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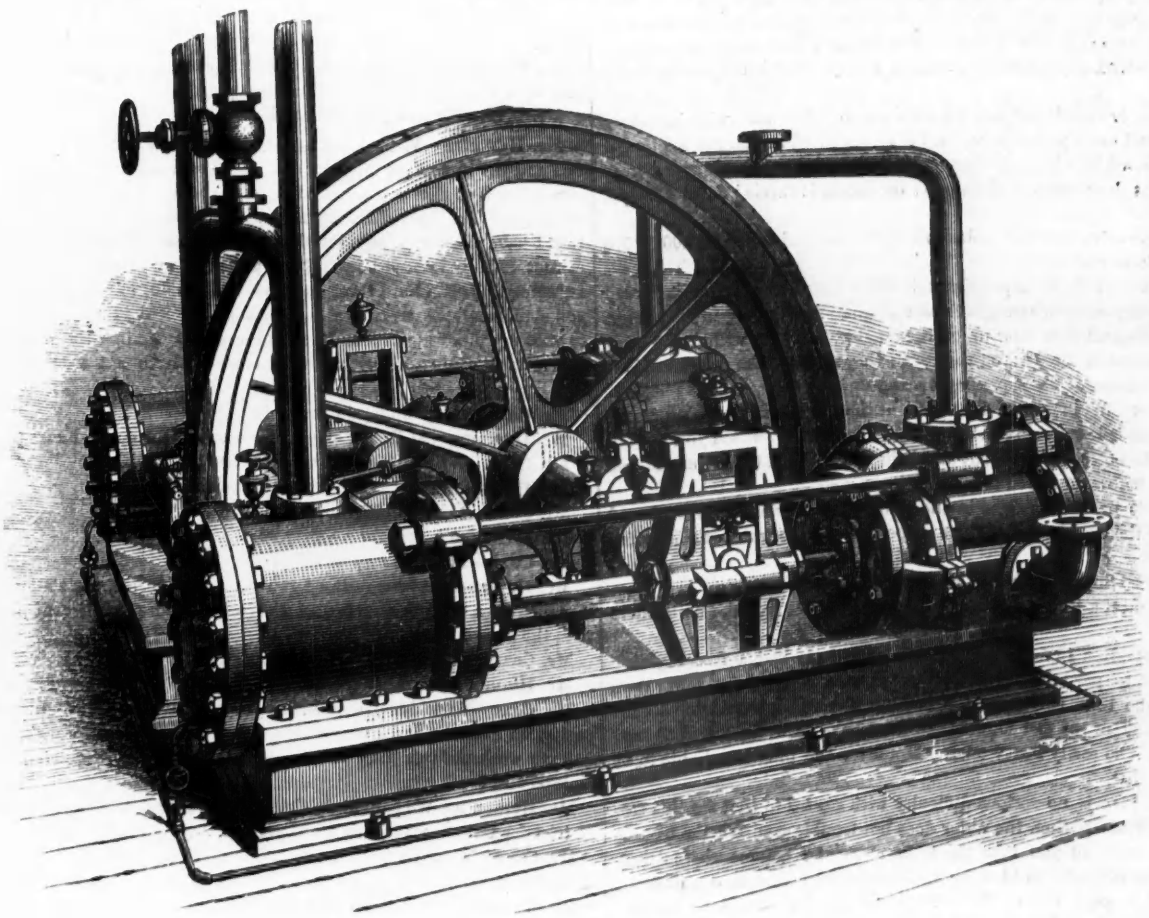
Clayton's Air Compressor.

THE use of machine drills for boring blast holes is now so common, that we are not surprised to see a new compressor enter the field. It is one that was made for Messrs. DILLON CLYDE & Co., the contractors for sinking the Harlem Railroad tracks in Fourth Avenue, New York, and its manufacturer is Mr. J. CLAYTON of Brooklyn. The machine comprises two horizontal steam cylinders of 18 in. diameter and 14 in. stroke, and two air cylinders of 16 in. diameter, the cranks running at right angles to each other. The designer has introduced his patent yoke motion and also his patent sliding journal box. The latter consists of a taper wedge lying along the side of a taper journal box, the latter being held in sition by a standing bolt, and the former by a flange on the top of the wedge. The yoke in which the journal box plays has a broad face and runs on a guide which steadies it perfectly, preventing all rocking motion. It is furnished with adjustable screws, so that the weight of the piston rods and yoke is carried squarely on the guide. The piston rods are made precisely alike, and of equal weights. They are so well supported on their guides, that there is no fear of their wearing down the lower side of the cylinders.



CLAYTON'S AIR COMPRESSOR.

In the heads of the compressor cylinder are valves, the construction of which we are not now able to give, but for which Mr. CLAYTON is seeking to obtain a patent. The object sought in their design has been to provide a valve which should be delicate enough to open with the least pressure, so as to ensure the complete filling of the compressor cylinder up to the last and slowest movement of the piston, and at the same time take up little room. The compressor piston is packed with hemp prepared with a particular composition which Mr. CLAYTON will supply. It is quite effective as a lubricant, for the compressor made for DILLON CLYDE & Co. has run two months without renewal of the packing.

As will be seen from the cut which accompanies this article, the yokes of the two piston rods carry the opposite ends of a crank on which is placed the fly-wheel, the force of which is communicated to each piston in turn as it nears the end of its stroke. Water enters the compressing cylinder at each stroke, and serves both to cool the air, secure lubrication in case the oil cups are allowed by any carelessness to get muddy, and finally to partially fill up the free space behind the piston, and thus cause the expulsion of all the air. It will be seen, therefore, that this, the latest of the compressors, adopts, like all the others, the principle of cooling the air. By this means the air is in a manner similar to the use of an inelastic fluid like water. Usually a cut off is not employed and the expansive force of the compressed air is only partially utilized, that partial utilization even being rather the result of the circumstances under which the air is used, than an object sought to be attained by special appliances. Though the machine takes little room, it has proved itself quite effective. It was made to run 6 Burleigh drills, is now working 7 drills, and the superintendent of the tunnel work is of opinion that he can work 10 with it. He also reports it to be economical of fuel. Its record is very creditable to the designer, especially when it is remembered that this is the first machine of the kind by its builder, and no alterations have been made in it.

Mr. JAMES CLAYTON, 14 and 16 Water street, Brooklyn, is the designer and manufacturer, and information in regard to the compressor may be obtained of Mr. EARL C. BACON, 36Courtlandt street, New York.

American Institute of Mining Engineers.

REPORT OF PROCEEDINGS OF THE PHILADELPHIA MEETING, WEDNESDAY, MAY 21.

(*Continued from page 3.*)

Mr. J. H. HARDEN then exhibited a new Drawing Board. He said: With the ordinary four legged tressel, most commonly used, one has not the means of adjusting the height of the board. To obviate this inconvenience and at the same time to enable one to incline the board, when needed, I devised this arrangement. Usually the height of the board is 3 feet 2 or 3 inches. Here, the central slot is adjustable, so that the board can be made three inches higher or lower, or even more if required. By this slot and the quadrants any necessary angle of inclination can be given to the board. The many cases for which such adjustments would be desirable it is hardly necessary for me to point out. Two tressels, of course, are needed to support the board.

WEDNESDAY AFTERNOON'S SESSION.

Mr. COXE exhibited and explained Leslie's Micrometer, an account of which will shortly be published.

Mr. COXE then read a Supplement to his paper on Shaft Sinking with the Diamond Drill.

The PRESIDENT—Was the hole fired with the galvanic battery?

Mr. COXE—A percussion cap is used in each cartridge and they are fired by the ordinary electro-magnetic machine.

The PRESIDENT—How with regard to the cross-cut?

Mr. COXE—They sank the slope first in the vein and then drove a gangway in the vein until it had passed both shafts; from this gangway the cross cuts were driven. It required a good deal of time, as is shown in the other part of the paper, to make the preparations at the surface, such as sinking through alluvium, walling up, timbering, etc., at the top of the shafts, and while doing all this they had plenty of time to sink in the vein and drive the gangways and cross cuts.

The PRESIDENT—With regard to the Cameron Pump, what is the reason that it was abandoned?

Mr. COXE—It was too small and was a piston pump. No man who has experience in mining will use a piston pump in the mines when he can get a plunger pump. It was replaced by a large double-acting Allison & Bannan plunger pump, which was placed at the bottom of the slope; the steam is carried down by pipes from the surface.

Mr. J. W. HARDEN—In case the holes are drilled around the shaft 200 or 300 feet, how do you do in case of water?

Mr. COXE—The bore rods are pipes through which a stream of water is forced down either by a pump or by bringing it from a height. The water passes through the center of the rods and then rises up on the outside, carrying with it the sand produced by the action of the drill on the rock; they seldom take out the rods—there is a constant stream of water passing up and down.

Mr. J. W. HARDEN—In sinking in dry strata, at the same time knowing heavy feeders of water to be below, boring in advance of the sinking, would you not tap those feeders into the bottom of the shaft and bring on yourself the inconvenience of sinking in water before you need to?

Mr. COXE—That is practically done in these shafts, as we stated. They bored a hole first down to the cross cut from the slope and let the water run into the slope.

Mr. J. W. HARDEN—Suppose you had no cross-cut.

M. COXE—If you meet a feeder of water, you would have to stop the holes there and put in a plug.

Mr. J. W. HARDEN—In a 12 feet shaft sunk by myself we had a feeder giving off 1400 gallons of water per minute; had we put down a hole 100 feet lower than was necessary for the time being for the sinking, the water would have been brought on to the sinkers 100 feet sooner than need have been; light feeders may be plugged back, not so easily heavy ones. Moreover the plugs are liable to be blown out by every shot.

The PRESIDENT—There is no serious difficulty with regard to that for this reason: As long as you are boring, the water does not trouble you, but the trouble does commence the moment you take the drills away and commence blasting. Now, first, there is no difficulty in blasting under water with dualin, dynamite or nitro-glycerine, and second, the trouble with water in ordinary shaft sinking, sinking them in the ordinary way with wet shafts, is that the men have to drill while the water rises on them. It is a job of great difficulty and time to bore holes in a proper condition and to put powder in to blast. The first of these falls away because you can put nitro-glycerine into the hole. There is only one condition that seems to me to be troublesome, and that is, if the upward current of water is such that you cannot put in sand or clay to keep it down.

Mr. SWEET—Might not a seed bag be used as in the oil regions?

Mr. COXE—It takes but a short time to put down such a hole. Practically, so far as these shafts are concerned, there is not water enough in them, and below 500 feet no water of any consequence is met with.

Mr. J. W. HARDEN—Take a three inch hole giving off 1400 gallons of water a minute how will you do your work but by pumping it out? And if you have to sink with two or three lifts of pumps in the bottom, will you have room enough for your drills? In a large shaft I should suppose so.

Mr. COXE—The pumps will not be in the way of the drilling apparatus because the latter can all be placed within 10 feet of the bottom of the shaft. As I said, in these shafts the question is not how to get rid of the water, but how to get water enough to keep them going. They have to bring it from the surface in order to obtain enough for drilling purposes. If you have a feeder of 1400 gallons it will be an expensive job whatever method you may employ, and this plan does not propose to meet this class of difficulties, but in ordinary cases of sinking it is a great success so far. They are down 500 feet and they expect to sink 100 feet this month.

Mr. HEINRICH then read a supplementary paper on Fighting Fire in the Midlothian Colliery.

Mr. COXE—This is a question in which we all take great interest. The method of working is similar to the one which the French call the *Méthode par remblais*, ("Gobbing up" method.) I have no doubt it is the true method of mining coal in large veins if it is not too expensive. Have you any idea what it costs you in Virginia to get a ton of coal by that method?

Mr. HEINRICH—I would be better able, probably, in a short time to give more accurate items in that respect. I have at present ground not entirely filled up, nor have I used all the ground from the bottom. There will be modifications at all works, and a man must avail himself of these modifications. As far as timber is concerned, we are compelled in such ground to timber every foot. I cannot, of course, under such circumstances, make an estimate of the amount of timber used.

Mr. COXE—I mean the filling up—the gobbing up. In cases where you actually bring ground from the outside to completely fill up the excavations, have you any idea how much the coal costs? This is the only case in this country where they actually take all the coal out and fill up the cavities left with ground brought from the surface.

Mr. HEINRICH—You must account for the modifications. I was compelled to timber every foot of my ground, and that required one-third of our labor. To give you some idea of the timber used last year at the most favorable time, I used about 10 bushels of coal waste to one foot of timber. Our timber is not worth much and for that reason it will be hard to make an estimate in general. I propose, when it can be obtained, to work in stuff cheap from the top, from the hill side near my pit, where there is a clay quarry.

Mr. COXE—By using the steam shovel?

Mr. HEINRICH—Yes. I propose to let my clay car come to the shaft and at one and the same time raise my coal and lower the clay. The question is one of arranging it so that you can feed in from above. I always drive my level about midways. The only difficulty now with us is in the case of the fire pits—not that I have there to contend with the fire, but to support the old ground, as we cannot do it by leaving large pillars, although we sometimes leave pillars "here" for safety. It is a hard thing to know what to do, to tell whether in some cases you shall send out the cars of coal or keep the coal in the pit. I was compelled to visit my pit every day, and I found my men sending the stuff out of the pit. I have principally nothing but black labor—I have not a dozen white men with me.

Mr. COXE—What wages do you pay?

Mr. HEINRICH—$1.75 per day to the best black labor, 8 hours per day.

Mr. COXE—What is the coal worth a ton?

Mr. HEINRICH—It is worth 12 or 13 cents a bushel.

Mr. COXE—About $3.75 a ton?

Mr. HEINRICH—Yes.

Mr. COXE—At the mouth of the pit?

Mr. HEINRICH—At the railroad station we get $3.75; the station is but a short distance from our works. It does not cost me more than ½ cent per bushel to get it to the station.

Mr. COXE—Are you losing or making money?

Mr. HEINRICH—Making money.

Mr. COXE—What does it cost you to get that coal out? In the Anthracite region we cannot put the coal on the cars with the miners working on a basis of $15 per week, for less than $1.30 or $1.50 per ton. How much more does your method cost?

Mr. HEINRICH—We cannot do that. You would not be able to raise coal in our district for less than $2.00 or $2.50 per ton.

Mr. COXE—What do you count there as the value of a ton of coal in the ground?

Mr. HEINRICH—One or 1½ cents a bushel.

Mr. COXE—How much more does it cost to get coal when you employ that method than when you do not?

Mr. HEINRICH—We have to pay from 50 to 75 cents less for labor, besides using the most inferior labor. I have seen men that could not put in timber and yet call themselves coal miners. Such are the men that we have to get along with in our country. Of course, I pay a white man more for the simple reason that he does more than the negro.

Mr. COXE—I have no doubt in my own mind that this is the method the French call the "*méthode par remblais.*" It is the true method if we wish to get the maximum amount of coal from a vein, but it cannot be used in all cases. If a man were to employ it in our region he could become bankrupt, because it would be so much more costly than the method now in use.

