087 tons, and gas coals 2602 tons.

The production of Cumberland coal from January 1st to August 15, inclusive, was 1,574,030 net tons of 2000 lb., as compared with 1,620,536 net tons for the corresponding period last year. The production for the week was 67,788 tons, as compared with 40,043 tons for the corresponding week in 1873.

The receipts of coal at Buffalo for the week were 7906 tons. The shipments for the same period were 9161 tons by Lake.

The receipts of Anthracite coal, by Lake, at Chicago, since the opening of navigation to August 15, have been 232,000 tons. Anthracite left over from last year, estimated 100,000 tons.

The most persistent interviewing and the most earnest desire to find something encouraging to say about the coal trade for the past week has been quite fruitless. There is nothing moving of importance; sales are slow, and there is no expectation of improvement till September, when possibly business matters may appear brighter.

Anthracite.—The regular advance of 15 cents per ton has been decreed for September; but the question of reduced production was left open to be decided at an adjourned meeting of the associated companies on the 2nd September. We learn that the Lehigh and Wilkes-Barre Coal Company has stopped work for the balance of this month; and as we announced in our Philadelphia correspondence last week, the Philadelphia and Reading has also stopped work for the balance of this month. The other companies are generally reducing their output, and the stocks on hand are lessening, which will give a better tone to the market. The recent failure of Mr. G. NICHOLSON, with liabilities at \$95,000, while his total capital he represented at not over \$22,000, has hastened the consolidation of this trade in the hands of the large companies and the small number of dealers who control collieries. It must be very evident that the middle man proper has no future in the trade, and it can only be a question of a few months, more or less, till they all drop out, though we trust but few will do so in the manner we have just noted. We

understand Mr. NICHOLSON'S offer to settle at 50 cents on the dollar has been accepted by his creditors.

Bituminous Coal.—There has been no change in this market since our last; prices have not down so near the cost of production that there is little room for a decline, yet we hear \$4 25 per ton at Georgetown named more openly than it was a few weeks ago, when we first stated that coal was being sold at that figure; \$4 30 is a fair quotation. Small lots may bring \$4 35, but the range in prices does not vary over ten cents, which is a very good criterion of how close the figures are to cost. We note sales of some 4000 tons in small lots at Georgetown at full quotation prices.

We note the sale of the Ohio coal, about 1200 tons, to which we have several times referred, to one of the gas companies on private terms, understood to be less than \$6 00, being less than the cost of transportation. This does not offer much inducement for sending new coals into this market.

We also note the sale of 1000 tons of Caledonia gas coal at \$1 75, gold, f. o. b., at the mines. The arrival of two cargoes of canal for Messrs. SKIDMORE & SON, noted by us last week, should have been English Ince Hall canal instead of Scotch canal as reported.

We note the arrival in Boston of 500 tons English house canal, sold on private terms, supposed to be about \$18 00. We learn that the James River Coal Company is finding a ready market for its coal, and one of our large hotels is laying in a stock of carbonite where formerly it used canal coal.

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

Table with columns for Lump, Steamer, Grate, Egg, Stove, Chestnut. Rows include Wyoming Coals (Lackawanna and Scranton, etc.), Lehigh Coals (Old Company at Port Johnston, etc.), and Schuylkill Coals (Schuylkill white ash, etc.).

\* Prices for September have been fixed at 15 cents above these rates. † f. o. b. in New York Harbor.

‡ These are the rates for Pittston coal. Buyers having registered contracts will be charged 15 cents less than above prices.

Table showing freight rates from Hoboken and Wehawken to New York, Elizabethport & Port Johnston, South Amboy, Newburgh, Port Richmond, and Rondout to New York.

Retail Prices.

Table showing retail prices for Pittston coal, Delaware & Hudson, Scranton, Wilkes-Barre, Lehigh & Locust Mountain, and Schuylkill Red Ash.

Cargo Prices of Bituminous Coal. Domestic Gas Coals.

Table showing cargo prices for Westmoreland and Penn. at Greenwich, Red Bank Canal Pa., Youghiogheny, Waverly Co., Despard, West Va., Fairmount, Newburgh Orrel, Md., Cannelton Canal, W. Va., Peytona Canal, Sterling, Straitsville, At Sandusky, O., and Foreign Gas Coals (Newcastle, Liverpool House, Ince Hall, Gas, Scotch Gas, Block House, Caledonia, Glace Bay, Lingan).

Sydney, International and Reserve mines, at Sydney 2 25 5 75. Pictou, Albion and Vale mines, at Pictou 2 50 6 50.

Broad Top, at the mine, \$1 25; at Port Richmond, Phil. 4 75@5 00 6 00@6 25. Cumberland, at Georgetown and Alexandria, Va. 4 30@4 40 6 50@6 75. Clearfield, "Derby," "Kitaning" and "Sterling," at the mines, \$1 25; and Greenwich, Phil. 4 75@5 00 6 25. James River, carbonite, at Richmond, Va. 6 75 9 00. Bituminous, " 4 00 6 25.

\* Steam coals are quoted 1/ per ton above these prices.

Retail Prices in New York. Liverpool House Orrel, \$20 00@22 00. Liverpool House Canal, \$25 00. American Block, 16 00@. Straitsville Canal, 16 00@. Carbonite, 12 00@.

Coal Trade of Philadelphia.

PHILADELPHIA, Aug. 12, 1874. Reported by our special correspondent.

