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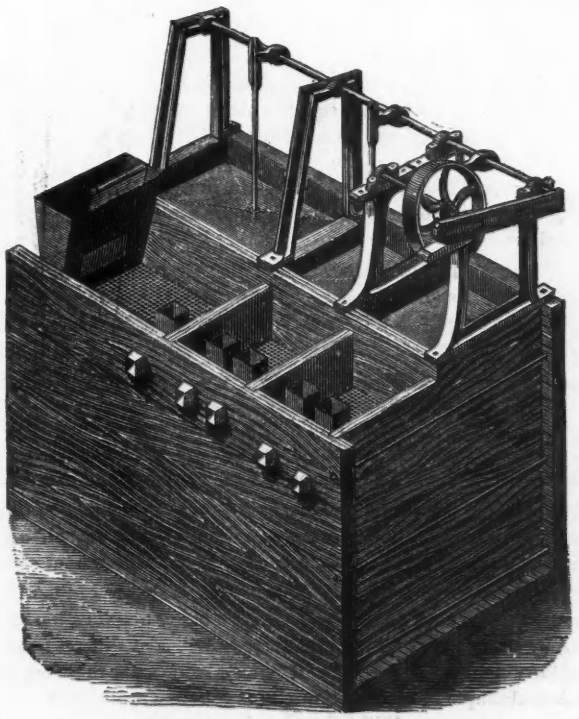
The Utsch Automatic Jig.

BY HENRY ENGELMANN, E. M.*

(Continued from page 378.)

The Utsch Automatic Jig is the latest valuable improvement in jigging machines and comes very near perfection. It concentrates to the highest degree ores which are the most difficult to separate, it does its work better and faster than any other jig now in use, and it separates in one operation as many of the different minerals constituting the ore as it may be desirable to sort out, provided they have sufficiently distinct specific gravities. It performs a great amount of work entirely automatically, without the least intervention of manual labor, surveillance or regulating, requiring no attendance for weeks and months, after having once been adjusted for an ore composed of a certain variety of minerals, although these may occur at different times in ever so varying relative proportions. It then works unremittingly, performing its task in the best possible manner, never missing. When the motive power stops it rests also, and resumes work without the least disturbance when the power is again thrown in gear. The relative quantity of the different minerals in the ore may change ever so much, one or more of them may be almost wanting for days together, still the machine will work on as before, with equally good results, like an intelligent being. All that is necessary is to supply it with food, with crushed ore, and to take away the finished product which it has discharged in cars or bins. The machine thus enables the operator to dispense with all manual labor, with its expense and uncertainty. There is no need of watching inexperienced or unreliable laborers, no shirking, irregularities, negligence or strikes, no holidays or pay days.



THE UTSCH AUTOMATIC JIG.

The machine does not differ in the general construction of its outer parts, and in the manner in which the machine power is applied, from an ordinary machine jig with plunger of the better patterns. Its distinctive feature and great excellence is secured by the manner in which the discharge of the separated minerals is regulated. This is done in the best pattern by pipes immersed from above in the ore bed, in which columns of the different minerals of different specific gravity and height, but of equal absolute weight, balance each other in, I might say, hydrostatic equilibrium, while discharging at different altitudes. The superiority of the machine is thus obtained through the application of strictly scientific principles combined with the life-long experience and the result of innumerable trials of the practical ore dresser. It was invented and first put in operation in Germany. After it had been thoroughly tested there, it was simultaneously patented and introduced in England and the Continental States, in Australia and America, and has met with the most universal approbation and success, because it is not only excellent in itself, but just the right thing produced at the right time—an outgrowth of the necessities of the hour. Nobody who has intelligently watched the operation of this machine can fail to appreciate its unsurpassed performance.

In the United States it was first introduced in the ore dressing establishment of the Matthiessen and Hegeler Zinc Company, at Lasalle, Illinois. They put it on trial for several months alongside of the excellent continuously working jigs which they had in their works, which had been built after the best patterns, and were perfectly satisfactory in their performances. Nevertheless the new machine displaced them and sent them to the rubbish pile, by its palpable superiority.