Mr. HEINRICH—If you have to bring all the stuff from the surface, I admit it.

Mr. COXE—We have in our regions mines with no timber of any consequence in them.

Mr. HEINRICH—We cannot work our pits at all without timber.

Mr. COXE—Another point is that in our region we would find it difficult to find places where we could get large quantities of clay cheaply.

MR. HEINRICH—We have a different system of mining.

MR. COXE—I am satisfied that your principle is the true one, if it were not for the question of the cost.

MR. HEINRICH—I do not think it will cost you so much. I think you make your calculations very large, by not making the proper allowances. I will try to figure what it does cost us, as I have kept close accounts which will show the amount of timber used. I know what it costs me for labor; it is a small matter to ascertain what it costs to dig out the ground, if all things are favorable.

MR. COXE—It costs us to get the coal out of the mine at least 80 to 100 cents for labor alone. Now it would cost us to get the dirt down perhaps half as much, because you see the coal is not so heavy as the dirt, and it takes more than one ton of dirt to fill up the same space as a ton of coal. I am satisfied that this is the true system of mining coal in large veins, if you can do it in such a way as not to make the cost of production too great.

MR. HEINRICH—It cannot probably be used everywhere to advantage.

MR. COXE—For that reason I would like to know about what it costs you, taking into consideration the wages you pay.

MR. HARDEN—What do you pay for white labor?

MR. HEINRICH—From $1.75 to $2.50 per day.

MR. HARDEN—Do you meet with any Anthracite miners down there?

MR. HEINRICH—Yes; some Welsh.

MR. HARDEN—Do they answer in your particular mining?

MR. HEINRICH—One of my bosses is a gentleman who worked in the State of Pennsylvania—MR. DICKERSON. I have white miners there, born both here and abroad. Gentlemen must remember that living, too, is much cheaper with us than here.

MR. HARDEN—How much do you mine?

MR. HEINRICH—From 5 to 600,000 bushels a year—29 bushels to a ton. The fact is that this mine is no criterion to base any value on. If you want to base a calculation of what it costs to fight fire, you cannot well get better information than this. In any new mine in the State of Virginia in our coal field, I venture to say, I can put coal on the top of the ground at 5 cents per bushel.

MR. COXE—Without counting anything for the interest or the investment?

MR. HEINRICH—Of course.

MR. SWEET—How did your pit come to be on fire?

MR. HEINRICH—In consequence of a bad system of working there was a constant combustion taking place.

MR. SWEET—It is bituminous coal?

MR. HEINRICH—Yes.

MR. COXE—Is there iron pyrites in it?

MR. HEINRICH—In the slate.

MR. COXE—I suppose the firing of the coal is due to that.

MR. HEINRICH—No sir; in all these coals decomposition takes place. It is a perfect distillery there.

MR. SWEET—There is not fire enough to be red?

MR. HEINRICH—We sometimes have walls for 10 or 15 feet just like looking into a furnace, and sometimes it rains fire. I sometimes have gone in after a Sunday, and the fine coal rained down like snow, all on fire. We then used all precautions and had no accidents at all.

MR. COXE—Your black labor will stand the fire better than the white labor.

MR. HEINRICH—The heat, but not the gas. If I had to fight gas I would use white men; they stand it longer. We have sulphuretted hydrogen there frequently, and we have smells of all sorts. I live on the pit-hill and I have often waked up at night and had to shut my windows.

MR. COXE—What is white damp? The only gas I know of that answers to the description of it given by miners, is carbonic oxide. It is very rare.

MR. HEINRICH—I suppose so, but I do not know. I know only that there are places where you cannot smell it, where the atmosphere looks perfectly clear, where I have stayed for five minutes, and although it did not affect me, my men could not stand it.

MR. COXE—I know it is a fact that what is called white damp will knock a man over and still his light will burn. There was a man killed in Stockton last year by what was supposed to be white damp. The man was found dying where a light would burn, and he was evidently asphyxiated. I have given attention to the subject, looked it up in the books without, however, finding anything definite in regard to it, and have come to the conclusion that white damp could be nothing but carbonic oxide. It is very treacherous. It may be possible the light will burn when an amount of carbonic oxide is present, which will be sufficient to asphyxiate a man.

The scrutineers, Messrs. HARDEN and DRINKER, appointed at the morning session to collect and examine the ballots for officers, reported the following persons elected:

President,	R. W. RAYMOND.
Vice-Presidents,	E. B. COXE, J. F. BLANDY, T. EGLESTON, W. P. BLAKE, R. P. ROTHWELL, E. C. PECHIN.
Managers,	G. W. MAYNARD, F. PRIME, JR., A. S. HEWITT, J. P. LESLEY, W. R. SYMONS, MARTIN CORYELL, T. STERRY HUNT, W. H. PEITER, F. FIRMSTONE.
Secretary,	THOMAS M. DROWN.
Treasurer,	THEODORE D. RAND.

Economical Results of Smelting in Utah.

BY ELLSWORTH DAGGETT.
Manager of the Winnamuck Smelting Works, Bingham Cañon, Utah.

CONTINUED FROM PAGE 2.

OPERATION.

IN starting the furnace, (which has been thoroughly dried by a slow fire, and strongly heated for several hours with coal,) the outer lead-well, *a*, is first filled with coal, ignited on top, and a blast from one of the tuyere-pipes is forced downward through the coal, driving the flame and heat through the connection, *c*, into the bottom of the furnace. This rapidly burns away the wooden plug inserted in building or repairing, and heats to redness the sides of the channel. This having been effected, the furnace is filled to the height of 5 or 6 feet with coal, and when this is thoroughly ignited, from 20 to 30 bars (2,400 to 3,600 lb.) of bullion are introduced through the charging door. This metal, melting and descending through the ignited coal, is received on the hot bottom of the furnace, and, filling the channel, rises in the outer well, where it is carefully covered with coal-dust. A light blast is now started, and regular charges of 6 bushels of coal, and at first small, but constantly increasing quantities of ore and flux, are introduced, until the furnace is full, when the blast is increased.† The full charge is usually not attained for at least twenty-four hours. Slag, from the starting, is generally saved for re-working, as the greater proportion of fluxes used in the beginning of a run renders the slag more basic than usual.

The average length of run during the year was 16 days; the largest, made with fire-brick or stone, 26 days.

In charging the furnace, the coal (6 bushels) is first measured in and spread upon the preceding charge; then the proper amount of ore, which has been equalized by spreading in heaps of 100 to 300 tons, is weighed; the corresponding amounts of the various fluxes are added by weight, and the whole mixture thus formed is spread over the coal. The charge of fuel is maintained at 6 bushels, and the weight of the smelting mixture is varied as may be rendered necessary by the variation in slope of the furnace, or by change in the ore.

The products are silver-lead, slag, and a small quantity of iron matte, containing little sulphur, with, occasionally, metallic iron in small amount. As the limited quantity of matte produced contained only 14 ounces in silver per ton, nothing has been done with it.‡

COST.

The cost of smelting Winnamuck ore for the year 1872 was high, mainly on account of the large amount of flux used, and the poor quality and high price of fuel. Below is given the cost of coal, fluxes, labor, etc. As a part of the cost of coal, is included all waste occurring after the coal was delivered at the works; but not the "shortage," or other losses on coal, occurring in transit to the works.

COST OF HANDLING 3954.91 TONS.

		Total.	Per ton of ore.
Charcoal		$96,718 76	$24 45
Iron ore	$34,792 00	42,502 10	8 80
Limestone	7,710 10		1 94
Labor		24,269 91	6 13
Other smelting expenses, wood, brick, etc.		10,911 26	2 75
Total smelting cost		174,402 03	44 09
Mining cost		23,430 17	5 92
General expenses		15,133 85	3 82
Sampling, assaying and bullion charges		4,582 11	1 16
Total cost		$217,548 16	$55 00

To find what portion of the smelting cost is due to the flux used, or, in other words, the difference between actual cost and the cost (at the Winnamuck works) of smelting an ore or a mixture of ores that would flux itself, we must deduct from the total cost the cost of the fluxes, thus:

Total cost of smelting	$174,402 03
Less cost of fluxes	42,502 10
Cost of smelting total material: ore, iron and limestone	$131,899 93
Cost per ton of material (without slag)	19 14

That is, an ore having the composition of our total material would have been handled for $19 14 per ton—probably a little less, as no deduction is made for cost in handling the flux after it arrives at the works, which is somewhat greater than for the same amount of ore.

The other costs given above on the ore handled were: mining, which includes all prospecting, dead work, etc.; general expenses, or such as belong equally to both mining and smelting (superintendence, office expenses, salaries, etc.), and freight on the bullion to the R. R., sampling, assaying, etc.

While the above figures represent the actual outlay in money required to produce the given result, yet they do not satisfactorily show the true cost. The losses in lead and silver should be represented, since they form as truly a detail in the calculation as does the fuel in smelting—and one greater in value than the mining of the ore. Moreover, as the metal lost is value consumed in the process, there is no reason why this value should not be classed as so many dollars and cents per ton, as on the charcoal, the ore and the mining cost. Although it is the custom, in speaking of the cost of working ore, to name only the actual

* A paper read before the American Institute of Mining Engineers, Philadelphia, May 21 constituting, also, a chapter in the Report of the U. S. Commissioner of Mining Statistics, rendered Feb., 1873, and not yet published.

† According to my note-book, the usual pressure of blast at these works (supplied by ROOT blowers) is 1½ inches of mercury. R. W. R.

‡ Some of the matte produced lately (in February and March, 1873) has contained upwards of 40 ounces (in one instance, 90 ounces) silver per ton, and is of course saved for subsequent treatment by roasting and re-working with the ore.

outlay, yet, to one who knows that in such working there is involved a notable and variable sacrifice of the original value of the ore, and that, as in lead and silver smelting in Utah, there is a still larger sacrifice of value in freights, separating and refining the silver and lead, the bare statement of so-called cost is far from satisfactory.

It seems necessary, especially in making comparisons of the relative values of different methods of treatment, to have some concise, definite expression which will show at a glance which of two or more methods is best; in other words, which will net to the ore-owner the most money. Such an expression can be found only by including the total value in the ore at the outset, and accepting as cost the difference between this total value and the net return.

If we suppose the average value of the lead to have been during the year 7 cents currency per pound, and that of the silver $1.2929 coin per oz., equivalent, with gold at 113, (the average of the last nine months of 1872,) to $1.46, currency, we have—

Value of 3.82 units loss of lead	$5 36
Value of 3 oz. loss of silver	4 38
Total loss per ton of ore in smelting	$9 74

There is also a loss in the treatment of the bullion, a portion of which is eventually recovered by the separating and refining works. As the details of costs and losses in the treatment of bullion are known to the separators and refiners only, it will be sufficient here to regard the aggregate of costs and losses, which may be found thus:

Weight in tons of the bullion produced	1232.741	
Weight in tons of 191,661.4 oz. silver contained	6.572	
Total amount of lead	1226.169	
1226.169 tons lead, at $1.40 per ton	$171,664 66	
191,661.4 oz. silver, at $1.46 currency	279,825 64	
Gross value of bullion at railroad	$451,490 30	
Net value of bullion at railroad	353,551 26	
Difference, being freight, costs, losses and profits of separating works	$97,939 04	
Bullion expenses per ton of bullion	79 44	
Bullion expenses per ton of ore	25 00	

General condensed statement of expenses per ton of ore.

Mining expenses	$ 5 92	
General Expenses	3 82	$ 9 74
Costs of smelting to base bullion	44 09	
Losses in smelting to base bullion	9 74	53 83
Bullion expenses: freight and separation	25 00	
Sampling and averaging	1 16	26 16
Total cost per ton		$89 73

It may be interesting here to compare with these figures the total costs and losses involved in other methods of disposing of ores, as, for instance, by selling them in Utah, or shipping them to England. In this comparison, it must be remembered that by "costs and losses" is meant the difference between the money received, and the gross value of the ore, calculated on its assay, assuming lead at 7 cents currency per pound, and silver at $1.46 currency per ounce; also, that all expenses on the ore previous to actual shipment or smelting, such as mining, transportation, and (in the case of shipment) sacking, handling, sampling and assaying—the last four items amounting to about $7.75 per ton—are omitted. The remaining expense therefore consists of the costs and losses in smelting and on the bullion produced, amounting with the Winnamuck ore, as above shown, to $80 per ton.

Three lots of Emma ore were shipped to England in 1871, amounting to 1225 tons and assaying

41 1-3 per cent. lead, worth per ton	$ 57 83
112,09 ounces silver, worth per ton	163 81
Gross assay value (currency) per ton at railroad	$221 64
Net value, or amount received (currency) per ton	109 55
Costs and losses per ton	$112 09

Twenty-seven lots of Emma ore were sold at open sale, in Salt Lake City, August 10 to October 17, 1872—about 2800 tons,* assaying

Lead 45 14 per cent., worth per ton	$ 63 19
Silver 69.73 oz., worth per ton	101 80
Gross assay value per ton at railroad	$164 99
Net value on amount received	71 10
Costs and losses	$ 93 89

Some items affecting these figures are omitted here, such as sampling, handling, etc.—necessary in shipping, but not in smelting ore at or near the mine. Moreover, the small amount of gold in the Winnamuck ore has not been charged to the ore. It would increase the Winnamuck costs about $2.50 per ton of ore.

A comparison of costs and losses in milling ores containing little lead, in Southern Nevada, and melting ores in Utah, though not strictly conclusive, (the conditions being different,) indicates that the advantage usually ascribed to milling is over-estimated.

In a report on the Meadow Valley mine, of Pioche City, made during the latter part of 1871, by AUG. J. BOWIE, JR., M. E., it appears (page 20) that the average value of the production for 1870-71 was $105 34 per ton, being 73.4 per cent. of the total value (silver).

Total silver value per ton, therefore, (coin)	$143 51
Value of production	105 34
Loss in silver	$ 38 17

The same report (same page) gives the

Total cost of mining, milling, taxes, etc., as	44 11
Costs and losses in silver (coin)	$ 82 28

Reducing this to currency at 113, we have the total costs and losses in silver, $92.97. To this must be added $1.40 for each unit of lead shown by assay to be in the ore. Assuming the average lead contents of the Meadow Valley ores to have been at that time 10 per cent., we would have

Total costs and losses	$106 97

If now, in order to institute a comparison, we take from the above sum the increase of cost due to the position of the Meadow Valley mine, involving higher cost of labor and supplies, which we may assume as not exceeding $15 in currency, we have costs and losses in mining and milling Meadow Valley ores in Utah about $92.

The costs and losses in mining and smelting the same ore with lead ores in Utah should not exceed this; and with the late improvements, such as the use of coke, etc., should be materially less. In general, the question as to the most economical treatment of an ore will be determined only by a careful consideration of *all* the conditions, such as the nature of the gangue, the lead contents, and the respective losses of the different processes, with the cost of the same—the latter consideration being only one of many—and it may happen that a wasteful process is the best, or that a costly process is the cheapest, that being really the proper treatment which, however wasteful, costly, or even unscientific, enables the owner to make the most money out of his ore.