There is no new feature to note in the coal trade of this city and of the Schuylkill region. The suspension of transportation of coal on the Reading Railroad and Schuylkill Canal, of which I gave information last week, commenced to-day, and has added to the general gloom. How long it is to continue it is difficult to tell, as no circular notice to shippers has been given. The prospective advance on the 1st. September on all sizes of coal, as agreed upon by the associated companies, is exciting, as usual, some attention of the trade as the close of the month approaches. As shipment from the mines is impossible, buyers will be compelled to wait the resumption of transportation or resort to the stocks of coal now stored at the principal points of distribution by the companies. Mr. GOWEN, the President of the Reading Railroad Company and of the Reading Coal and Iron Company, who has been in Europe for the past two months, is expected home by the middle of next month. The retail trade is the only branch of the coal interest that shows any degree of activity. Prices, as a rule, are 25 cents a ton higher than in July, and another advance of 25 cents may be expected for September. The prices of coal by the barge on board at Port Richmond is, of course, unchanged from the published schedule of the Reading Coal and Iron Company on the first of the month. The movement in bituminous coal for the past week has been more vigorous at prices last quoted and firm. It is no longer problematical that many manufacturing establishments are altering their machinery and boilers to the use of bituminous coal as the only protection from the monopoly in anthracite. Those who have perfected their arrangements in this city report almost universally that it is cheaper; not so clean, but much less destructive to boilers, and the furnace is much more easily managed. There is really little else to report with regard to the coal trade in this city and in the Schuylkill County coal fields than general stagnation, and with regard to prices, they, being regulated by the combined companies without any regard to the laws of supply and demand, are arbitrary and fixed and unchangeable for the month, the only deviations that are made being in violation of an honorable understanding and agreement. That such deviations are being made is well understood by the trade, but it is hard to fix the responsibility for them. Such sales are made by persons who owe no other allegiance but to those who secretly employ them. Therefore, when you get the regulated prices for the month other quotations are superfluous.

Bituminous Coal, Wholesale.

Penn. and Westmoreland (Gas), f. o. b., Greenwich 5 25. Broad Top, (according to destination) f. o. b., Port Richmond 4 75@5 00. Clearfield f. o. b. at Greenwich, according to destination 4 75@5 00.

Bituminous, Retail.

\$6 00 in yard, per 2240 lb., cartage added.

Prices of Anthracite Coal for Aug., 1874, at Various Points.

Wholesale—Per ton of 2240 lb.

Table showing prices for Mauch Chunk, Lehigh coal, Port Carbon, Schuylkill Haven, Port Clinton, Carbondale, Pittston, Scranton, Wilkes-Barre, Buffalo, N. Y., f. o. b., Rochester, Weedsport, Syracuse, Ithaca, N. Y., f. o. b., Charlotta, N. Y. f. o. b., Auburn, Elmira, Oswego, Oswego, retail delivered.

\* Broken coal for these points is 10 cents per ton above these figures. † By Railroad and Canal. ‡ Lump coal for these points ranges from 40 to 65 cents per ton above these figures.

Rates for coal on the line of the P. & N. Y. R.R. and L. & B. Junction per ton of 2240 lb. Broken and Egg, \$3.05; Lump, Stove and Chestnut, \$3.30.

Baltimore, Md. Aug. 19, 1874.

Prices remain unchanged.

WHOLESALE PRICES PER 2240 lb.

Reported by our special correspondents.

ANTHRACITE.

Table showing anthracite prices for Wilkes-Barre, Lump, steamboat, Broken, Egg, Stove, Pittston and Plymouth, Lump, steamboat, and broken, Egg, Stove, Boston (free burning), Shamokin, red or white ash, Egg, Stove, Lykens Valley, red ash, all sizes.

BITUMINOUS.

Table showing bituminous prices for George's Creek and Cumberland f. o. b. at Locust Point for cargoes, West Va. Gas Coal f. o. b. at Locust Point, Kanawha Canal, coarse, Tyrone, and Kitchie Mineral of West Virginia.

Boston. Aug. 15, 1874.

From the Commercial Bulletin.

Coal has had a very dull week. The sales of anthracite have been checked by the inability of sellers to enter sales at July values. The coal to come to parties outside of the ring for August is about all secured. In foreign coal the dullness is extreme. Lots to arrive next month from Liverpool in ballast are hard to place. The gas companies having had a rather small summer's demand, and looking forward to a light winter's business, consider their supply now in sheds sufficient, and are only disposed to operate at present in a speculative way upon the possible necessities and margin of costs a year hence. Cumberland coals are lifeless, and although the freights have stiffened, and show a higher basis for a month hence, coal buyers are indispensed to take advantage of present opportunities on account of present full supplies and very small sales.

Drummers from some of the Baltimore and Pittsburgh coal companies have been canvassing the New England trade, hoping to induce consumers to place an order, but as far as heard from, they are very blue and seem surprised at the meagre coal consumption of New England compared with previous years. There is a prospect that the reduction of wages demanded by the nail factories of their workmen will be accorded. The facts were noted in our iron market of August 1, and these shops start up again. Their supply of anthracite is not over abundant, and some cargo sales are looked forward to as certain in these quarters.

CARGO PRICES TO TRADE.

Reported by our Special Correspondent.