We will let figures speak for themselves. At Iserlohn, Germany, the machine was first constructed and used for the separation of an ore containing of valuable minerals, a few per cent. of galena with some zinc-blende and calamine, which were associated with iron pyrites in a gangue of spathic iron ore, quartz, and siliceous slate. The object was to obtain the lead ore and zinc ore separately and free from the other minerals. This mixture is a peculiarly difficult one to dress, in as much as the spathic iron ore has not only almost the same specific gravity (3.7 to 3 9) as the zinc ores, (blende=3 9 to 4.2,) but the calamine formed by the oxidation of the blende is often porous and light, while the spathic iron breaks in lamellar fragments which are difficult to dress out. This ore had caused much trouble before the introduction of the new machine, but now the result was eminently satisfactory. The product was a rich galena ore and an excellent zinc ore obtained in one operation, while the refuse contained only a minimum of metallic matter. As an average result of two months' operation, a single jig with three sieves, with an aggregate length of 60 inches and a width of 20 inches, worked up 55 tons of raw material in ten working hours, and yielded seventeen and three-quarter tons of concentrated lead and zinc ore without the employment of a single laborer, except for hauling away the finished product. It was then found that for this machine a less perfect sizing or sorting of the crushed ore was necessary than for ordinary jigs. The machine worked perfectly with a mixture of grains of such sizes as can well be treated with the same length of stroke, thus allowing considerable latitude, and enabling the operator to dispense with several sieves or sizing drums, affording an advantage in simplicity and cost of plant over dressing establishments with ordinary jigging machines.

At Lasalle, Illinois, the ores are partly zinc blende mixed with some galena, calamine, a little pyrites, and veinwork, partly oxidized and consisting mainly of calamine with some blende, galena, lead carbonate, oxide of iron and gangue. They contain a large percentage of zinc ore, and the object in dressing them is, therefore, not to separate a few per cent. of a valuable mineral from a preponderating mass of barren work, but to concentrate still more and purify as much as possible an already valuable and moderately rich zinc ore; especially to free it from the deleterious admixture of lead ore, and incidentally to change the latter from an unwelcome substance, causing trouble and expense in the manufacture of the zinc, to a valuable article of commerce. The result of this concentration is, therefore, an almost pure galena ore and a highly concentrated rich zinc ore. Both kinds of ore, the blende as well as the calamine, are worked in the new machine alternately without the least inconvenience, and without its requiring any regulating whatever when the change is made. For the last three months the machine has been working day by day, and not been touched nor regulated, and there is no reason why it should not work on thus until some parts are worn out and need repairing. The raw ores at Lasalle, contain a far higher percentage of valuable minerals than those at Iserlohn, and the final product is dressed to a higher percentage. Consequently a much smaller proportion of the raw material can be discharged from the first sieve as worthless waste soon after entering the machine.

* Read before the American Institute of Mining Engineers, at Philadelphia, May 21, 1873.

From 80 to 90 per cent. of it, consisting of mixed grains and ore, have to pass further along in the machine. A far smaller quantity of raw material will, therefore, keep the machine taxed to its utmost capacity, under circumstances similar to those existing at Lasalle, than where poor raw material is dressed. At Lasalle the jigs have, moreover, not always been fed to their full capacity. The amount of raw material worked up in a machine at Lasalle has therefore been less than at Iserlohn, but the quantity of concentrated ore obtained has sometimes run up to 19 tons of blende alone in 10 working hours of one jig, varying between that number and 13 tons, irrespective of the lead ore and of the middle grades which were returned to the fine crusher. The one machine here made 5 distinct divisions of material consisting mainly of :

a. Gangue and non-metallic waste.

b. Grains consisting of gangue, with calamine or blende attached, which are crushed finer.

c. Zinc-blende and calamine for the zinc furnaces.

d. Grains of zinc ore with particles of galena attached, which are crushed finer.

e. Pure lead ore.