*This ore, owing to its amount, and the regularity of the supply, was sold to the best advantage, and commanded a price rather higher than other ore sold in open market at the same time.

The Franklin Iron Company's New Furnace.

The works of the Franklin Iron Company are situated at Franklin, in Sussex County, about fifty-three miles from New York by the Midland Railroad, and eighty miles by Morris and Essex and Sussex roads; also thirty miles by Midland Railroad to Middletown, N. Y., on the Erie Railroad. These different roads give them access to all the coal fields, iron ore beds and markets.

They have at present one old charcoal furnace, built about 1800, about 32 feet high, and 8½ feet boshes. This is now being used to burn lime for building purposes.

The new furnace, now approaching completion, is 67 feet high, 23 feet boshes, 10 feet diameter at bottom of hearth, 11 feet 9 inches at tuyeres, 4 feet up—9 feet 8 inches, about 15 inches below the top; top closed with bell and hopper. The lining is of various thicknesses, from 24 to 48 inches, of fire brick, being thinnest at the top, where it is backed up with red brick. The shell is 33 feet diameter; iron ¼ inch and ⅜ inch thick, supported by mantel which rests on eight large columns, which stand on a base ring. Inside the shell and one inch off it is a 12 inch wall of soft red brick. Between this and the lining is a filling of loam, having sufficient clay to keep it from running like sand when dry, and not enough to allow it to cake like brick. Two beam engines, cylinders, 54 inch and 84 inch, 6 feet stroke, built by L. P. MORRIS & Co., Philadelphia; room and foundation is provided for a third engine, since it is proposed to have three engines to blow two furnaces. The second will probably be built if the first works satisfactorily. All the buildings are of brick or stone. A Worthington pump supplies water to a reservoir 80 feet above the earth, from which the tuyere coils &c., draw.

There are six boilers (40 inches by 70 feet) in two separate nests, with 36 inch heaters about 55 feet long under the boilers; iron, C. H. No. 1, 5-16 inch thick. The boilers, as well as ovens, are on the ground, and conductors 60 inches diameter, lined all around with 4½ inch fire brick, convey the gas to them—one conductor on each side of the furnace. There are four ovens, each with forty syphon pipes. The arrangement is that of the Kent Oven. The company own large tracts of land in the immediate neighborhood, from which their ore supply (hematite and magnetic) is drawn; and both white and blue limestone are also near the furnace. In fact, the engine house and furnace foundations rest on white limestone.

The President of the company is Mr. MOSES TAYLOR, of New York, and the Superintendent, who resides at the works, JOSEPH C. PLATT, Jr. The Directors include some of the most prominent and successful men in New York City, and in New Jersey.—*Sussex Register.*

THE Stove Makers have decided to adhere to the scale of prices made in last February, at Pittsburgh. Those prices, as we then published them, were: Minimum for common stoves, per pound, 7¼ cents; Medium class, per pound, 8½ cents; First-class, per pound, 9½ cents; Odd plates, per pound, 9 cents.

The term of credit is not to exceed four months, with five per cent. discount for cash or thirty days.

THE COAL TRADE.

NEW YORK, July 3, 1873.

The fourth of July having, as usual, interfered with the regular business of the week, there is nothing of special interest to be reported in the coal trade.

Anthracite.

Business is rather dull, and only the first days of the week were made a little more lively by the shipment of coal due on last month's contracts. At July rates only light sales are reported so far.

Bituminous coal is in good demand and prices are fully sustained.

Anthracite Coal Trade for 1873 and 1873.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending June 28, 1873, compared with the week ending June 29, 1872.

COMPANIES.	1874. WEEK.	1874. TOTAL.	1873. WEEK.	1873. TOTAL.
Phila & Reading R. R†..	117,876	2,272,395	123,627	2,499,381
Schuylkill Canal	28,400	949,474	25 732	274 764
Lehigh Valley R. R. ...	72,229	1,725 :85	76,996	1,747 .22
Lehigh & Sus. R. R.....	43,407	895,968	49 052	957,578
" " Canal	26,920	270,469	11,326	243,727
Scranton North.....	15,301	325,557	21,715	373,627
" South	42,527	1,066,933	45,415	1,138,866
Penn. Coal Co., rail.....	21,765	567 :21	31,710	561,810
" " " canal....	486	2,034	369	3 088
Del. & Hud C. Co. Canal	53,375	491 145	50,516	514,255
" " East...	11,3 7	326,180	9,560	195,475
" " West..	7,578	175,241	11,121	226 725
" " South	9,575	178,604	1.039	125,433
Shamokin.....	18,769	25 ,527	14 304	275,521
Trevorton.....	..	....	....	....
Lykens Valley Coal Co..	..	....	....	....
Wyoming North.....	11,574	319,915	16,793	360,978
Wyoming South.....	....	....	....	....
P. N. Y. C. & R. R. Co..	....	....	....	....
Williamstown Col'y.....	....	.....	....	....
Big Lick Col	....	.....	....	....
Total..	481,642	9,132,845	489,972	9,493,748
1872.....			481,642	9,132,845
Increase			8,330	360,933
Decrease.....				

These figures are for the week and fiscal period commencing Nov. 20

† Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1873 and 1873.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending June 28, 1873, compared with week ending June 29, 1872.

COMPANIES.	1872. Week.	1872. Year.	1873 Week.	1873 Year.
C. & O. Canal.....	19,102	270,148	22,169	263,948
B. & O. R. R.....	24,980	600,755	30 175	677,57 /
Penn. S. Line.....	....	.....	1,331	47,467
H. & B. T. R. R.....	6,026	144.264	8 8 7	220,638
*Harrisburg & D.....	6,9=9	256,250	6 509	179,213
*L. V. R. R....	488	15,648	1,015	15,918
P. & N.Y.C. & R. Co.....	7,352	194,130	5,963	163,045
{Cumberl'd Branch Canal	6,729	88,472	5,122	42,918
" Railroad....	829	8,795	563	55,388
Total.....	72,495	1,576,457	82,615	1,661,111
	....		72,495	1,576,457
Decrease.....	....			
Increase			10,120	84,654

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending June 28, 1873.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received:		
From Lehigh Valley R. R.....	12,741 16	230,999 02
" Lack. & B. R. R.....	93 18	16,285 18
" Pleasant Valley R. R.....	3,707 05	33,902 07
" Sul. & Erie R. R.....	250 07	19,849 02
Total	16,792 16	360,976 09
Same time last year	11,574 05	319,915 00
Increase	5,218 11	41,061 09
Decrease		
Distributed:		
To Lehigh Valley R. R.....	609 11	21,078 07
To Lack. & B. R. R.....	25 16	659 14
To S. Central R. R.....	2,645 01	84,663 00
To Ithaca & A. R. R.....	5,041 0	58 3 1 12
To Erie R. W. Pockets for shipm't.	7,036 19	128,7.0 06
To Erie Railway, Watkins direct..	747 08	747 08
To Individuals on line of road....	127 15	17,505 04
To points at & above Coxton for use of Co.....	377 15	15,189 06
To points between Waverley and Elmira.....	181 11	33,611 12
Total.....	10,792 16	360,976 09
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda.....	5,917 04	161,880 17
Shipped south from Towanda.....	46 06	1,118 14
Northern Central R. R.....	....	45 14
Total.....	5,963 10	163,045 05
Same time last year.....	7,352 04	192,129 13
Increase	.....	.....
Decrease.....	1,388 14	29,084 08
Distributed:		
To Erie Railway.....	5,886 15	143,768 07
To So. Central R. R.....	30 09	18,9.3 05
To Ithaca Valley R. R.....	....	149 08
Lehigh Valley, R. R.....	24 06	580 16
To individuals on line of Railroad.	22 00	505 05
To points on line of road for use of Company.....	....	118 04
Total.....	5,963 10	163,045 05
Grand totals transported		
Anthracite.....	16,792 16	360,976 09
Bituminous.....	5,963 10	163,045 05
Total.....	22,756 06	524,021 14
Same time last year	18,926 09	512,044 13
Increase.....	3,829 17	11,977 01
Decrease	.....	

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, June 28, 1873.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair. - - - - - - - - - -	31,476 00
" Port Carbon. - - - - - - - - - -	4 432 04
" Pottsville. - - - - - - - - - -	2,584 15
" Schuylkill Haven. - - - - - - - - - -	33,731 06
" Pine Grove. - - - - - - - - - -	6,428 04
" Tamaqua. - - - - - - - - - -	14,605 10
" Harrisburg. - - - - - - - - - -	
" Dauphin. - - - - - - - - - -	6,766 18
Total - - - - - - - - - -	100,073 07
FOR SHIPMENT BY CANAL.	
Passing Frackville Scales - - - - - - -	9,431 18
" Mill Creek " - - - - - - -	2,089 19
" Schuylkill Valley Scales - - - - - - -	741 04
" Mt. Carbon " - - - - - - -	1,240 06
" Cressona " - - - - - - -	10,472 18
" Pine Grove " - - - - - - -	615 05
" Tamaqua " - - - - - - -	2,156 09
Total - - - - - - - - - -	26,449 16
SHIPPED WESTWARD VIA CATAWISSA AND WILLIAMSPORT BRANCH AND NORTHERN CENTRAL RAILROAD.	
Via Catawissa & Williamsport Br. - - - - - - -	134 04
" N. C. R. R. passing Locust Gap. - - - - - - -	2,628 13
" " " Shamokin. - - - - - - -	3,893 09
" " " Herndon. - - - - - - -	...
Total - - - - - - - - - -	6,656 06
SHIPPED WEST OR SOUTH FROM PINE GROVE.	
Via Schuylkill & Susquehanna R. R. - - - - - - -	1,584 18
" Lebanon & Pine Grove Branch - - - - - - -	1,026 17
Total - - - - - - - - - -	2,611 05
CONSUMED ON LATERALS.	
From Frackville Scales. - - - - - - - - - -	531 18
" Mill Creek " - - - - - - - - - -	2 9 07
" Schuylkill Valley Scales. - - - - - - - - - -	1,019 19
" Mt. Carbon " - - - - - - - - - -	668 15
" Cressona " - - - - - - - - - -	221 12
" Pine Grove " - - - - - - - - - -	59 16
" Tamaqua " - - - - - - - - - -	337 16
Total - - - - - - - - - -	3,068 10
LEHIGH AND WYOMING COAL.	
Received via Silverbrook Junction, Sent East - - - - - - -	9,737 17
Cat. & Wpt. Br. Sent West - - - - - - -	....
" " Rupert, Cat. & Wpt Br. - - - - - - -	....
" " Allentown, E. Penn'a br. - - - - - - -	21 02
" " Alburtis, " - - - - - - -	16 10
" " Oreland, G. & N. Br. - - - - - - -	207 12
" " Willow Street R. R. - - - - - - -	5 5 00
Total - - - - - - - - - -	11,218 01
BITUMINOUS.	
From Harrisburg. - - - - - - - - - -	6,489 04
" Connecting R. R., G. & N. Br. - - - - - - -	
" Junction R. R. - - - - - - - - - -	20 00
Total - - - - - - - - - -	6,509 04
COAL FOR COMPANY'S USE.	
Anthracite - - - - - - - - - -	6,576 05
Bituminous - - - - - - - - - -	213 05
Total. - - - - - - - - - -	6,789 10

RECAPITULATION.

	Total for Week.	Corresp'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val. Branch - - -	100,073 07	103,576 19	d 3,503 12
For Shipment by Canal - -	26,449 16	30,347 09	d 3,897 13
Shipped Westward via Northern Central R. R. - - -	6,656 06	7,044 17	d 388 11
Shipped West or South from Pine Grove - - - -	2,611 05	2,319 08	i 291 17
Consumed on Laterals - -	3,068 10	3,067 07	i 1 03
Lehigh and Wyoming Coal -	11,218 01	1 866 11	i 9,351 10
Total Anthracite paying freig't	150,077 15	148,222 11	i 1,854 14
Bituminous - - - -	6,509 04	6,989 08	d 480 04
Total of all kinds paying freig't	156,583 09	155,211 19	d 1,374 10
Coal for Company's use - -	6,789 10	6 811 15	i 22 05
Total Tonnage for Week - -	163,375 19	162,023 14	d 1,352 05
Previously this year - -	3063,96 14	2972[illegible]4 11	i 90,841 03
Total to date - - - -	3226371 13	3134478 05	i 92,193 08
SHIPPED BY CANAL.			
From Schuylkill Haven -	23,272 00	29 900 00	d 6,628 00
" Port Clinton - -	2,460 00	2,454 00	i 6 00
Total Tonnage per Week -	25,732 00	32 3 4 00	d 6,672 00
Previously this year -	249,032 10	3 4,199 09	J 74,166 19
Total to date - -	274,764 10	356,553 09	d 81,788 19

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, June 28, 1873.

	WEEK.	SEASON.
By Delaware and Hudson Canal.....	50,5:6	514,255
By Railroad, East.....	9,860	195,475
" West.....	11 523	226,725
" South	1,039	125,433
Total 1873	72,933	1,061,888
Corresponding time in 1872:		
By Delaware and Hudson Canal.....	53,375	491,145
By Railroad, East.....	11,337	326,180
" West.....	7,578	175 241
" South.....	9,575	276,604
Total.....	81,865	1,171,170
Decrease.....	109,282	

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, June 21, 1873.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North.....	21,734 16	373,627 06
Shipped South.....	45,415 05	1,133 865 15
Total.....	67,150 01	1,507,493 01
For the Corresponding time last Year:		
hipped North.....	15,301 09	326 557 02
ipped South.....	42,527 00	1,066,932 16
Total.....	57,828 09	1,393,489 18
Increase.....	9,321 12	114,003 03
Decrease.....	.....	

Report of Coal Transported over the Lehigh Canal

For the week ending June 27, 1873.