Table showing cargo prices for Lingan coal, Caledonia, Pictou, Flock House, Red Bank Canal, Glace Bay, Sydney, Westmoreland, Waverly Co. Youghiogheny, Cannelton Canal, Cumberland, Anthracite, Retail.

Burlington, Iowa.

Aug. 15, 1874.

Specialy reported by Messrs. WIGHTMAN & CUMMINGS

wholesale and retail dealers and shippers of coal.

Prices remain unchanged.

Per ton of 2000 lb.

Table showing prices for Lehigh Lump, Lackawanna, Bloisburg Smithy, Pittsburgh, Illinois Smithy, Illinois.

Buffalo, N. Y.

Aug. 19, 1874.

Reported by our Special Correspondent.

Continue quotations.

Per ton of 2000 lb.

Table showing prices for Cannelton coke, Sterling canal, Red Bank, Youghiogheny coal for gas, Briar Hill coal, Fairmount, Catfish, Stoneboro.

Briar Hill coal, and Sterling and Red Bank canals, at \$3; all other coals \$1 per ton above wholesale prices.

Anthracite f. o. b. vessel. Retail prices \$1 per ton additional, delivered.

Grate, 6 25; Stove, 6 75; Egg, 6 25; Chestnut, 6 00.

Chicago, Ill.

Aug. 17, 1874.

Specialy reported by Messrs. REIL & LITTLE, Coal Merchants.

The following are present prices:

Table of retail prices per ton of 2000 lb. delivered to buyer for various coal types like Lehigh Lump, Lehigh prepared and car load lots, Lackawanna, Wilkes-Barre and Pittston, etc.

75 cents off these prices for car load lots to country dealers and manufacturers.

Table of retail prices per ton of 2000 lb. for Youghiogheny, Pomeroy coal, Cannel coal, Semi Cannel, etc.

Table of retail prices per ton of 2000 lb. for Youghiogheny, Pomeroy, Cannel, Kanawha Semi Cannel, Anthracite, Foundry coke, Soft coke.

Table of retail prices per ton of 2000 lb. for Blossburg (blacksmith), Anthracite, Iowa.

Table of retail prices per ton of 2000 lb. for Blossburg, Anthracite, Iowa.

Table of retail prices per ton of 2000 lb. for Canon, Marshall, Murphy, Baker.

Table of retail prices per ton of 2000 lb. for Lehigh, grate, egg, Briar Hill, Lehigh chestnut, Lykens Valley, Schuylkill and Wilkesbarre, Blossburg (Smithing).

Table of retail prices per ton of 2000 lb. for Chensango Valley, Mahoning Valley, Nut, No. 1 slack, Bituminous, by car loads to factories.

Table of retail prices per ton of 2000 lb. for Best Block coal, Best Highland, Block Nut, Highland, Block slack, Peytona canal, Grate, Egg, Block, Highland, Block, Slack.

Table of retail prices per ton for Anthracite (Grate, Egg) and Bituminous (Stove, Chestnut) in Louisville, Ky.

Specialty Reported by Messrs. BYRNE & SPEED. The market remains as last quoted. Retail prices are unchanged: Pittsburgh, per load of 1900 lb., Pomeroy, Buckeye Cannel, Peytona Cannel, Nut and Slack, Kentucky lump, City-made Coke, Kentucky on cars, Anthracite.

Table of retail prices per ton for Lehigh Lump, Lehigh Prepared, Lackawanna.

Table of retail prices per ton for Pittsburg coal, Anthracite, Spadra (Arkansas) coal, Mt. Carbon, Scotch Cannel.

Table of retail prices per ton for Youghiogheny coal, Connellsville coal, Pittsburgh coal.

Table of retail prices per ton for Anthracite, Australian, Coos Bay, Cumberland, English.

Table of retail prices per ton for Lehigh Lump, Lackawanna, Semi Anthracite.

Table of retail prices per ton for Washington Indiana, O'Fallon, Collinsville and Belleville, Indiana Cannel, Missouri Cannel.

Table of retail prices per ton for Wilkes-Barre and Scranton, Large and Small Egg, Stove, Chestnut, Lehigh Lump.

Table of retail prices per ton for Scotch Steam, Pictou, Anthracite at retail, Egg, Stove.

Toronto, Ont. Aug. 17, 1874. Reported by our Special Correspondent. The prices and terms of the Toronto Coal Exchange remain unchanged as follows:

Table of retail prices per ton for Broken, Egg, Stove, Blossburg, Briar Hill.

Coal Freights from the Anthracite Mines to the Principal Markets. We refer to our issue of July 11th any one desirous of consulting the above.

Table of freights from Elizabethport, etc., to New London, Pawtucket, Stonington, Taunton.

Delaware and Raritan Canal. Rates of the above, for August, may be found in our issue of Aug. 1st.