It thus appears that the quantity of ore which the automatic jig can dress depends, much as with other jigging machines, mainly upon the percentage of valuable ore which the raw material contains, and also upon the percentage in it of mixed grain which has to be returned to the crusher after having been separated by the machine. It varies under these conditions between about 20 tons of rich raw material and 55 tons of poor raw material for 10 hours work per jig. The size of the single grains of ore has a further influence upon the capacity of a jigging machine. A very fine grain retards the operation materially.

LOSS.

The loss of mineral in jigging by this machine is very small, smaller than in any other jig, because it always does its work uniformly well and automatically, and is not dependent upon the attention of a laborer. Its construction precludes the discharge of ore matter with the refuse. Even with common jigs, when they are carefully worked, the loss is quite small, and the loss of mineral in ore dressing occurs principally in the treatment of the finest sands and slimes, which are too fine to be successfully treated with jigs, and which offer little resistance to the flow of water.

Recently the use of jigs has been extended successfully to the finest sands, which it was formerly found impossible to treat in this way, and the use of other concentrating apparatus is more and more narrowed down.

The principle upon which the automatic self-regulating discharging arrangement of the URSCH machine is founded, is that of mutually balanced columns of materials or minerals of uniform specific weight in each column, and different specific weights in the different columns. Each column discharges the surplus at once wherever an accumulation of the material composing it increases its height, and this it is that makes the separation in it so perfect, far exceeding that obtained by any other arrangement of the discharge. A column of galena of 7.5 specific gravity and 3 inches height, exercises the same pressure as a column of blende of 4 specific gravity and 5.62 inches in height, or a column of quartz of 2.6 specific gravity and 8.66 inches in height. They balance each other. In the jig the height of the water in each partition, and other minor conditions enter into the calculation. If, then, the construction of the machine and the operation of jigging prevent the access of quartz to the blende column, and of the blende to the galena column, the arrangement is complete and cannot fail to operate with mathematical precision, irrespective of the varying quantities of the single minerals.*

If no galena is contained in the ore fed to the machine, the galena column will remain stationary and not discharge, but the discharge will be resumed as soon as galena is again mixed in the ore. With the other minerals it is the same. The first adjustment of the machine requires intelligent management and considerable experience ; but its parts are so extremely simple, that once adjusted properly, it cannot get out of order until some part is worn out.

Being quite simple in their construction, these jigs are very durable—more so than most other jigs—and need few repairs, and these can be easily executed under any circumstances, without the assistance of experienced mechanics. The sieves are made of the usual material, are solidly fastened, and not weakened by perforations or inserted pipes or slots, which always cause a premature destruction of the sieves. The discharge pipes enter the ore bed from above and do not touch the sieves. They are of the plainest form, and can be exchanged any moment if they should wear out by the attrition of the ore, which is seldom the case.

The motive power is applied in the usual manner ; best by means of crank and slide or by eccentrics. The power required for such a jig is about one-third horse power, of course varying with the size of the grain, the different sizes requiring different lengths and number of strokes of the plunger.

The quantity of water necessary is about four cubic feet per minute per jig ; for fine grain somewhat less.

The weight of the machine is that of a common machine-plunger jig of the same size, as there is nothing unusual in its general construction. The peculiar parts of it weigh not more than a few pounds. The body of the jig can be made of wood at the place where it is to be put up.

The URSCH machine is calculated to dress ore which has previously been sorted or sized by means of sifting drums or shaking sieves, like most machine jigs, and as is necessary in all cases where minerals difficult to separate are to be dressed out. It can be used for grain varying between 1 and 30 millimetre (0.04 and 1.2 inches) in diameter ; but every ore dresser is well aware that different sizes of grain require a different length and number of plunger strokes. These widely varying sizes of grain cannot therefore be dressed together without sorting. Yet with the automatic jig, on account of the admirable thoroughness with which it performs its task, difference of size of the pieces of the ore to be separated, is of less moment than is the case with ordinary jigs, in order to secure a complete dressing ; in other words, it can dress ore-masses of more unequal or less uniform grain than other jigs. At the La Salle works, where formerly six sizes of jig-stuff were separated between 1 and 22 mmtr. diameter, four sizes proved sufficient between the same limits for securing satisfactory results with the new machine. For ores more easy to separate, the sizing might be still further reduced to three numbers ; but for ores rich in precious metals and of somewhat complicated composition, the sizing should be performed in the most complete manner in order to avoid everything that might possibly cause loss, and to be able to separate even such grains which contain only a small fragment of ore attached to a mass of gangue, or base mineral.