REGIONS SHIPPED FROM	TIDE. tons. ct.	LOCAL. tons. ct.	TL WEEK tons cwt	TL. DATE tons, cwt.
Mauch Chunk Region.	1,240 18	1,491 12	2,732 02	14,564 14
Mauch Chunk Region Hazardville . .	675 17	956 07	1,631 19	2,711 14
Beaver Meadow Region	485 19	1,696 01	2,182 00	28,946 07
Mahanoy Region . . .	282 15	724 11	1,007 06	5 813 01
Hazleton Region . .	644 16	1,837 04	2,5 2 02	72,192 19
Upper Lehigh Region .		189 16	189 16	10,079 12
Wyoming Region . .	753 10	322 19	1 081 09	29,418 16
Wyoming Region, Hazardville				
Total, . . .	4,1:8 04	7,218 04	11,326 08	243,726 13
Previously reported . .	86,668 13	143731 12	23 ,400 05	
Total to date . . .	9 ,776 17	165949 16	243,726 13	
Corresponding week last year	104591 02	166874 11	70,468 13	
Increase.	13,817 06	12 924 15	23,743 00	
Decrease				

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR. 1873.	YEAR. 1872.
Consumed on line of Lehigh Canal . . .	746 17	2,286 16	23,961 04	29,033 14
Passed into Morris Canal to Tidal Points . .		261 06	848 13	1,960 16
Passed into Morris Canal to Local Points . .	481 14	629 18	9,4 3 04	7,143 08
Passed into Del. & Rar. Canal to Tidal Points.	4,709 04	11,459 12	89 923 04	102,733 08
Passed into Del & Rar. Canal to Local Points .	285 15	474 01	4,732 18	6,726 07
Consumed on line Delaware Div. Canal . . .	472 03	1,567 04	11,721 13	17,006 00
Passed through to Bristol	5,263 05	10,248 01	105,719 17	105,891 02
	11,346 08	26 919 18	243,726 13	270,468 13

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending June 28—Compared with same time last year

REGION SHIPPED FROM.	TIDE. tons ct.	LOCAL. tons ct.	CANAL. tons ct.	TL WEEK tons cwt.	TL. DATE tons.cwt.
Wyoming	26240 07	8680 01	697 03	35617 11	896547 08
Upper Lehigh . .	84 12	3977 04	2 3 15	3448 03	891 0 10
Beaver Meadow	6152 14	1699 07	931 12	8784 13	11566 0 04
Hazleton.....		141 04	2453 12	2594 16	77904 11
Mauch Chunk .	5730 16	4494 12	2180 08	13405 16	247247 09
Total.....	37210 16	18962 13	6345 10	63818 19	1,42549) 02
Prev'ly reported	648151 18	5.0749 06	212760 19	136671 03	
Total to date .	687362 14	518911 19	218315 09	142549) 02	
Same time .1872	580481 11	494215 19	169704 15	1143492 05	
Increase	106881 03	24696 00	5.610 14	282987 17	
Decrease					

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR 1873	YEAR 1872.
Forwarded East by Rail to Tidal points .	30210 16	30805 18	687362 14	580481 11
Forwarded East by Rail to Local points .	7731 09	11057 01	2 0026 14	186567 04
Forwarded East by Rail use Central Division	1884 09	1681 18	44691 07	38559 00
Forwarded East by Rail use L. & S.	231 11	211 16	6 81 17	4338 08
Delivered at and above Mauch Chunk . .	2065 08	1392 08	39215 13	26997 02
Delivered at Coalport & Hazard for Canal .	7779 02	19867 06	249903 18	193473 11
Delivered to L. V. R. R. at Packerton . .	104 01	228 08	14875 04	7854 02
Delivered to L. V. R. Rd at Sugar Notch . .	431 03		81390 11	
Delivered to L. & B. R. R.at Plymouth Bridge	4380 19	5701 04	112327 06	105101 07
Total . . .	62781 12	70855 18	1425490 02	1143402 05

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending June 28, 1873, with Totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming.....	26,078 10	454,578 13
" Hazleton.....	50,364 17	1,137,242 17
" Upper Lehigh.....	26 06	1,993 03
" Beaver Meadow.....	16,113 15	263,372 18
" Mahanoy.....	13,447 12	243,689 15
" Mauch Chunk.....	2 : 05	2,999 04
Total.....	106,646 05	2,202,656 10
Same time last year.....	15,578 11	2,136,480 19
Increase.....	11,067 14	66,177 11
Decrease.....	.....	.....
Forwarded East from Mauch Chunk by rail.....	76,906 09	1,747,722 02
Same time last year.....	72,250 18	1,729,284 17
Increase.....	4,6 7 00	18,937
Decrease.....		
DISTRIBUTED AS FOLLOWS.		
Local East of Mauch Chunk.....	1,090 04	44,511 04
Forwarded East for use L. V. R.	633 00	31,180 02
Delivered to Furnaces and Manufacturing Companies	11,589 04	401,543 08
Delivered to Cat & Fox R. R.....	52 15	3,375 04
" " East Penn R. R.	25 19	6,130 17
" " North Pennsylvania Railroad..	6,468 14	180,570 04
" " Port Del. ...	7,250 05	63,840 08
" " East Amboy Railroad		
" " Morris and Essex Railroad....	6,959 15	164,952 13
" " Bel. Del Railroad	27,194 02	513,881 17
" " Central Railroad	15,979 10	317,5:6 10
Delivered at and above Mauch Chunk for use of L. V. R.R.....	1,539 05	40,614
To P. & N. Y. C. R. R.	12,741 16	230,9:9 02
To North'n Central R. R.....	81 16	9,143 03
To D. R. & W. R. R.....	37 17	19,3:7 1
To L. & S. R. R. at Packerton for rail....	127 17	7,274 02
To Individuals at Mauch Chunk.....		1,721 17
To Individuals above Mauch Chunk.....	110 00	8,823 14
To L. & S. R. R., at Penn Hav., for railroad		1,541 10
Do. for canal	2,602 02	72,193 02
To Lehigh Canal Mauch Chunk.....	2,513 08	24,703 11
To Catawissa Railroad.....		50 00
To L. & B. R. R. at Lack. Junc.....	9,7:3 15	39,544 14
Total	106,646 05	2,202,656 1

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday June 21, and during the year 1873, compared with the corresponding period of 1872.

WEEK.

	C. & O. C'l Tons. Cwt.	B. & O. R. R. Tons. Cwt.	Pa. S. Line Tons. Cwt	Total. Tons. Cwt.
1873	22,169 06	30,175 06	1,930 14	54,275 03
1872	19,102 09	24,979 15	....	44,082 04
Increase	3,066 17	5,795 13	1,330 14	10,193 04
Decrease	....	....	....	....

YEAR.

1873	263,947 17	677,876 00	42,466 15	983,991 01
1872	270,148 06	600,755 06	....	870,903 12
Increase		76,821 03	42,466 15	113,087 89
Decrease	6,200 89	....	....	....

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To P. & O. R. R. Co. Tons. Cwt.	Total. Tons. Cwt.
1873	5,121 16	863 17	5,985 03
1872	6,728 12	829 15	7,557 07
Increase	—	34 12	....
Decrease	1,606 16	....	1,572 04

YEAR.

1873	42,918 01	55,398 05	98,316 07
1872	88,471 18	8,796 09	97,267 05
Increase		46,602 17	1,039 01
Decrease	45,553 16		

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, June 28, 1873.

	WEEK.	SEASON
North	66,272 19	1,297,554 11
South	1,039 01	125,433 09
Total 1873	67,312 00	1,422,987 00
Corresponding time in 1872:		
North	58,190 05	1,272,815 11
South	9,5.4 16	178,604 05
Total, 1872	67,705 01	1,451,419 16
Increase North	8,052 14	24,738 00
Decrease North		
Increase South		
Decrease South	8,535 15	53,170 16
Increase	453 01	
Decrease		28,432 16

Northern Central Railway, Shamokin Division

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the 7 days ending June 29, 1873.

	Tons.	Cwt.
East	1,120	07
West	13,243	18
	14,364	00
Same time last year	18, 59	05
Increase	....	
Decrease	4,395	05
Total amount shipped to date	27,554	00
Same time last year	250,527	07
Increase	24,993	13
Decrease	....	

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending June 28, 1873.

	1873. WEEK.	1873. YEAR.	1872. WEEK.	1872. YEAR.
By Railway	31,710 09	561,810 09	21,747 13	567,120 12
" Canal	368 00	3,068 00	486 04	2,034 10
	32,078 09	564,898 18	22,234 03	569,155 02
Decrease, 1873	4,256 04			

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK. July 3		AT PHILADELPHIA. July 3.	
SCHUYLKILL.	R. A.	W. A	R. A.	W. A.
Lump	$—	$5 45	— —	4 10
Steamer	— —	5 45	— —	4 10
Broken	5 70	5 45	4 35	4 10
Egg	5 85	5 60	4 50	4 25
Stove	6 05	5 75	4 70	4 40
Chestnut	5 20	5 95	3 95	3 60
Pea	— —	— —	— —	— —
LEHIGH.				
Freight to New York 50 cents.			— —	— —
Lump, (on board)	— —	5 60	— —	— —
Broken	— —	5 30	— —	— —
Egg	— —	5 30	— —	— —
Stove	— —	5 45	— —	— —
Chestnut	— —	4 75	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*			— —	— —
Honey Brook, Le'h W. A.	4 70@5 60		— —	— —
Spring Mountain " "	5 60@— —		— —	— —
Sugar Loaf " "	5 70@— —		— —	— —
Room Run " "	4 70@5 55		— —	— —
Hill & Harris " "	4 70@5 60		— —	— —
Shamokin " "	4 70@5 60		— —	— —
Lykens Valley " "	4 55@5 10		— —	— —
Broad Top " "	6 60@— 10		5 35	— —

Company Coals.

July, 1873.

	L.	Str.	Org.	Egg.	Sto.	Chest
*Scranton at E. Port	4 35	4 35	4 55	4 75	5 60	4 35
Pittston at Weehawken	4 80	4 80	4 80	5 00	5 20	4 70
*Lackawana at Weehawken	4 70	4 70	4 90	5 15	5 60	4 70
Wilk'b're at Hoboken	4 65	4 75	4 90	5 00	5 20	4 65
Old Co. Lehigh at Pt. John's	5 40	—	5 30	5 45	5 50	4 80
New York Coal Exchange	5 45	—	5 20	5 30	5 45	4 75

For freights to different points see "Freights."
*To contractors only.

Prices at Baltimore—July, 1873.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 75@6 00
Pittston and Plymouth, do	5 50@5 75
Shamokin Red or White Ash, do	5 50@5 75
*Lykens Valley Red Ash, do	....@5 80
By retail, all kinds per ton of 2,240 lbs	7 50@8 00
*George's Creek and Cumberland f. o. b. at Locust Point for cargoes	....@5 00
Fairmont and Clarksburg gas f. o. b. at L. Point	6 50
Kanawha Cannel, coarse	@12 00

* Freight to New York $2 15.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	....
Tyconnel f. o. b.	$7 00

Prices at Georgetown, D.C., and Alexandria, Va.

July, 1873.

George's Creek and Cumberland f. o. b. for shipping $5 00@— —

Prices at Havre de Grace, Md.

July, 1873.

Wilkesbarre and other White Ash for Cargoes	$ @....
Lykens Valley	@....
Shamokin Red or White Ash	....

Bituminous Coals (Cumberland).

Georgetown, F.o.b	$4 60
Baltimore "	5 10
New York "	7 25
South Amboy "	7 50

Prices of Foreign Coals.

July, 1873.

Duty 75 c. per ton.

Corrected weekly by ALFRED PARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Cking	— —@— —
" " Cannel	17 00@— —
" House "	20 00@22 00
" " Orrel	20 00@— —

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$20 00@22 00
" Cannel, "	17 00@ ...

Per ton 2,000 lbs. delivered.

Prices of Gas Coals.

July, 1873.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y.

	Coarse	Slack
Rock House	$2 50	$1 25
Gowrie	2 00	0 00

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal.
Pictou nett	$3 00	1 50
Sydney	3 25	1 00
Lingan	2 75	1 00
Caledonia	2 75	1 25

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm: 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushels.

AMERICAN.	Nominal quo Currency.
Westmoreland f. o. b.	$6 00 @7 00
Fairmount Gas Coal Co. of N. Y. "	6 50 @7 00
Despard Coal Co. "	6 50 @7 00
Penn "	6 50 @7 00
Newburg Orrel Gas "	6 50 @7 00
West Fairmount Gas Coal "	6 50 @7 00
Redbank Cannel, at Pa "	12 00 @0 00

AT PHILADELPHIA.

Westmoreland "	7 50 @0 00

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven Lump and St., net, $1 60; Br., Egg and Ch., $1 65; Stove, $1 75 Shipping at Pt. R., 20c., for use at Phil., $2 15 from Pt. Carbon.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 72
C. R. R., N. J., Phillipsburgh to Elizabethport	06
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 23

MAUCH CHUNK TO PORT JOHNSTON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 72
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 06
Shipping expenses	25
Wharfage	10
Total	$2 23

TO HOBOKEN

L. V. R. R., Mauch Chunk to Phillipsburgh	72
Morris & Essex R. R. Phillipsburgh to Hoboken	1 06
Shipping expenses	25
Wharfage	00
Total	$2 23

TO SOUTH AMBOY.

L. V. R. R.	72
B. & D. R. R.	1
Cam. & Am. R. R.	1
Shipping Expenses	35
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	54
C. RR. of N. J. Phillipsburgh to Elizabethport	1 06
Shipping expenses	15
Wharfage	20
Total	$2 35

Freights.—July, 1873

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Philad'a.	Anthracite. From Port Johnston, Weehawken, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
Amesbury	3 75	— —		— —	— —	— —
Bangor	3 25	— —		2 10	2 30	— —
Bath	3 10	3 00		2 10	2 20	— —
Boston	3 00	3 00		2 00*	2 10	1 25
Bridgeport	2 80	3 00		1 00	1 10	— —
Bristol	— —	— —		1 40	— —	— —
Cohasset Nar'ows	3 10	— —		— —	— —	— —
Derby	3 00	— —		1 75†	— —	— —
Dighton	2 65	— —		1 50	1 70	— —
East Cambridge	2 75	— —		2 00	— —	— —
Fall River	2 50	2 75		1 40	1 60	1 65
Hackensack	— —	— —		— —	— —	— —
Hartford	3 10	3 25		1 50	1 70	1 75
Hoboken	2 15	— —		50	— —	— —
Jersey City	2 10	— —		50	— —	— —
Lynn	— —	— —		— —	— —	— —
Middletown	— —	— —		1 25	— —	— —
Mystic	— —	— —		1 25	— —	— —
New Bedford	2 70	2 85		1 30	— —	— —
Newburyport	3 25	3 25		2 15	2 50	— —
New Haven	2 50	2 50		1 00	1 20	1 25
New London	2 50	2 65		1 15	1 40	1 50
Newport	2 60	— —		1 40	1 60	1 65
New York	2 25	2 15		50	60	65
Norwalk	2 75	2 50		1 00	1 20	1 25
Norwich	2 60	2 75		1 30	1 60	1 63
Pawtucket	1 40	3 00		1 80‡	1 40‡	1 65
Portland	3 00	3 00		1 90	2 20	— —
Portsmouth, N.H	3 10	3 25		2 10	2 25	— —
Providence	2 50	2 75		1 40	1 60	1 65
Rockport	— —	— —		— —	— —	— —
Saco	— —	— —		2 25	2 55	— —
Sag Harbor	— —	— —		1 25	— —	— —
Salem	— —	3 25		2 10	2 20	— —
Stamford	— —	— —		1 00	— —	— —
Stonington	— —	— —		1 25	— —	— —
Taunton	— —	— —		1 90	2 20	— —
Warren	— —	— —		1 40	— —	— —
TO RIVER PORTS						
Albany	3 50					55
Catskill	— —					50
Cockeackie	— —					65
Coeyman's	— —					50
Cold Spring	— —					20
Fishkill	— —					40
Haverstraw	— —					40
Hudson	2 50					65
New York vessels	2 00					45
Nyack	— —					50
Poughkeepsie	2 40					30
Rhinebeck	— —					—
Rondout	— —					40
Saugerties	— —					50
Sing Sing	— —					55
Stuyvesant	— —					50
Tarrytown	— —					60
Troy	— —					25
West Point	— —					50
Yonkers	— —					

+3 c. per ton per bridge extra.
† New Haven rate and towing 25 c. extra per ton.
‡ Towing from Providence and return, extra.
§ And towing.