Freights on Bituminous Coals from the Mines to Tide-Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles) the charge is 3 cents per ton of 2240 lb. per mile. From State Line to Amboy, (346 miles) \$4.00 per ton of 2000 lb. On coal shipped beyond that point there is a drawback of 50 cents per net ton. From Cumberland to Baltimore, (178 miles) \$2.58 per ton of 2240 lb., or \$2.30 per net ton, and 4 cents per gross ton for use of cars. From Cumberland to Georgetown, (152 miles) by canal, \$1.76 per ton of 2240 lb. To Alexandria, Va., 11 cents per ton more. From the Mines to Piedmont, (from 4 to 10 miles) 5 cents per ton of 2240 lb. per mile on distances less than 5 miles, and 4 cents per ton per mile on distances not over 10 miles. From Piedmont to Baltimore, (206 miles) \$2.97 per ton of 2240 lb., or \$2.65 on net ton. From any point in the Kanawha Valley to the James River wharves below Richmond (say 350 miles) by C. and O. K. R., including terminal charges, per ton of 2000 lb., for Cannel coal, \$5.35. Subject to rebate on large quantities. Do., do., for Semi Cannel or Splint, \$3.65. From Hawks Nest to Richmond (say 300 miles) the freight Bituminous or Splint is \$3.25 per ton of 2000 lb.; on Cannel is \$5.00. From Irwin to W. Phila. (say 332 miles) per P. R. R. Penn. Westmoreland gas coal, per ton of 2000 lb., \$5.00. From Occochee to W. Phila. (say 248 miles) per T. & C. R. R. bituminous coal of 2000 lb., \$5.35. From Fairmount and Carlsburg to Baltimore (say 300 miles) by B. & O. R. R. including loading, per 2000 lb., \$5.20. On through coal after deducting drawback, per 2000 lb. From Richmond, Va., to New York, 322 miles per 2000 lb., 4.15. " " " Boston about 650 " " 3.00. " " " Philadelphia 292 miles " " 1.75. From the Mines to Richmond via James River and Kanawha Canal, 15 miles, \$5.20.

Towing. Our issue of June 27th contains full information on the above.

REVIEW OF THE BRITISH COAL AND IRON TRADES.

From our Exchanges to August 5th, 1874. England.—London.—Best house coals are quoted at from 21/0@24/6d. North of England and Cleveland.—Prices of iron are declining on account of the decline in wages and the cost of coal, and while business is improving there appears to be some hesitation among purchasers, who look for still lower prices. There is generally a scarcity of foundry iron. No. 3 may be quoted at 70/ and 75/ for No. 1. Best coke is selling at Middlesbrough for 16/ delivered, and other kinds several shillings less. The Collieries seem to be well supplied with men, and though they do not earn as much as last year, yet the average of hewers' wages in the North Durham Collieries may be stated at 7/ per day, working 11 days per fortnight. Similar reports come from Northumberland, but they work only 10 days per fortnight. Large orders for rails have been placed, but the standing complaint is still heard that prices are utterly unremunerative. Much of the difficulty experienced in making a profit on North country rails is explained by the formidable rivalry of the South Wales rail-makers, whose quotations are always lower than those of the North. In Durham the effect of this severe competition has been to reduce rails by nearly 20/ per ton during the past two months, ordinary sections being now placed at from £7 15/ to £8, and light sections at £8 10/, and £8 15/. In Staffordshire, best coals are worth 20/ per ton at the mines, but many good varieties can be obtained at much less, all the way down to 12/. In South Staffordshire, the price of coal has not been red, coal,



as expected, the principal firms maintaining the price at 14/6d. @19/for forge coal. A reduction of from 2/6d. is expected to be made soon.

The Iron Trade is somewhat better and some of the furnaces for some time out of blast are about being relighted. Common cinder pigs are £3@£3 5/.

In the West Biding there is an absence of bustle, but work is going on steadily. As in other districts, foundry iron is very scarce and some of the foundries are stated to be much hampered by the difficulty of obtaining raw material.

About Rotherham and Dronfield, however, much activity is noticeable. Favored by accessible fuel and a large stock of iron ore, the furnaces on this side of Sheffield have enjoyed exceptional prosperity and are now in full blast.

In Lancashire, the iron trade is improving, Middlesborough for immediate delivery No. 3 brings 80/; for future delivery it can be bought for less money. Ordinary bars are worth about £9 10/ and heavy bars £8 10/ delivered.

Scotland.—The Scotch Iron Masters have decided on blowing in some more furnaces; this resolution will soon give 120 furnaces in blast. Under date of 5th August, BRAINERD RADCLIFFE'S Iron Circular, quotes as follows: "Warrants, m-n G.M.B., f.o.b. Glasgow, prompt cash, 89/6d; Gartsherrie, f.o.b. Glasgow, No. 1, 115/; No. 3, 90/; Coltness, do. do., No. 1, 117/6d; Summerlee, do. do., No. 1, 112/6d, No. 3, 90/; Carnbroe, No. 1, 99/6d, No. 2, 87/6d; Scotch G.M.B., cost, freight and insurance to Liverpool, free of commission, cash against bill of lading, No. 1, 98/6d, No. 3, 92/6d; Gleggarnock f.o.b. Ardrossan, prompt cash, No. 1, 100/; No. 3, 86/; \*Eglington, do. do., No. 1, 92/; No. 3, 86/.

Malleable Iron.—Subject to the Usual Discount. Com. Bars, £10 10/ to £11 10/; Nail Rod Iron, £10 10/ to £10 0/; Angle Iron, 11 0/ to 12 0/; Plates, ship, 11 0/ to 0 0/; Hoop Iron, 10 10/ to 11 0/; Plates, boiler, 11 10/ to 0 0/; Rivet Iron, 10 0/ to 10 10/; Bulb Beams, 10 10/ to 10 0/; Delivered f.o.b. in Glasgow.

Middlesborough Pig Iron.—Nett Cash. Table with 2 columns: No. and Price. No. 1 Foundry 75/; No. 2 " 70/; No. 3 " 65/; No. 4 Forge Grey 57/6d; No. 5 Forge Mottled 55/; No. 6 Forge White 54/.