For an ore dressing establishment of sufficient capacity it will of course be advantageous and necessary to have a separate jig for each size of grain ; but for a smaller establishment which could not keep so many jigs in constant operation, several sizes of grain may be alternately worked on the same jig without changing any thing except, perhaps, the length of stroke, which can in all cases be done easily. If the largest size of grain is not too great, even one jigging machine might suffice in this manner. The sizing drums would then have to work into bins from which their contents would be alternately carried by spouts to the jig.

We need hardly say that the automatic jig can equally well be used for purifying the coal slack for the manufacture of coke. The first discharge pipe will then yield the pure coal, the second the slate, and the third the sulphuret of iron, which are mixed with the slag. By actual trial, the dressing has been found excellent beyond expectation.

One jig of the size of an ore jig, as given above, worked up in 10 running hours over 1000 cubic feet of slack, equal to about 33 tons ; but for dressing coal, the sieves can, without injury, be made much wider than in ore jigs. Instead of 20 inches the width can be increased to 30 or 32 inches, in which case they can dress 50 or more tons of screened slack in 10 hours per jig. In effectiveness and quality of the work done, they can therefore not be surpassed by any other similar machine.

The States of the Mississippi valley, with all their wealth of bituminous coal and iron ores, have hardly begun to realize the importance of supplying the immensely growing pig iron interest with a superior article of coke. For a long time it was thought that the coal of the Mississippi valley was too impure for that purpose ; but it has been proved conclusively and on the largest scale, that these coals can be sufficiently purified. Some failures have occurred, as in most new branches of industry, a result of inexperience and mismanagement ; but final success is no longer uncertain, and the new automatic jig will help to accomplish the desired result by its incomparable efficiency and exactness of work.

The automatic jig can likewise be used for the concentration of the phosphates from the sands with which they are found mixed, and for all other purposes of separation where there is any difference in the specific weight of the substances.

Summing up the foregoing remarks, we can truly say of the automatic jig that it does better work than other jigs, effects a closer dressing, enables us to separate in *one* operation with great precision any number of different minerals differing in specific weight, dispenses with all manual labor, does therefore cheaper work, is durable and simple in construction and is equally effective for dressing ores, coal, and other substances. With all these advantages it renders the plant cheaper by enabling us to use a smaller number of sizing drums and a smaller number of jigs.

* In the machine represented in the drawing, the area of the sieves is divided by partitions into 3 compartments, communicating with each other by slots of the width of the sieves and placed immediately above them, which allow only the heaviest material on each sieve to reach the next compartment. This progress of the heavy material is facilitated by placing each successive sieve lower than the preceeding one.—H. E.

Quicksilver at the Vienna Exhibition.

IN the pavilion of the Ministry of Agriculture, erected on the Exhibition Place, which contains highly interesting collections, a floating cannon ball may be seen. Although weighing 50 lb. it lies like a down feather on a splendid silvery mass, consisting of pure quicksilver from the celebrated mines of Idria. 150 cwt. of this metal is exhibited in a large iron caldron, offering a sight seldom to be met with, and on it rests the solid iron ball. It was interesting to observe the emptying of the quicksilver into its receptacle. The metal is very cleverly stowed away in bags of white sheep leather, specially prepared for the purpose, each containing 50 lb. of the mass, the bags being tightly bound round the top, and then put into small wooden barrels, carefully bunged up. Formerly, this liquid metal, which penetrates easily all porous substances, was transmitted in wrought-iron bottles of very expensive make. A gentleman, in testing the resistance of the metal, had to use some force in inserting his hand into the mass ; but how great was his surprise when, withdrawing his hand, he found that two gold rings he wore had been changed to silver.—*Iron.*

THE COAL TRADE.