St. Thomas	$— —	Gold
Martinique	— —	"
Demerara	— —	"
New Orleans	— —	
Mobile	— —	"

Foreign and Provincial Freight

July, 1873.

Foreign.
Newcastle and Ports on Tyne, per keel of 21 1-5 tons £ Liverpool, 5 per cent primage

TO NEW YORK.

Provincial	
Sydney	$3 75
Lingan	4 00
Cow Bay	4 00
Port Caledonia	4 00
Little Glace Bay	4 00

TO BOSTON.

Sydney	3 50
Lingan	3 60
Cow Bay	3 50
Port Caledonia	3 50
Little Glace Bay	3 50

TO MONTREAL.

Caledonia	3 75 gold.

TO CUBA.

Caledonia	6 50 gold.

MARKET REVIEW.

NEW YORK, July 2, 1873.

IRON—Most of the outside lots of Scotch Pig have been disposed of, but with considerable known to be on the way, buyers are reluctant to enter the market at present figures, believing that rates have not as yet reached their lowest point; the stocks now on hand are not large but sufficient to meet the small hand-to-mouth trade that has been carried on for some time past; Eglinton having sold down to $42 is now in lighter stock, and, perhaps, except for a strictly cash offer, could not now be had below $43, while from yard we quote it $43@$44; Glengarnock may be quoted $44@$45, and Coltness $53@$54. There has been nothing done in large parcels. Strictly No. 1 brands of American Pig are not being offered by the furnaces, they being (as several times before noticed), largely sold ahead, though outside parcels of poor to good No. 1 brands, can be had at prices ranging from $45 to $48. The Allentown Co. is not offering No. 2 brands, though other brands may be had as low as $40@$41, and we believe in many cases are being pressed for sale. Gray Forge is in good stock, and dull at about $35, though we understand that it has sold for less at the furnace. New English Rails are

entirely nominal in the absence of business—we quote $65@$67.50 gold; and new American $77.50 currency at mills in Pennsylvania. Old English are very quiet and there is no business of moment; a small lot sold at $49, 4 mos. and interest, deliverable in Philadelphia. In Scrap, we hear of nothing doing. Refined Bar continues quiet and depressed, no increase of demand, or other circumstance having occurred to change the dulness of the market.

LEAD—Pig is very quiet; Ordinary Foreign may be quoted 6¼ cents gold; 25 tons Selby sold at 6¼ cents gold. Bar 9¼ cents, Sheet and Pipe 10½, and Tin-lined 16½, less 10 per cent. to the Trade.

Withdrawals from bond for consumption 27th, 28th and 30th June—

Lead, Spain pigs.555

COPPER—There has been no further decline in the prices of Manufactured, and the market is steady at our quoted rates. Ingot remains very dull, but prices are unchanged; the sales embrace about 100,000 lb. Lake in lots at 28½@29 cents, and 35,000 English 28¼@28½. An arrival of Old Copper from the West Indies has been placed at 26 cents.

SPELTER—Foreign remains very quiet; held at 7¼@7¾ cents gold for Silesian. Domestic is held at 10c. currency.

Withdrawals from bond for consumption 27th, 28th, and 30th June—

Spelter, Germany plates.500

STEEL—Prices continue firm for all descriptions. The impression prevails that American is fast supplanting the Foreign, which cannot be laid down here at the prices obtaining for American.

REGULUS ANTIMONY—May be quoted 13¾ cents gold, without sales.

TIN—Pig is less active, but prices are not quotably lower; sales have been made of 100 slabs Straits at 31¼ cents, 450 do, on private terms, and 10 tons Eglish 30½, gold. Holders generally demand 32 cents for Straits, 30¾@31 for English, and 26@26¼ for Banca, gold. The demand for Plates has fallen off, but the market is firm at last quotations; the sales are 300 bxs. Charcoal Tin, "Parkend," at $11.50; 500 do., $11.25@$11·50; 500 do., $11.12½; and 350 do. Coke Tin, $9.37½, all gold.

Withdrawals from bond for consumption 27th, 28th, and 30th June—

Tin from England.....bxs.764

ZINC—Sheet is quiet, except in a jobbing way, and not very active in that. Manganese black oxide 4 cents, do. gray peroxide 6½ cents.

METALS.

NEW YORK, July 2, 1873.

IRON.—Duty: Bars, 1 to 1¼ cents ₩ lb; Railroad, 70 cents ₩ 10 lbs.; Boiler and Plate, 1½ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₩ lb; Pig, $7 ₩ ton; Polished Sheet, 3 cts. ₩ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ₩ ton	53 00@54 00
Gartsherrie	— —@— —
Glengarnock	44 00@45 00
Eglinton	43 00@— —
Pig, American, No. 1	45 00@48 00
Pig, American, No. 2	40 00@43 00
Pig, American, Forge	35 00@— —
Bar Refined, English and American	60 00@— —
Bar Swedes, assorted sizes gold	— —@137 50
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ⅜ & ⅞ 2 sq. & 6 to 12 x ⅜ & ½	175 00@185 00
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ¼ to 1 in.	92 50@ 95 00
Bar, Refined, 1¼ to 6 by ¾	97 50@100 00
Bar, Refined, 2⅛ to 2⅞ round 1 & 1⅛ by ¼ & 5:16	100 00@102 50
Large Rounds	102 50@117 50
Scroll	112 50@145 00
Ovals and half-round	120 00@140 00
Band	110 00@112 50
Horse Shoe	— —@122 50
Rods, ⅝ to 3-16 inch	97 50@140 00
Hoop	150 00@170 00
Nail rod	9¼@ 9¾
Sheet, Russia, as to assortment (gold)	16½@ 18
Sheet, Singles, D. and T. Common	—6¼@— 7¼
Sheet, D. and T. Charcoal	—7¼@— 8½
Sheet, Galv'd, list 10 per cent, discount	— —@— —
Rails, English (gold), ₩ ton	67 50@— —
Rails, American, at Works in Pennsylvania, currency	77 50@— —

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₩ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₩ lb	— @— 38
Copper Bolts	— @— 40
Copper Braziers, 16oz. and over	— @— 40
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	26 @— 27
Copper, Old, for chemical purposes, 14@16 oz	— @— —
Copper, American Ingot	24¼@— 26¾
Copper English Pig	— @— 28¾
Yellow Metal, New Sheathing & Bronze	— @— 27
Yellow Metal Bolts	— @— 32
Yellow Metal Nails, Sheathing and Slat'g	27 @— 30

LEAD.—Duty: Pig, $2 ₩ 100 lbs.; old Lead, 1½ cents ₩ lb Pipe and Sheet, 2½ cents ₩ lb.

Galena, ₩ 100 lbs		$6 62½	@6 75
Spanish (gold)		6 62½	@6 75
German, do		6 75	@7 00
English do		7 25	@— —
Domestic do		6 12½	@6 25
Foreign, Refined		7 25	@— —
Bar (net)		9 25	@— —
Pipe (net)		— —	@10 50
Sheet		— —	@10 50

STEEL.—Duty: Bars and ingots, valued at 7 cents ₩ lb or under 2¼ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 3½ cents ₩ lb, and 10 ₩ cent ad val. Store prices.

English Cast (2d and 1st quality)	₩ lb	— 18½	@— 20
English Spring (2d and 1st quality)		— 9½	@— 10½
English Blister (2d and 1st quality)		— 14	@— 18½
English Machinery		— 14½	@— —
English German (2d an 1lst quality)		— 12½	@— 14½
American Blister "Black Diamond"		— —	@— 11½
American, Cast, Tool	do.	— —	@— 17
American, Spring,	do.	— —	@— 11
American Machinery	do.	— 11¾	@— 12
American German,	do	— 9	@— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ₩ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₩ cent.; Roofing 25. ad val.

	Gold ₩ lb.
Banca	36 @36¾
Straits	31¼@ 32
English	30½@ 31

PLATES.

Fair to Good Brands.	Gold.	Currency
I. C. Charcoal, ₩ box	$11 25 @11 50	$13 25 @13 75
I. C. Coke	9 25 @10 00	11 00 @11 75
Coke Terne	8 75 @ 9 00	10 50 @10 75
Charcoal Terne	10 00 @10 50	12 25 @12 75

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100lb

Plates, Foreign (gold) p. 100 lb.	7 62½@	7 87½
Plates, Domestic p. lb.	8½@	11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c per lb

Sheet ... per lb.—10½@11

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, July 2, 1873.

We have advices from the San Francisco Stock Board, dated the 1st of July. Excepting a slight advance in Savage and Chollor Potosi, the market is weaker. The report is as follows;

	July 2.		
Savage	144	—	—
Crown Point	102	—	—
Yellow Jacket	67	—	—
Kentuck, "New Issue"	9¾	—	—
Chollar Potosi	57	—	—
Gould & Curry "New Issue"	12	—	—
Belcher "New Issue"	93	—	—
Imperial	6	—	—
Raymond & Ely	6	—	—
Meadow Valley	21¼	—	—
Eureka C. V.	—	—	—
Ophir	—	—	—
Hale and Norcross	—	—	—

From the American Chemist.

ESTIMATION OF SULPHUR IN IRON AND STEEL.

BY T. J. MORRELL.

The more common method of estimating sulphur in iron and steel consists in acting on the metal with sulphuric or hydrochloric acid, and precipitating some metallic sulphide by the evolved sulphuretted hydrogen. It would be a desideratum, in point of time, if this sulphide could be directly weighed.

By passing the evolved gasses through an ammoniacal solution of cadmium oxide (or a solution of sulphate to which an excess of ammonia has been added), a precipitate of cadmium sulphide is obtained, which can be at once collected upon a small filter, dried at 212 deg. F. and weighed.

The phosphoretted hydrogen, evolved in a solution of the metal together with the sulphuretted hydrogen, causes no precipitate in the solution.

The presence of ammoniacal salts would also prevent any precipitation of carbonate of cadmium by the traces of carbonic acid in the air drawn through the apparatus by the aspirator after the metal is dissolved. However, the aspirated air could easily be passed through potash solution, to remove its carbonic acid.

To prevent the precipitation of oxide of cadmium on the filter, the precipitate should be washed with distilled water containing diminishing quantities of ammonia.

If, in very accurate estimations, it is necessary to estimate the minute quantity of sulphur left in the solution and residue of the metal, this can be done as usual and added to that found as above.

Five test analyses of a piece of Bessemer steel known to contain 13 per cent. sulphur, gave as follows: 1st. .124 per cent.; 2d, .125 per cent.; 3d, 137 per cent: 4th, .125 per cent.; 5th, .124.

CAMBRIA IRON WORKS, Johnstown, Pa., October 13, 1872.

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 are payable in advance at the annual (May) meeting. Remittances should be made, as far as possible, by P. O. Order, payable to the Secretary.

III. The first volume of Transactions of the Institute is in course of preparation and will be sent, as soon as issued, to all members not in arrears.

IV. General meetings are held on the fourth Tuesday of February, May and October. Authors of papers are requested to notify the Secretary, in advance of meetings, of the subject and length of their papers.

THOMAS M. DROWN, Secretary.

1123 Girard street, Philadelphia, Pa.

MISCELLANEOUS.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.
JOHN A. CHURCH, E. M. Editors.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.* It is the Organ of the American Institute of Mining Engineers, and is regularly received and read *by all the members and associates* of that large and powerful society, *the only one of the kind in this country.* It is therefore the best medium for advertising all kinds of machinery, tools and materials used by Engineers or their employees.

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THE SCIENTIFIC PUBLISHING COMPANY.
WILLIAM VENTZ, SECRETARY.
27 Park Place,
P. O. Box 4404. NEW YORK CITY.

CONTENTS FOR THIS WEEK.

THE burning up of Western towns appears to be one of the certainties of life in that part of the world. Some towns, in fact, work themselves out of existence every two or three years. Hamilton, Nevada, the headquarters of the White Pine mining region, is the latest to seek glory and purification by fire. It was almost entirely destroyed June 27, the business part of the place suffering most. The money loss is $500,000, which, we are happy to say, is all the injury done, for no lives were lost.

A BOILER explosion of extraordinary severity, both in force of explosion and in its fatal results, has taken place in the well-known rolling mill at Jemappes, Belgium. When the occurrence took place 150 men were at work in a neighboring building. Fifteen of them were killed and horribly mutilated by burning coals from the furnaces, steam, boiling water, and falling walls. The fire box was raised vertically and thrown 100 feet, while a part of the dome was thrown a distance of 275 yards, passing over the roof of a neighboring glass manufactury, but the boiler itself was torn almost to atoms, and the parts being thrown in all directions entirely destroyed the mill. The cause of the disaster had not at last advices been discovered.

SINCE the English have been able to force the importation of opium upon the Chinese in the face of the world's protests and in the midst of a philanthrophic spirit at home, which has been actively engaged in the suppression of the trade in slaves by other nations, it is not to be doubted that equal success will attend the efforts to make China the field of a new development of British energy. It is reported that the introduction of railways and the opening of coal and iron mines under English auspices will soon be sanctioned by the government of that country, and then we shall probably see a phase of the railway, mining, and bond mania which will be at least equal in importance and in loss to any other of the numerous similar enterprises of the past.

NEWS comes from Europe that the ancient mining district of the Venetian Alps was severely shaken by an earthquake at five o'clock on the morning of June 29. From the line of Venice and Verona the shock seems to have covered a region extending perhaps a hundred miles northward, as the severest damage appears to have been done at Belluno, fifty miles north of Venice. Belluno is an enterprising and quaint old inland town of Italy, and is the jumping off place from which the old copper mines of Agordo and the new mercury mines of Valalta are reached. It has long been a matter of dispute how the Agordo deposit which is a huge solid, bedded mass of iron pyrites, could exhibit the phenomenon of *slickensides* or pieces of ore highly polished on one side. The polishing was undoubtedly done by friction, and the smooth surfaces mark the line of a seam, the opposing walls of which have rubbed each other. At Agordo none of these seams were clean through the mass—there are no faults—and it has been a question whether a crack of a hundred or two feet length, the ends being closed by perfectly firm continuations of the solid pyrites, could allow movement enough to produce the highly polished surfaces. If the earthquake ran up into that almost unvisited region, the miners may have had visible proof of how slickensides is made.