Delivered f.o.b. in the Tees. Carriage by Rail to Liverpool is 8/9d per ton.

The market still continues to be very firm, with little variation in the price of Warrants. Yesterday's market closed at 89/1 1/2d. buyers, 89/3d. sellers, prompt cash, and 1/ per ton less one month fixed.

Coal is slightly lower. The following are prices f.o.b., at the Glasgow harbor cranes: Wishaw Main Coal, 8/10/ per ton; house coal, 9/9d@13/; splint coal, 9/6d@11/; steam coal, 11/6d@12/6d.; smithy coal, 17/18/.

South Wales.—There is a general complaint of lack of orders in the iron trade, and as prices are now said to be at a figure which leaves no margin, a further reduction of wages is anticipated, though it will probably cause a strike; a number of works are idle from want of orders.

\* 6d. per ton less for Shipment to the Continent.

IRON MARKET REVIEW.

New York.

Aug. 20, 1874.

The revival of the iron trade, about which we see so much reported, especially by the American correspondents of the English papers, and which we are told has already commenced in the West, has certainly made no progress here, and we are disposed to look upon these rosy reports as representing a state of things that exists in our hopes rather than in fact.

The impression among our best-informed dealers corroborates our own, that at no time this year has the iron trade been duller than during the past week, and though quotations are nominally unchanged, the prices obtained, or rather asked, where it is believed the inquiries mean business, are lower than they have been.

That there will be a better demand later in the year is hoped and expected generally; but that there will be the active, brisk trade foretold by so many of the papers is more than doubtful, and there can scarcely be much of a revival in prices while our stocks in makers' hands are so large.

Our import iron trade has declined enormously in rails. Even last year we took from England more than twice as much as any other country did; we have this year imported less than one fourth the quantity we imported in 1872.

"Exports of Railway Iron from Great Britain, extracted from Government returns."

Table with 3 columns: 1872, 1873, 1874. Rows include: To the United States, Total exports of rails, Total exports from Great Britain of Iron and steel to all countries.

Table with 3 columns: 1872, 1873, 1874. Rows include: To the United States, Total exports of rails, Total exports from Great Britain of Iron and Steel to all countries.

If it were not that our decreased imports are due, in a great measure, to the prostration of business here, and that they are more than equalled by our decreased consumption, these figures would be very encouraging. We import scarcely any but steel rails, and most of these have been sent in filling old contracts.

American Pig.—There are no transactions worthy of note to report. We quote No. 1, \$29 50@31; No. 2, \$28@29; grey forge, \$25@27; and even these prices could be reduced for heavy orders.

Scotch Pig.—The stock of Scotch iron in this market can scarcely exceed 800 tons, and it is stated to be now all in the hands of one dealer. Prices have been advanced, and we quote Eglington, \$34; Gleggarnock, \$36; Carnbroe, \$35.

There has been no change in the Scotch market worthy of being telegraphed. Our mail advices to the 7th of August state there are in Scotland 89 furnaces in blast, as against 125 at the same date in 1873.

Iron Rails.—There have been no transactions to note, except we should repeat a report of a sale of 4000 tons (to be correct it should be 3600) which has formed a kind of stock in trade for the reporters for the past eighteen months.

We quote American 57@59, and foreign, \$48@49, gold.

Steel Rails.—There is reported a sale of 5000 tons—3000 by the Cambria Iron Co., and 2000 by the Besselsberg works—to the Delaware and Hudson Canal Company, at a private price stated to be less than \$90 at tide water.

Old Rails.—We have no transactions to report, and quote \$37@35.

Scrap Iron.—No transactions and prices unchanged. No. 1 wrought, \$34@36; Cast, \$22@26.

Spiegel Eisen.—In the absence of business we quote nominally \$55 gold; No. 1, foreign, is quoted at £6 f. o. b. at Rotterdam. Best English makes £7@£7 10/, f. o. b. in English port.

Boston.

August 15, 1874.

Pig continues to sell in a moderate way in small lots, while there is still to be noticed small encouragement for a better future in the fact that each week some new faces this season are seen in the market, inquiring, and now and then making a small and starting purchase.

A considerable part of the improvement might be traced to MOSELEY, HODGMAN & CO., who have put flyers on the market, of some of which they advertise being able to offer lots at the very bottom prices.

Bar is very dull, and yet the week has been on the whole the best in a month. There has been a small inquiry from tool-makers, and a number of large country blacksmiths have been in, buying general assortments, an event with the trade of unexpected joy.

Steel is still very quiet, though here and there the tool-makers have bought some stocks.

Nails, since the Long Branch meeting of the makers on the 6th inst., have been somewhat firmer. The extras on fine finish advance the price 75c., and on box and floor 25c.

We quote yard lots of American Pig Iron at \$36 00@40 00 per ton, including No. 2 extra at \$34@36, and No. 1 at \$36@38. We quote Eglington at \$38, Coltness Gartsherrie at \$45@46, Charcoal at \$45@55.

Chicago.

Aug. 18, 1874.

Specially reported by Messrs. ROGERS & Co., dealers in Scotch and American pig iron.

Table of iron and steel prices in Chicago, listing various grades like No. 1 Coltness, No. 1 Gartsherrie, etc., with prices in dollars and cents.

Cleveland.

Aug. 18, 1874.

Specially reported by Messrs. C. E. BINGHAM & Co., dealers in pig iron and iron ore.

A slight improvement is noticeable in our pig iron market. We quote as follows:

Table of iron and steel prices in Cleveland, listing various grades like No. 1 Anthracite Foundry, No. 2, etc., with prices in dollars and cents.

Cincinnati.

August 18, 1874.

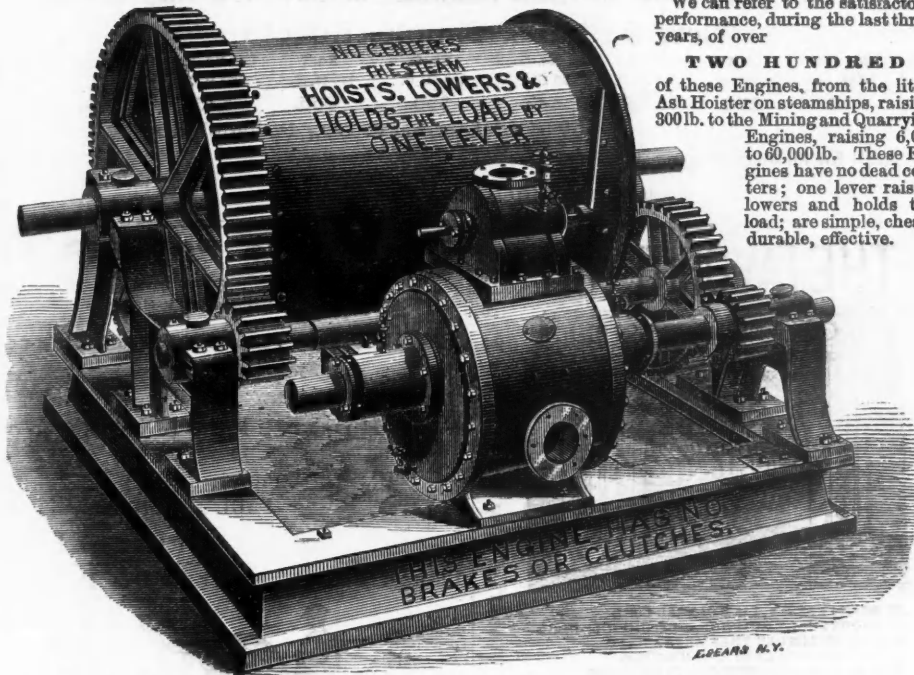
Specially reported by Messrs. TRABER & AUBREY, commission merchants for the sale of pig iron, blooms, ore, etc.

There has been a fair demand for foundry metal during the past week and prices are firm at our quotations.

Table of iron and steel prices in Cincinnati, listing various grades like Hanging Rock, No. 1 Foundry, etc., with prices in dollars and cents.



ROTARY REVERSIBLE HOISTING ENGINES.



We can refer to the satisfactory performance, during the last three years, of over

**TWO HUNDRED** of these Engines, from the little Ash Hoister on steamships, raising 300 lb. to the Mining and Quarrying Engines, raising 6,000 to 60,000 lb. These Engines have no dead centers; one lever raises, lowers and holds the load; are simple, cheap, durable, effective.

We ask those looking for Hoisting Engines, and Mining Machinery to consult either of the following references: Eckley B. Cox, Proprietor of Cross Creek Collieries, and Manager of the Am. Inst. of Mining Engineers, Jeddo, Luzerne Co., Pa.; J. H. Lyon, Pres't. Straitsville Coal Mines, Office 115 Broadway, New York; Geo. F. Hall, Pres't. Central Vermont Marble Co., Post Office Cleveland, Ohio; Ingersoll Rock Drill Co., No. 5 Park Place, New York; Gilbert Fowler, Chief Engineer Pacific Mail Steamship Co., Pier 42 North River, N. Y.; S. F. Shortland & Bro., Steam Lighters, 106 Wall St., New York; Divine Burtis, Jr., Contractor, Brooklyn, N. Y.; Wm. A. Lighthall, Consulting Engineer, Office 4 Bowling Green, N. Y.; Erastus W. Smith, Consulting Engineer, Office 42 Dominick St., New York. Every Engine fully warranted. Made only by

**LIDGERWOOD MANUFACTURING CO.,**  
165 Pearl Street, New York.

SEND FOR CIRCULAR.

American Institute of Mining Engineers.  
OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The ENGINEERING AND MINING JOURNAL, which is the Organ of the Institute, and contains its proceedings, transactions and notices of meetings, will be sent to each Member and Associate on the payment of his annual dues. Back numbers cannot, as a rule, be sent.

II. Dues (ten dollars per annum) are payable on election and at the annual (May) meeting. Members and associates elected at the February meeting pay ten dollars only to May of the following year. Remittances should be made, as far as possible, by P. O. Order, payable to the Secretary.

III. The Council earnestly requests members to forward to the Secretary, for preservation, copies of all printed mining and geological reports, particularly pamphlets, which may fall in their way. It is believed that by this means a large amount of valuable fugitive information concerning different regions and properties in this country, may be caught and preserved.