"Beauty in its relation to the Shape and Proportion of Stoves" was the subject of a paper read by Mr. PITTMAN, of Cincinnati, at the late meeting of the National Association of Stove Manufacturers at Niagara Falls. The subject was well selected, and has as great importance as any other question of decorative art. A stove is one of the most prominent articles of furniture in the house for many months, partly because it usually stands out from the wall, and partly because it is the center of the family circle. But we fear that the New Zealander who is to play so prominent a part in the archæology of the future, instead of greeting the first stove he finds as the emblem of warmth and happy home life, will be inclined to shed the tear of sympathy over it, as (presumably) the sad relic of a former graveyard. The forbidding black, the mortuary wreaths, the mica skylights, all point to a receptacle for human ashes with more probability than to the source of household heat and the center of a living group. What our stoves need is, first, the removal of all semblance to graveyard decoration; second, neat proportion, and third, a reform in the matter of color. The latter is a very important point. When it was that black was introduced into our dwellings is not now known, but the persistency with which that color has been driven out by brighter colors, even from objects like chairs and sofas, on which it was relieved by the livelier mahogany, is a proof that the stove of the period will vanish as soon as a brighter one is introduced. The time is especially auspicious for the change, for Americans are developing a taste for bright colors and cheerfulness generally in their homes, which is a promising sign for the future of the country. We are aware that it is no easy matter to produce a paint, varnish or lacquer which can outlast the winter, be perfectly inodorous, and have good radiating powers. The end for which we are speaking is attained abroad by the use of glazed tiles, but these require total change in the management of house heating. German stoves are regenerative ovens in which a mass of brick is heated up rapidly, and then slowly gives out its heat while the fire dies away. But these constructions are massive and often laid down with the house. It is possible that something might be done by encasing small pipes in a shell of handsome tiles in such a way that the pipes would be heated by the fire, and in their turn heat a current of air passing through them. But a change in construction so thorough as this is not what the stove men want, and the field is now open to the makers of silicate or other paint. If they can add to the American stove the beauty of the lily and the rose, they will perform a service worthy of the gratitude of the whole people and remove one of the most unsightly objects from the country house.

A Year's Experience on the Narrow Gauge.

THE first annual report of the first extensive narrow gauge railway built in this country is necessarily a document of interest and importance. We may hereafter give some extracts from the report of the Denver and Rio Grande Railway, which lies before us, but for the present we shall do no more than consider some of the results of the year's work. It is hardly necessary to say that it is an *ex parte* statement which we follow, but it is valuable for all that. That part of the road which was completed and open to business by January 1, 1872, extended from Denver to Colorado Springs, 76 miles; and Pueblo, 42 miles further, was reached by the track-layers June 15. Since then, 38 miles of the Arkansas branch have been completed, running up to the coal mines of Freemont County. The traffic on this distance was, of course, quite variable from the varying length of track and the fact that a coal supply was not reached until late in the year. But the freight amounted to 47,598 tons, of which 11,326 tons was evidently railroad supplies, and 4,065 tons was coal, part of which was undoubtedly also for the use of the road. Still the average of the whole was 152 tons a day carried an average distance of 61 miles. Of passengers 25,158 were carried, or 80 a day, over a distance of 67 miles. In addition to this there were 292,000 miles of "dead heads," which, at the same rate of averaging, gives 14 a day, carried 67 miles. The free pass system is now abolished. With this business the company were able to make the following financial exhibit:

Earnings.		Expenses.	
Freight	$172,102·23	Conducting Transportation	$63,160·44
Passenger	134,391·56	Motive Power	62,311·73
Miscellaneous	1,645·03	Maintenance of Cars	4,885·95
		Do. Way	55,060·13
	$308,138·82	General Expenses	16,526·60
			$201,944·85

This gives $106,193·97 nett earnings. A small portion of this belongs to the Arkansas branch, and, deducting this, we have $104,067·40 as the earnings for about 100 miles of main line. The directors expect to earn five times that sum, or $500,000, this year, and the increase, in the ordinary course of things, is certain to be very great.

But it is not our object to exhibit the finances of the road, which, however encouraging to the stockholders, must give place to the results of experience in

their bearings upon the vexed question of narrow gauge roads. The directors calculate the saving in the cost of construction and equipment at 37½ per cent., over a standard gauge of the same style of building. The trains have been run at the speed usual in the West, which we suppose means 15 to 19 miles an hour, including stops. When required on special occasions they have run 30 to 40 miles an hour with steadiness. The passenger cars have proved comfortable, and the passenger traffic has been very much greater than was expected. The day car weighs 19½ tons, or 696 lbs. to each passenger. The capacity of the freight cars is well brought out. When sixteen loaded cars arrive at Denver on roads of the standard gauge for transhipment, their contents are transferred to 20 narrow gauge cars. The 16 cars weigh empty, say 136 tons, and the 20 cars weigh 60 tons. The loaded standard cars weigh 296 tons, and the same load in narrow gauge cars weighs with the cars 220 tons, so that there is a saving of 76 tons, or close on 25 per cent. These data are for fully loaded cars. The loading of the narrow box cars, weighing four tons, was as follows :

Of wool in sacks, loose	5,000 lbs.
Do. bales, loose	8,000 "
Wagons and agricultural machinery,	9,000 "
Furniture (double first class rates)	4,000 "
Furniture "knocked down"	10,000 "
Groceries and dry goods, assorted	12,500 "
Iron, lumber, grain, flour, etc.	16,000 "

EDITORIAL CORRESPONDENCE.

Lieutenant Wheeler's Expedition.

NEAR SANTA FE, NEW MEXICO, June 17, 1873.

The extent and importance of the work of exploration under various departments of the Government, in the great Territories of the West, is scarcely appreciated by the public. More than ten years ago, in the darkest crisis of the war, President Lincoln was far-sighted and patriotic enough to recommend the institution of such surveys, and the publication of their results, as one of the best means of maintaining the credit and promoting the progress of the country. At that time, Congress was scarcely ready to manifest so great a confidence in the future ; but since the close of the rebellion a commendable liberality and energy has been displayed in the prosecution of this important enterprise. Lieutenant WHEELER, who has been engaged for several years in the execution of difficult and dangerous surveys in Utah, Nevada and Arizona, is now about to take the field again with several well-equipped parties. A conversation with Mr. LOCKWOOD, at present representing him at Santa Fe, enables me to give the outline of the work planned for the coming season, and to promise further details when all the parties shall have been organized.

The larger part of Lieutenant WHEELER's expedition are now in camp at Santa Fe, in daily expectation of his arrival. It may be mentioned that a force has been left at Washington, preparing the results of former surveys for publication. This is a specially gratifying fact, in view of the unfortunately prevalent tendency among the commanders of field-explorations to be satisfied with meagre preliminary reports, and to push forward the mere accumulation of materials until the public interest in their work has perceptibly cooled, and the proper publication of digested results has become a difficult matter to accomplish. KING's two volumes (out of five) are all that we have from the surveys of many parties (including those of HAYDEN, POWELL, and others) working through six or seven years, except hasty "preliminary" reports, out of which it is hard to extract connected information. The results of WHEELER's work, when they appear in the form of new, accurate and extended maps (some of which he has issued already), will be instantly and universally appreciated. It is announced that a series of atlas maps, on a scale of one inch to eight miles, based upon careful triangulations, will be forthcoming during this year.

The immediate field-work will proceed from the neighborhood of Santa Fe, where an astronomical station will be established, and the latitude and longitude will be carefully determined. The main party, under the command of Lieut. WHEELER, will move southward from Santa Fe through New Mexico, and thence into Eastern Arizona, completing the survey west from Rio Grande, to connect with the work of former years. The various sub-parties employed in triangulation will converge first upon Fort Wingate, and thence extend operation, south and west to Forts Craig, Bayard, ect. The first base line will be measured near Santa Fe.

Two parties of this expedition will move in nearly parallel lines southward along the backbone of the continent, one from Denver and the other from Salt Lake, reconnoitring for routes of communication, locations for supply-depots, suitable points for artesian wells, etc. All the parties are said to be thoroughly equipped with scientific talent and apparatus, so that the topographical work will be accompanied with trustworthy observations upon the geology, natural history and resources of the regions traversed.

The season has been unusually dry in this Territory, the so-called early rains having failed. At many points there has been no rain for nine months. But last week, and the week before, there were heavy rains along the Rocky mountains, from Denver to Santa Fe. The rainy season may have set in prematurely—it is not due for ten days yet. But the weather at present, though fitful, is delightfully mild. The thermometer ranges at about 70° Fahrenheit, where I am writing, at a small Mexican village in the San Lazaro mountains, the altitude being about 7,000 feet—the same, within a few feet, as that of Santa Fe, twenty-seven miles distant. The Mexican younglings are running about in the sun, in all degrees of clothing, from zero to what might be charitably called full dress, though it includes neither hat nor shoes nor coat. Donkeys, goats, babies and dogs make the small hamlet lively to the ear as well as the eye. The inhabitants make an easy living, when they choose to work, by washing gold from the rich placers of these mountains—an industry not now interfered with by the Company owning this grant, though it will doubtless be suppressed when active operations shall have been resumed by the proprietors. These mountains, generally known as the Old Placer mountains, or the Ortiz mine grant, are undoubtedly very rich in alluvial gravel-deposits, as well as quartz mines, veins of iron ore, and coal beds of remarkable quality. It is on this estate that the famous New Mexican anthracite occurs—a coal which is undoubtedly identical in original character with the lignites (pitch-coals) of Colorado and Wyoming, but which has been locally altered by the immediate neighborhood of porphyritic dykes, to a truly authracitic texture and chemical composition.

This will doubtless be a dull year for mining in New Mexico. As I have said, the Old Placer is temporarily in the hands of Mexicans. The New Placer, on the next range southward (a deposit of equal richness, though less extent) is worked, if at all, by the same shiftless and indolent class. On the Maxwell or Cimarron grant, near the northern line of the Territory, an accident to the flumes of the Moreno ditch is said to have interfered with the little mining that channel was able to supply. The Moreno ditch was projected in a wet season, and would scarcely get adequate water in ordinary years. This year it has run deplorably low—and now, if I am correctly informed, it is under repairs. Gulch mining is scantily represented, however, on the Cimarron grant. The principal quartz mine, the Aztic, is shut down ; the English Company is reported to be waiting and negotiating for railroad connections ; and the pretty and once flourishing town of Cimarron is lapsing into a desolation the discouraging aspect of which can scarcely be imagined by one who has not seen a village of empty adobe houses. However, the company holds its annual stockholders' meeting in a few days ; and something may yet be done to revive the activity and prosperity of the past. It must be confessed that the rapid approach of railroads from the North and East tends to deaden temporarily the enterprises of regions not quite reached, as yet, by such facilities. In the first place, the great stimulus given to the development of districts along the roads relatively injures those more remote. In the second place, owners of mines and land are tempted to wait a little longer, and prosecute work under better auspices.

From Silver City, Grant County, the news of the silver mines indicates some depression. Only two mills are said to be running. But the hopes of the mining population in that remote district seem to have substantial foundation in the amount and tenor of the ores produced, thus far, with little deep working of the mines.

Indian troubles are not anticipated, though the Kiowas in the far South are capable of mischief ; and the Navajoes, nearer Santa Fe, though well-disposed in the main, are annoyed by the Utes, who presume on their former alliance with us to commit depredations in our name.

R. W. R.

CORRESPONDENCE.

The Ore Knob Copper Mine.

ASHE COUNTY, NORTH CAROLINA, June 25th, 1873.

TO THE EDITOR :

Sir—I have come to this region at the request of several gentlemen of Baltimore to visit the Ore Knob mine, which lies near New River in the northwest county of North Carolina. Mining operations were begun here before the rebellion, and a considerable amount of rich copper ore extracted, but the mine was for some reason abandoned. Within the last three months, however, it has been re-opened by Messrs. S. S. CLAYTON and J. E. CLAYTON, of Baltimore, with results so remarkable as to deserve a notice in your journal. The ore-deposit, which appears to be a true fissure-lode, cuts vertically the moderately inclined strata of gneiss and mica-schist of the Blue Ridge, which have the lithological characters of what I have called the White Mountain or Montalban series. Both the country-rock and the lode are, as is usual in this region, decomposed to considerable depths, and the latter exhibits a cap of from fifty to seventy feet of gossan or hydrous peroxyd of iron, which, in its lower part, is highly charged with oxyd and carbonate of copper, and rests directly upon the unchanged sulphurets of the lode. The out-crop has been traced for 1900 feet in a N. E. and S. W. direction, but the unchanged ore is as yet exposed only for a distance of 661 feet, in five shafts, one of which is new, while the others are old workings. These have just been re-opened, and operations commenced in two of them, in one of which the solid ore has now been penetrated to a depth of twenty-four feet. Unfinished drifts have been completed opening a level of 220 feet wholly in the vein, which consists of solid sulphuretted ores, almost without admixture. On several parts of the drift the northwest wall has been exposed, and in two places the opposite wall been reached by cross-cuts, showing the lode to have here breadth, of fourteen feet and nine feet. The bottom of the deepest shaft is eleven feet wide, and the sides are, like the floor, solid ore. In the other parts from six to eight feet are seen, with an undetermined thickness of ore on one or both sides of the level. The outcrop of gossan is in many places from fifteen to twenty feet in width.

In this remarkable deposit the copper ores themselves may be said to form the veinstone. If we except a layer of a few inches of vitreous quartz carrying a large portion of variegated ore, which has been observed at some points along the exposed, or northwest, wall, the filling of the vein consists of yellow and variegated copper ores, through which are disseminated portions of quartz, mag-

netic iron, and some other foreign minerals. In the part of the vein now being removed there is a breadth of from three to four feet of an iron-black, friable, drusy, crystalline, sulphuretted ore, enclosing grains of quartz, garnet and magnetite, besides a black, non-magnetic mineral not attacked by nitric acid. The mass yields about thirty-six per cent. of copper, and demands a more careful mineralogical and chemical study than I am now able to give it. It is mixed in some parts with bright yellow copper pyrites, and this species, with a massive and more or less cellular variegated ore, makes up the remainder of the vein. From the admixture of foreign substances the proportion of copper in the former is reduced to from sixteen to twenty-two, and in the latter to from thirty-five to forty-five per cent. The material mined from the workings of the last two months consists solely of ore, which, from a series of assays, I have estimated to average from twenty-five to thirty per cent. of copper. The amount now in the ore-heaps appears from measurement to be about 1400 tons.