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Analysis of Average New Bed Pure Ore.	Analysis of No. 1 Bessemer Pig.
Metallic iron..... 68.24	Undetermined matter and loss..... .134
Oxygen with the iron... 26.01	Silicon..... 1.019
Water..... .38	Carbon..... 3.821
Insoluble Siliceous matter..... 4.32	Phosphorus..... .048
Sulphur practically none.	Sulphur practically none.
Phosphorus..... .038	Calcium..... .140
Alumina..... .28	Metallic iron..... 94.838
Lime..... .14	
Undetermined matter and loss..... .592	100.000
100.000	

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Port Henry, Essex County, N. Y.

Furnace at Fletcherville, near Mineville, N. Y.

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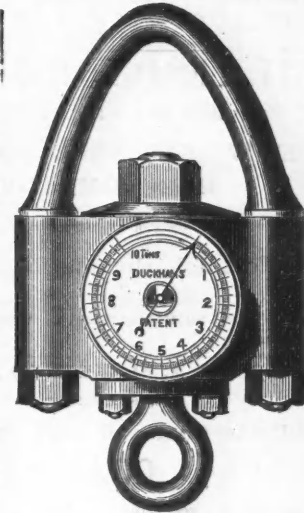
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SOME PURPOSES TO WHICH IT CAN BE APPLIED.  
(First.)—As a Weighing Machine generally.  
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TONS SCRANTON COAL,  
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50,000 TONS

OF  
COAL, FROM THE LACKAWANNA REGIONS,  
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The sale will be positive; each lot put up will be sold to the highest bidder; no bids, in any form whatever, being made for account of, or on behalf of, the Company. The conditions will be fully made known at the time of sale.

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

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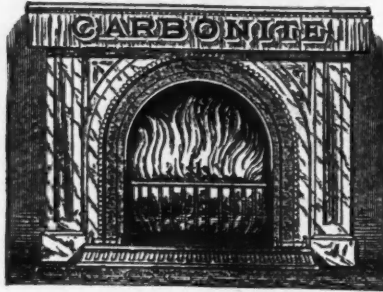
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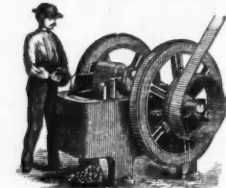
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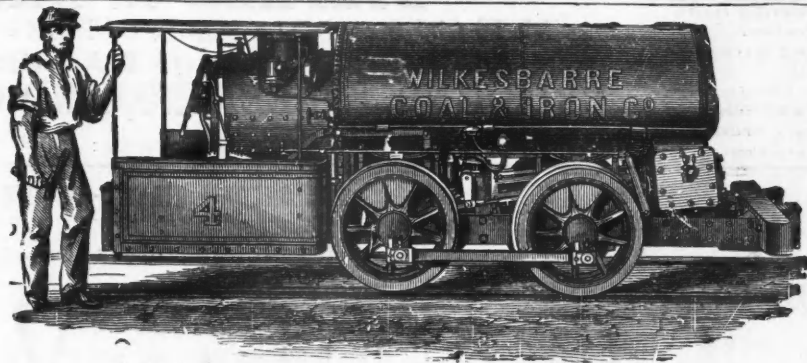
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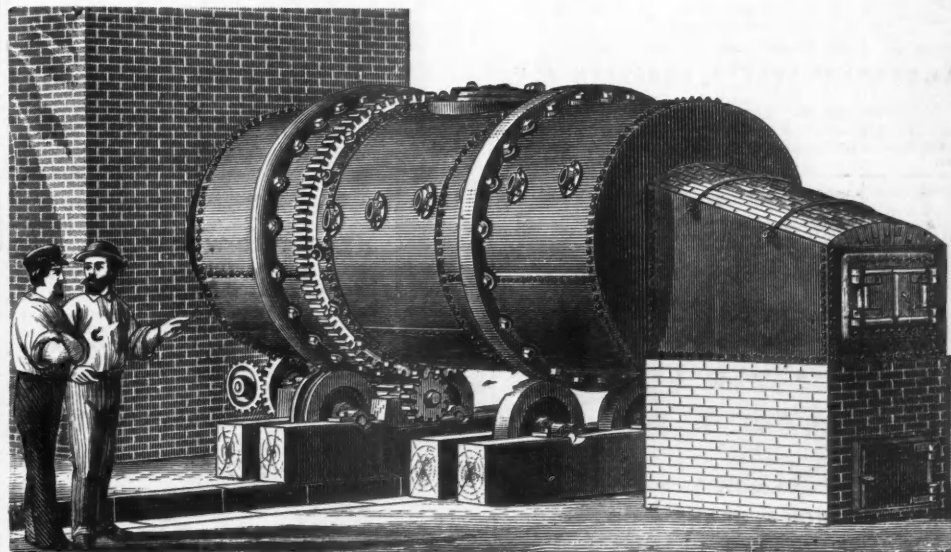
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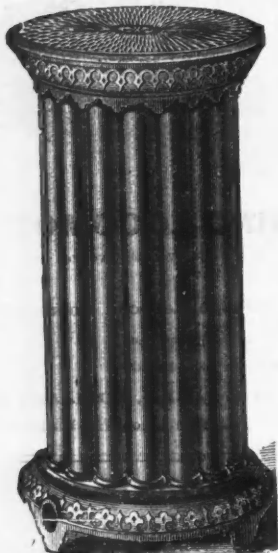
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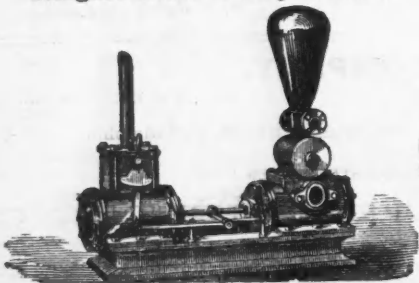
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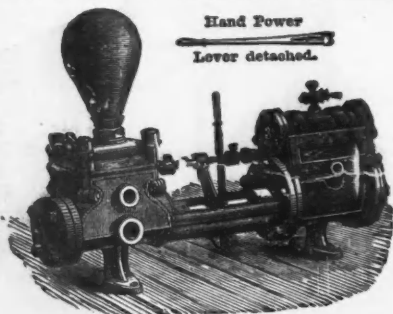
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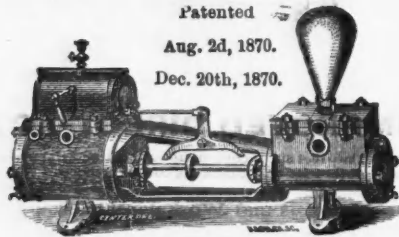
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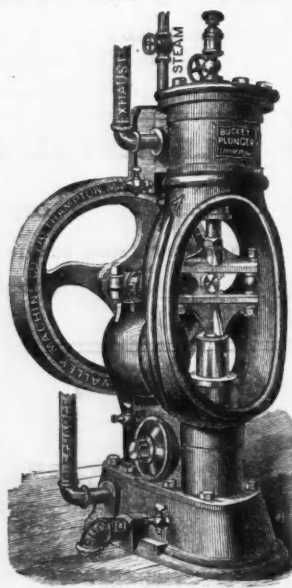
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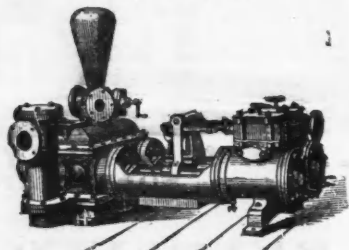
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**PUMP,**

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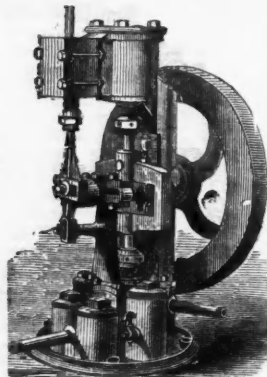
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Price only \$95.

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**The Pulsometer.**

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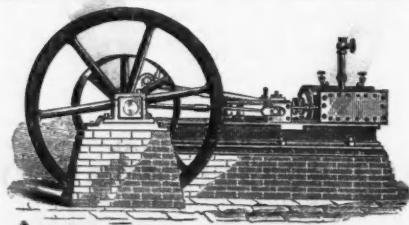
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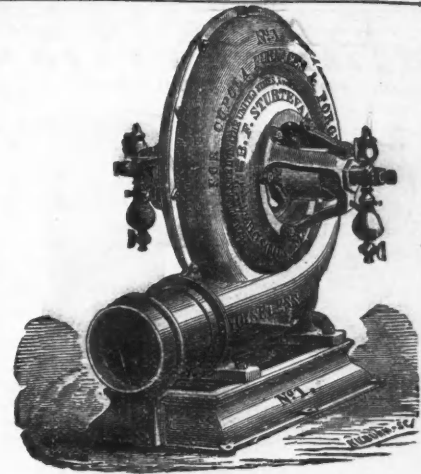
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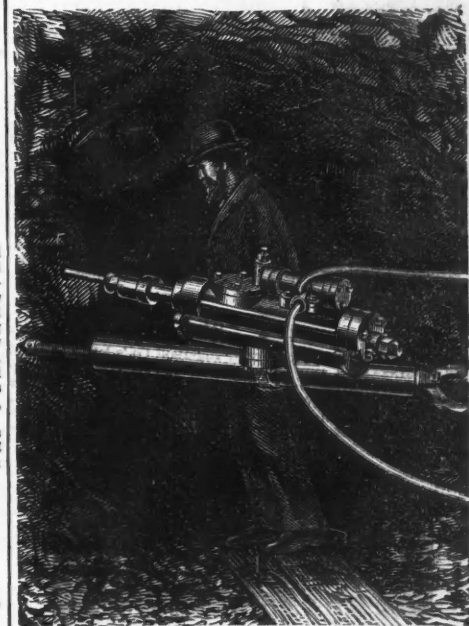


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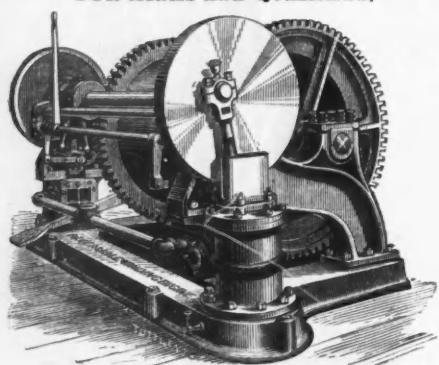
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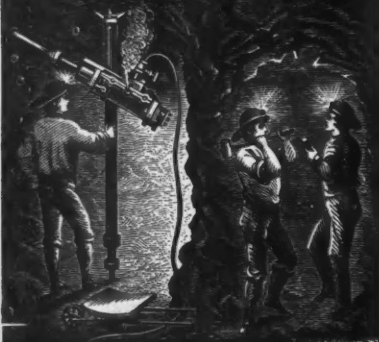
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