The lode cuts obliquely across a steep hill, and an adit of 300 feet, now nearly completed, will intersect it at right angles beneath the lowest shaft. From this point a drift carried along the course of the lode will pass beneath the shafts on the crest of the hill at depths of seventy-five and ninety feet from the top of the sulphuretted ore. If we assume fourteen feet as the average breadth of the lode the portion between this level and the gossan above will contain about 74,000 tons of ore, and if, as we may reasonably expect, the lode shall maintain its present character in depth, and be found continuous beneath the whole outcrop of gossan, its capacity of production will be enormous, and, I believe, without precedent in the annals of copper-mining. The development of this mine will therefore be watched with great interest, and can hardly fail to affect materially the copper-market of the country. The work of opening the vein and erecting suitable buildings and machinery is rapidly going on, and the mine will soon be in a condition to furnish very large quantities of copper ore. The cost of transportation over the mountain roads, some forty-five miles to Marion, the nearest station on the Virginia and Tennessee railroad, is so considerable that the proprietors propose to erect at once works at the mine for the treatment of the ores, and the reduction of the copper by a moist process. The gentlemen above named have associated with them, the Hon. Washington Booth, and Messrs. John S. Williams, George Small, and James E. Tyson, of Baltimore, to form a company for the working of the Ore Knob mine, the reduction of the ores, and the construction of a railway to connect with the Virginia and Tennessee line.

Wonderful as is the promise of copper-production at this place facts already known to me with regard to several localities in this same mountain belt to the northeastward, in the counties of Floyd and Carroll in Virginia, where copper mines were opened before the war, warrant the expectation of results second only to Ore Knob. Many of these abandoned mines have been recently acquired by the Messrs. CLAYTON, who are preparing to develop them. I am about to visit this region of Southern Virginia, and may give you in a future letter some of the results of my observations.

T. STERRY HUNT.

American Society of Civil Engineers.

A regular meeting of this society was held at the rooms in New York, March 19th, 1873.

JOSEPH WHITNEY, E. C., of Cambridge, Mass., presented the subject of "Leakages in Water Pipes," illustrated by specimens of defective water pipes from the Cambridge water works,

He desired to make a simple statement of his own operations and experiments. The great and growing increase in the consumption of water is a matter of the first importance in the management of water works. Scarcely a report relating to water works is issued which does not refer to it—and as something quite unaccountable, still no systematic effort is made to ascertain its cause.

Some years since his attention was called to the subject in Cambridge, where, for three years preceding, the water pressure had been growing less, thus causing much inconvenience and insecurity in case of fire. This was ascribed to the great number of users from one main, an eight inch pipe. In a particular house, the water scarcely rose to the second story—at night or day.

After enquiry, a series of observations were made with syphon pipe and pressure gauge, to determine the cause. These were made in the morning, when the consumption was nearly nothing, and in one case, by shutting off certain sections from the main, say a four or six inch pipe, a large leak was revealed where the pipe, laid in a street filled with oyster shells, had parted. In another case, when the gate was closed, the water in the syphon at once rose sixteen feet—equal to about two stories of an ordinary house—the pipe, about 600 feet long and laid upon a mach, was examined and the leak found in a joint where the two parts had been entirely separated by a settlement of one section. These and other leaks, detected similarly, were closed, and thus, without any increase of size in the main, an additional head was secured of 35 feet, which gives a full supply to each house in that locality.

Observations were afterwards made upon the water in the reservoir in the night time, which showed still a leakage. By continued experiments upon the pipes throughout the city, nearly two hundred leaks of from 1,000 to 2,000 gallons each per hour were found. The necessary repairs were made, and thereby the average daily consumption per head was reduced from 85 to 35 gallons, which is not more than one-half that in most cities.

Leakage of this character may exist a long time without being known; thus, it may start when the water is first let on, and the water find a passage through some blind channel into the sewer; it will not be seen at the surface unless thus upward and outward is the easiest course.

It is quite probable that the subject concerns other cities than Cambridge, and furnishes a satisfactory reason for the great increase in the consumption of water, and the corresponding growing demand for supply, which more or less embarrasses public authorities.

It is said that in the city of New York the consumption is about one hundred million gallons per diem. If so, he was sure at least fifty million were wasted through unrecognized leaks into the sewers and surrounding rivers. In Boston more than seventeen millions of gallons are supplied, where eight millions should suffice.

It is a fair presumption that one-half these great amounts are but waste, and its corresponding cost in the construction and operation of water works may be saved; surely, examination, complete and exhaustive should be made to determine whether this is presumption or fact.

THOMAS F. ROWLAND, M. E., of Greenpoint, N. Y., presented a paper on the "Adaptation of Mechanical Power to the Work of Charging and Discharging Gas Retorts," illustrated by a large working model of machinery for the purpose, by which it is proposed to take the coal from a pocket outside of the retort house, size, mix, transport and deposit it in proper quantities in the retorts and afterward discharge therefrom the resulting coke into the coke barrows.

The apparatus consists, first, of an iron car, which traverses the retort house in front of a bench upon a railroad of twelve feet gauge, and carries the mechanism for charging and discharging—and second, a series of buckets which, suspended from an overhead or "pendent railway" conveys coal to the charging apparatus.

The iron car, about fourteen feet square, is propelled by an engine and boiler placed upon it, which also drive the machinery carried. Midway on the car the meter is located which receives the coal from the buckets and deposits it in the charger.

The meter is a horizontal cylinder divided longitudinally into three compartments or cavities—such that each will contain enough coal for one retort. It revolves intermittingly at the base of a hopper or "coal pocket," which receives the coal from the bucket, each cavity therein being in turn filled with coal and emptied by discharge into shutes, severally in communication with the three scoops of the charger. These shutes are placed one above the other, and as the meter revolves, are automatically opened and closed, so that the coal is discharged into each in succession. The edges of the meter cavities and of the throat of the "coal pocket" are armed with hard, sharp, steel blades, to cut or crush fragments of coal which, lodging between the surfaces, otherwise might clog the machine.

The "charger" is a carriage traversing the top of the car, transversely; its three scoops are placed one above the other at distances corresponding to the vertical measure between the retorts, and have moveable bottoms. When the scoops are filled, by a transverse movement of the carriage, they are thrust forward into the retorts; the motion being reversed, the bottoms, and then the scoops are withdrawn, thereby the coal is deposited evenly over the retort, and then the scoops made ready for another charge.

The "discharger" is a carriage similar to the "charger." The two are placed at opposite ends of the car, and the meter between them. By an automatic device three hoes or rakes are simultaneously thrust into three retorts, dropped until they rest on the retort bottoms, and then withdrawn, whereby the coke is removed and discharged on to the retort house floor, or into coke barrows.

One tier of retorts may be charged and the adjacent one discharged at the same, and in a very brief, time.

The "pendent railway" consists of two single parallel rails, ten feet apart—suspended from the retort house roof, over the railroad before mentioned, and connected at the ends by semi-circular rails, thus together forming an endless line, from which is suspended a series of coal buckets, attached to a flexible steel belt, by which they are separated, at uniform distances apart. The belt passes around horizontal drums, ten feet in diameter, and placed one at each end of and below the line, their vertical shafts being in the center of the curved rails. One of the drums is an idler—the other, that at the receiving end, is in a tower outside of the retort house. In its periphery are two openings, diametrically opposite, which by two inclined shutes, are connected with a fixed cylindrical hopper or reservoir for coal above. The buckets are vertical cylinders with one half of the upper part cut away, so that when they are in contact with the drums their axial planes coincide with the periphery. The space between the buckets on the belt is equal to one half the circumference of the drum.

When this apparatus is in motion, the buckets pass along the "pendent" railway; their openings are brought successively in contact with the openings of the drums, so that the coal conveyed by the inclined shutes from the reservoir, drops through them—the quantity being regulated by valves in the shutes, worked automatically.

The buckets have hinged bottoms to drop downward, and are opened when passing over the "coal pocket" on the car at the will of the operator, by releasing a catch; they are mechanically closed just before reaching the drum, where they are filled.

The coal in the yard, after passing between sizing and mixing rolls, is lifted to the reservoir over the drum, by elevators, similar to those used at Messrs. HECKER'S flouring mills in New York.

The several parts of this apparatus can be worked independently, and thereby accommodated to the varying demands likely to be made upon it.

The Car Builders' Convention.

At the meeting of the Car Builders in Boston there were several warm discussions on the size of axle journals. Mr. Garey (New York and Harlem) said that the subject was a very important one, and he hoped that it would not be postponed another year, One hundred thousand cars had been built during the past year in the United States, and it was time that the Association should adopt some standard and uniform size. The matter should be thoroughly discussed, and, if possible, a decision reached at this session. The committee appointed to collect the opinions of members reported the following sizes in use, with the number of their advocates: 7×3¾—30; 7×3½—28; 7×4—7; 6½×3½—3; 8×3¾—1; 6×3¾—1; 6×3½—1; 8×4—1; 6½×3¾—1. A proposition was then made to make the standard seven inches long by four in diameter, and it was defeated by a rising vote. A roll-call was had on the proposal to make the standard 7×3½, and resulted in thirty in favour to thirty-eight opposed to that standard. A motion to make the standard 3¾×7 was then put and carried, and the size of journal was accordingly fixed. The Association then voted that six feet ten inches between the buttons or collars be the standard length of the axle. During the meeting competitive trials were made of the Westinghouse and Vacuum brakes, the results of which were reported as follows:

BOSTON, June 11, 1873.

"The committee appointed to take charge of a series of experiments upon the Boston and Maine Railroad, to test the relative merits of the Westinghouse brake and the Vacuum brake, beg leave to submit the following report:

"For the first three experiments twelve cars were used in each train, which were furnished by the Boston & Maine Railroad, run side by side, with results as follows: Trains run at speed of 26 miles per hour; signals for stops, explosion of torpedoes on each track; Westinghouse train stopped short of Vacuum train 25 feet.

"*Second and third trials*—Speed 32 1-10 miles per hour; 26 and 31 seconds in stopping respectively. Distance: For second trial, Westinghouse stopped in 825 feet and Vacuum in 800 feet. Third trial, Westinghouse 992 feet and Vacuum 967 feet.

"*Fourth trial*, with nine cars on each train. The Westinghouse train consisted of cars furnished by the Eastern Railroad, and they were equipped with the automatic attachment. Results as follows: Trial No 4, Vacuum train stopped in 22½ seconds; Westinghouse train stopped in 15½ seconds, and 315 feet less distance than the vacuum train.

"*Fifth trial*—Vacuum train stopped in 26 seconds; Westinghouse train stopped in 20 seconds, and 265 feet less distance than the Vacuum train.

"*Sixth trial*—Consisted of disconnecting locomotive from train at speed, and the train was succes-fully stopped by the Westinghouse automatic brake. Time and distance not taken.

"*Seventh trial*—Consisted of breaking train in two parts, or disconnecting three cars from the rear. Stop was made by the automatic brake successfully.

"*Eight and ninth trial*—Were to see which train could stop and start the quickest. In the eighth trial the advantage was slightly in favor of the Westinghouse brake. In the ninth trial the Vacuum brake had a decided advantage.

"On the return trip a series of experiments were made, consisting of station stops; the Vacuum train following the Westinghouse from Lawrence to Boston. The Westinghouse train made the following stops without using the automatic attachment: The first stop was made at Andover, and 2 minutes and 26 seconds elapsed between the stopping and starting of the train. The reason of this long stop was that an outward-bound train was standing at the station. At Ballardvale 6 seconds were used; at Wilmington, 4; at Reading, 4½; at Wakefield, 7; at Melrose, 5; and at Malden the train did not stop. The Vacuum train made the following stops: At Andover, 23½ seconds; at Ballardvale, 19; at Wilmington, 19; at Reading, 12; at Wakefield, 91; at Melrose, 11; at Malden, 8.

"The locomotive of this train was short of steam, it being so low she started the train with difficulty at nearly every station."

Signed by the Committee.

The following named gentlemen were then elected officers for the ensuing year: President, J. W. Van Houten, of Pittsburgh, Pa.; Vice-President, V. D. Perry, of Hartford, Conn.; Secretary, Leander Garey, of Morrisania, New York; Treasurer, A. Steinbach, of Reading, Pa.

The New York members of the Association were under the care of a committee consisting of General E. S. Greeley, Chairman; Albert Brady, P. R. Wood, Colonel R. S. Ricker: C. Roby, L. Valentine, and C. W. Kalkman, who made all the arrangements for the trip in a very thorough manner, taking charge of the excursions and playing a very useful and well appreciated part throughout the meeting. While on the excursion to Newport three more trials of the Westinghouse brake, which has been on this train for three years, were made with the following results: First trial, speed 35 miles an hour, time 33 seconds, distance 888 feet. Second trial, speed 33 miles an hour, time 31 seconds, distance 942 feet. Third trial, speed 33 miles an hour, time 27 seconds, distance 696 feet. There was a down grade of thirty feet at the time of the last trial.

Explosion of a Safety Boiler.

THE explosion of "safety" boilers is beginning to be an item of telegraphic news of disagreeable frequency. As every one knows, the only element of safety in these boilers is to make them of a great number of small parts combined in such a way that the rupture of one shall not necessarily be disastrous to the safety of the others. By this device it was hoped the alarmingly violent and destructive explosions could be prevented, and in some measure this is undoubtedly the case. But bad workmanship cannot be kept from working its will in any kind of construction, as was lately proved in an establishment near London, where a Howard Safety Boiler exploded, killing four men, and scalding others severely. *Engineering* gives the following account of the occurrence. It will be observed that disastrous as were the consequences of the accident, the sectional system answered well the object for which it is especially designed—the rupture was confined to one part of the boiler:

"The boiler is one of two, each consisting of five five-tube sections, worked at 150 lb. pressure, sometimes at 155. The steam gauge is figured up to 160 only, but has ranged up to about 170 lb. The tubes are 12 ft. long by 9 in. diameter outside, 8¼ in. inside; there is a ring at the back end ⅝ in. thick, 7 in. diameter inside, welded to the tube end. This welding gave way, and the tube blew out, and the two boilers were entirely emptied of both water and steam. The building was quite uninjured, and if a new pipe had been at hand the works might have been going on as usual in an hour after the explosion. An inquest was held on Saturday last, and adjourned to last Wednesday, when the coroner produced the evidence of Mr. E. B. BARNARD, who, as a skilled engineer, had inspected the injured boiler. His evidence was to the effect that the ring had never been welded—that it had missed the heat. Messrs. HOWARD'S workmen gave evidence that the appearance of separated welds, if the separation was made when the metal was heated, would show no torn surface, but an even black skin, just as it had before welding. The question appeared to turn upon the accuracy of this statement, and the owners, Messrs. MARTIN and SHIEL, asked that the inquiry might be adjourned to get the opinion and tests of Mr. KIRKALDY, of the Grove, Southwark. On Saturday morning the inquest will be continued, and we will report the result of this interesting question in our next. At the inquest we observed Mr. LONGRIDGE, Mr. HEATH, and other representatives of boiler insurance companies, and Mr. McF. GRAY, from the Board of Trade, who, we understand, have all examined the boiler, that the lessons it teaches may not be lost. It is an error, we think, to work steam boilers with steam gauges marked only up to a mere trifle above the ordinary working pressure, especially where such rapid generators of steam are used as these boilers unquestionably are. If the safety valve should stick, the pressure would in a minute or two have carried the finger to the limit of its range, and there would be no indication of further increase of pressure, until an accident occurred. In this case, it appears, that was not in any way connected with the explosion, but we nevertheless think it important to take the opportunity to impress the importance of this precaution on our readers.

The Saint Gothard Tunnel.

The accounts of the progress of this great work to the end of March are satisfactory. According to the accounts of the Swiss Federal Council the driftaway had been driven on March 31 to the extent of 252 metres, enlarged to its full size along 210 metres, and the masonry finished over a distance of 103 metres. The average number of men engaged in the work during the month was 617, and the maximum number 813. On the Göschenen side the tunnelling is through granite, or a hard gneiss, more or less faulty, and full of fissures. On the last day of March the first experiment in mechanical perforation was made with the machines of MM. DUBOIS ET FRANÇOIS. The operation took place on the Airolo side, through a schist in beds of unequal thickness. At the distance of 148 metres from the mouth the temperature of the air was 13 deg. c. and of the water 70 deg. c., the air outside the mouth of the tunnel showing a temperature of 7 deg.; at 162 metres the air rose to 17 deg. c., when the outer air showed 9 deg.

The infiltration, which was trifling at first, grew in proportion as the increase of the mica and the diminution of quartz, and the frequency of argillaceous beds between the mica and schist, all of which circumstances, of course, diminish the consistency of the soil excavated. The quantity of water augmented considerably at the point of 164 metres; a stream broke in at the rate of more than 16 gallons per second, and disintegrated the rock to such an extent that several slips occurred, and the work was suspended in consequence for some days. At the end of March the outfall of water at the mouth of the tunnel was found to be equal to 9 gallons per second.

Nature of Loess.

In an inaugural address by Jentzsch, discussing the "quaternary strata in the vicinity of Dresden, and the formation of loess in general," he concludes, from careful examination of, and experiments with, loess, that all its essential characteristics are simply consequences of the degree of comminution, and are sufficient to separate it geologically from loam and clay. Its particles are chiefly from about .0008 to .0016 of an inch in diameter, and those of plastic clay and loam about .00024 to .0004 of an inch. The cohesion of the loess is consequently less than that of clay, and it falls to pieces in water on this account, as well as because the angle of friction is lessened by water. Absence of stratification is explained as resulting from the obliteration of sharply-defined margins of the earlier deposits by this effect of water; and strata are consequently only recognizable when

the layers are in different states of comminution. The properties, as well as the location and contents, indicate that it is a fluviatile deposit in overflowed portions of valleys.

MINING SUMMARY.

Nevada.

The London *Mining World* publishes the following report on this mine:

EBERHARDT AND AURORA.

I have delayed thus long making any report on the condition of the mine, for the reason that my time has been so much occupied in attending to other matters, which would not admit of delay, that until lately I could not give myself the opportunity to examine the mine and into its workings in so careful and thorough a manner as would justify me in making any report to the board, or enable me to state with any degree of accuracy what changes, if any, may be necessary in the manner of prosecuting the work, or what may reasonably be anticipated as the result of future operations; nor can I now see far ahead, as we are working on top of the ore, with few reserves on hand, and little prospecting done to develop ore on which to rely, should the ore bodies in which we are now working give way. In my explanations I shall commence with the north end of the mine Ward Beecher, and in speaking of depths will use the dotted line A B on the map-tracing forwarded to you this date, that being the surface level of the Ward Beecher shaft. The principal or deepest of the group of shafts on this end is the Ward Beecher (marked *a*). This shaft has been sunk to the depth of 136 feet, and is used as the principal working shaft for this end of the mine (the steam hoisting works being in use there), and and reaches the level of the bottom of the Lady's chamber (marked *e*). *b*, and *c*, on the tracing, represent respectively the Blaisdel, the Autumn Whip, and the Buchanan chambers, and will be remembered by you as the locality of what is familiarly called "the big blast." From these the ore has been almost entirely extracted, small amounts being left at intervals along the sides, but at present unobtainable, by reason of the quantity of snow still remaining in the open cut. There can, probably, be about 500 tons of milling ore taken from this point. Continuing south along the tracing, I pass the portion marked *d*, no developments of sufficiently high grade ore for milling having been obtained. From the Lady's chamber large amounts of good ore have been extracted, and four pillars still remain, but cannot be taken out at present without great expense, as they support the roof of the chamber. There is some ore, too, on the sides, which is also at present unavailable; it is difficult to estimate the quantity. I now come to *f*, the east chamber—this is the same depth as the Lady's chamber: there is still remaining on the roof some good ore, and also on the bottom. Just how far it may extend upward or downward it is impossible to say, and can be ascertained only by prospecting or working. From the bottom of this chamber, and 100 feet easterly from the Ward Beecher shaft, a prospect shaft (8) has been sunk to a depth of 102 feet 10 inches on the east and west break, but no developments of ore have resulted from it. *g*, *h*, and *i* embrace the middle, east and Napoleon chambers, and in these ore is left of low grade. From the southwest corner of the Lady's chamber, and at the same depth, a drift designated *n* has been run, connecting with the central shaft (15); this drift is in barren rock, mostly limestone. The central shaft is 152 feet deep from surface (128 feet from line A B); at the bottom of this there are indications of ore, which I am now developing, but have not obtained any as yet of sufficiently good quality for milling; the indications, however, are very favorable. Leaving the north, and passing to *a*, *b*, and *c*, at the south end of the mine, we have the Ridsdale and DePass chambers. In these the ore may be estimated at about 1,000 tons, lying on the east and west sides, and in two pillars; there is also ore on the bottom, but to what depth it may extend it is difficult to say, as no prospecting has been done to indicate it. The South Aurora tunnel has been continued from the line of their claim in a northerly direction, a distance of 240 feet, passing under the DePass chamber 132 feet from the surface level, A B, and connected with the Pearless chamber (C). Here we have a very fine body of ore; we have worked it to a depth of forty-eight feet from the bottom of the tunnel, by fifty feet from north to south, and thirty feet in width from east to west. We are still in ore in the north and east sides to their full extent; the bottom is also all in ore. From this chamber the Stamford mill is being mainly supplied. The indications are that this will prove very extensive, and I regard it one of the finest, and believe it will prove the largest body of ore yet developed by this company; at all events, should no unforeseen change occur, I do not anticipate any difficulty in filling from it our contract with the Stamford mill, at least. The Eberhardt mine I am not working, as there is no ore available of a grade fit for milling. It has not been prospected to any greater depth than it was at the time it was transferred to the Eberhardt and Aurora Company. The Blue Bell shaft is down 184 feet, and from the bottom of this a drift is run, in an easterly direction, 140 feet, to the Atwood shaft, which is 160 feet deep. There is also a drift run from the Blue Bell to the Keystone shaft, a distance of 170 feet. The ore on the dumps is of inferior quality; would about pay for the expense of assorting and milling had the company a mill of their own. There are on North Aurora dump 500 tons; on Ward Beecher, 150 tons; and on Eberhardt, 40 tons; in all, 690 tons. Somewhat different figures from my predecessor's report of 3,700 tons; but I state just what there is. From reading the foregoing dry remarks one might be led into the supposition that there is very little mine left, or that it is of little value; this, however, would be quite a mistake. I write on the conditionof the mine as I find it, and as it has been worked; the truth is it has been overworked, if I may use the expression, that is—in the endeavor to make it furnish 60 stamps, when it could, as developed, only supply 30, it was overtaxed—the proper order of things was reversed, and instead of the mine crowding the mill the mill has been forcing the mine, and consequently no systematic prospecting has been done, but whenever a pound of ore was found it was immediately pounced upon to send to the mill without a due regard to the state in which it would leave the mine; the mine has always been worked on the top of the ore, and what in most instances are called "reserves," are only certain (or uncertain) amounts of ore which it was found either undesirable or impossible to remove; as a further result I find that the ore has to be handled several times before it reaches the surface, from some points as often as seven times. Now, when it is remembered that handling once the quantity of ore extracted is a charge of one dollar to each ton of milling ore, it will be seen how greatly this frequenc, of handling adds to the expense of mining. The cost of mining must be reduced, and the only way to bring about that result is to systematize the "prospecting" or "dead work;" to have certain central points to radiate from, and prosecute the labor in such a manner that when ore is found it can be taken to the surface without losing its profit on the way. With these considerations in view, I propose (if I have the necessary means) to sink the central shaft so as to connect with the Pearless chamber; to sink the Ridsdale shaft seventy-five to eighty feet, and through that take the ore from the Pearless chamber to the surface; and to sink the Ward Beecher shaft 100 feet, to connect by drift with Prospect shaft, and to run drifts south and east. I should sink the Atwood or Blue Bell shaft (on which there is a good whim ready for use) deeper, for I have not the slightest doubt of being able to find good ore by prosecuting the work on this (hitherto neglected) mine; the Ridsdale and Ward Beecher shafts should also be cut and rearranged for the more economical handling of the ore. All of this will involve an outlay of 5,000*l.* to 6,000*l.*, dependent somewhat on the character of the rock through which we pass; but it must be done, in order to work the mine economically and profitably and develop its resources; and I have full confidence that the carrying out of these projections will open up as fine and extensive bodies of ore as those heretofore worked by the company; and with the works in the condition in which this expenditure will place them, the company will be enabled, by the consequent reduction of the mining cost, to realize good profits from the mine. In this connection I may observe (and I do so without any desire to cast reflection upon the integrity and skill of my predecessor) that it has been the custom heretofore to return one-third of the labor as "dead work." This is all a mistake, as, with the exception of the Prospect shaft, from which no drifts have been run in my direction, very little "dead work" has been done, much of what has been estimated as such having been work necessary to be done in extracting the ore. I can safely promise that I can meet all the expenses to be incurred in carrying out the foregoing plan from the profits to be derived from our Stamford Mill contract; but two things are necessary for the assured and speedy success of the company—first, a mill belonging to the company; and second, working capital. A 30-stamp mill can be erected for say 13,000*l.* to 15,000*l.*, by using such portions of the old machinery as can be made available. On this I will shortly send you a closer estimate, but in the meantime beg to call your attention to the importance of immediate action, as our seasons are short, and if the company are determined to build no time should be lost. The company should have a credit in San Francisco of 10,000*l.*, thus enabling them to be prompt in their payments, to take advantage of markets, save the high rates of interest prevailing here, and place their financial condition a on a proper basis, as well as putting them in such a position that, should bankers at any time overcharge for commission, exchange, or interest they could, without fear of disastrous consequences, either demand fair dealing or withdraw their business. Hoping to hear of prompt action in regard to the foreging statements, etc. F. DRAKE.

Utah.

LITTLE COTTONWOOD DISTRICT.

From the Salt Lake City *Herald* of June 25.

ALTA, June 20, 1873.

We are now having a season of moisture under foot. The streets of Alta are taking pattern after Salt Lake, only the water courses here are more eccentric and meander about where they please, even taking the liberty to empty their contents into the houses, where the houses are below the level. The snow on Emma Hill has almost disappeared within the last two days, and the numerous buildings that dot the side of that noted mountain, and which have been buried for months, are beginning to make their appearance. Everything goes in this country, and even our snow is going—an item which we are glad to note. The roads from here to Granite are much better than they have been since winter. The road between this place and the Emma mine is in very bad condition. The snow has melted so rapidly that the streams have cut the road into all manner of shapes. A large force of men is employed on this road, and it will soon be in good order. It is passable now, as a number of wagons have loaded at the mine, during the last two days. The road from the Emma mine to the Davenport ore house, on Grizzly Flat, is now being placed in condition for wagons. The Davenport company have had a large force of men engaged on the road all the week; banks of snow and ice, fully ten feet in depth, have been shovelled through. Next Monday we hope to chronicle the arrival in Grizzly Flat of wagons.

Grizzly Flat is a burgh that something good will be heard from this summer. The inhabitants thereof are energetic, industrious, and generally sober. There are no business houses established here yet, the mining companies and miners obtaining their supplies at Alta City. Some of the most prominent mines in Cottonwood are located just above and around this flat, among the principal of which may be mentioned the following well known claims: The Davenport, Matilda, Grizzly, City Rock, Darlington, Herman Tunnel, Topeka, and Amy Dagmar. There are a number of other claims that are very promising around this Grizzly Flat, and that town is about to rise like a ship's mast through a fog.

THE FLAGSTAFF MINE—Has shipped about one hundred and fifty tons for the week. It has had a large number of men employed on the road, and did not ship ore the latter part of the week.

THE VALLEJO—Shipped about twenty tons, but discontinued during the latter part of the week for the same reason.

THE EMMA—Shipped about eighty tons. Good reports are afloat about this mine, and public opinion is daily growing in its favor.

THE DAVENPORT—Shipped twenty tons. This mine discontinued shipping on the 9th of the month, and will not ship any more ore until the teams can load at the mine.

The City Rock has discontinued for the same reason.

THE WELLINGTON—Shipped about ten tons. It is reported that this mine is full of water, and will not be able to ship for some time.

All of the principal mines in the camp are obliged to discontinue work for the same reason. The snow has melted so rapidly that it has flooded everything. Land and snow slides have been frequent during the week, but fortunately no accidents have occurred yet.

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The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is doubly valuable as a permanent means of keeping an advertisement before the public. It is the Organ of the* AMERICAN INSTITUTE OF MINING ENGINEERS, *and is regularly received and read* BY ALL THE MEMBERS AND ASSOCIATES *of that large and powerful society,* THE ONLY ONE OF THE KIND IN THE COUNTRY. *It is therefore the best medium for advertising all kinds of machinery, tools and materials used by engineers or their employees. It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country, and presents the very best means of reaching that very important class of men.*

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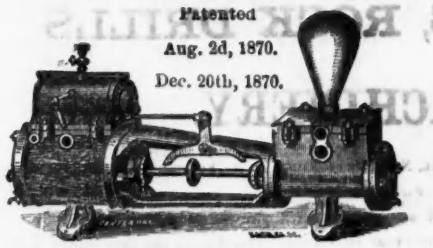

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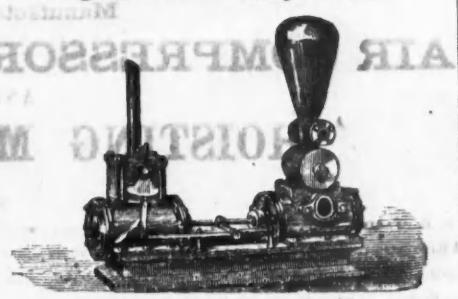

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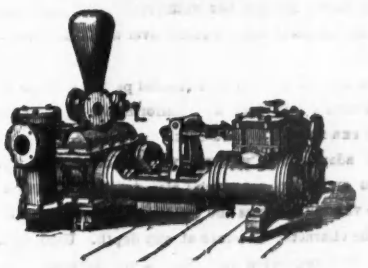

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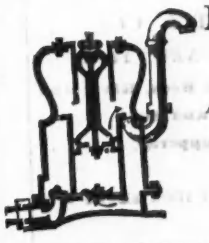

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