NEW YORK, June 20, 1873.

The trade in Anthracite shows an increasing improvement though not a marked one. This is the week for fixing the rates for another month, and though our paper goes to press too early to obtain all the reports, we give below such as have reached us. It will be seen that the ten cent advance comes as if it were moved by clockwork.

The Delaware and Hudson Canal Company's prices are:

Furnace, Lump	$4 75
Steamer, Lump	4 85
Grate	4 95
Egg	5 10
Stove	5 30
Chestnut	4 75

The Lehigh Coal Exchange has fixed the following prices:

Lump	$5 55
Broken	5 40
Egg	5 40
Steamer	5 55
Chestnut	4 85

The Philadelphia and Reading Company's advance chequers their list up in very promiscuous style, as will be seen by comparing last month's prices with the following:

	Lump	Steamer	Broken	Egg	Stove	Chestn
Hard White Ash Coal	$4 30	4.30	4.40	4 40	4.60	3.65
Free Burning White Ash Coal	$4 30	4.30	4 40	4 40	4.60	3 65
Schuylkil Red Ash Coal			4 40	4 55	4 75	3.75
Alaska Red Ash "			4 40	4.40	4 60	3.65
Shamokin White Ash "			4 55	4.70	4.80	4.00
Shamokin Red Ash "			4 55	4.70	4 80	4.00
North Franklin "			4 7	4.85	4 85	3 75
Lorberry "			4 95	4 95	4 95	4 00
Lykens Valley "				5.85	5.85	4 50

The Pennsylvania Coal Company announces the following rates:

Lump	$4 70
Steamer	4 70
Grate	4 80
Egg	4 90
Stove	5 20
Chestnut	4 70

The Wilkesbarre Coal will be in July:

Lump	$4 75
Steamer	4 85
Broken	4 95
Egg	5 10
Stove	5 30
Chestnut	4 75

The price for Lindermann's Sugar Loaf Coal is fixed as follows:

Lump	$5 70
Broken	5 55
Egg	5 55
Steamboat	5 60
Chestnut	4 90

Mr. GOWEN, President of the Philadelphia and Reading Railroad, has gone to Europe for three or four months, and during his absence Mr. J. W. JONES, first Vice-President, will officiate in his place.

The Reading (Pa.) *Eagle* says: "A company of surveyors are now surveying a route for a coal railroad from Belmont (in Philadelphia), on the eastern side of the river Schuylkill, coming up on that side of the river, to Phœnixville, where they will have to tunnel the Black Rock hill, and from there they will bear to the north to the valley of the Goschenhoppen in Montgomery County, following up this valley to the Lehigh, from which point they expect to obtain coal. The length of the road will be about 160 miles. The surveyors are now between Norristown and Phœnixville."

Bituminous.

Trade is fair, but only fair; prices are firm.

Bituminous Coal Trade, 1872 and 1873.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending June 14, 1873, compared with week ending June 15, 1872.

COMPANIES.	1872. Week.	1872. Year.	1873. Week.	1873. Year.
C. & O. Canal	18,111	230,905	23,134	218,796
B. & O. R. R.	26,581	549,5.8	28,305	618,115
Penn. S. Line	....	.....	1,474	39,810
H. & B. T. R. R.	....	131 240	....	204,279
*Harrisburg & D.	9 680	240,6?8	5,770	165,769
*L. V. R. R.	449	14,830	898	14,7?6
P. & N.Y.C. & R. Co.	8,875	175 857	5,997	150 151
Cumberl'd Branch Canal	6,153	73,940	2,349	33,553
" Railroad	944	7,497	2,315	52,681
Total	70,796	1,424,365	71.442	1,497,952
Decrease	....		70 796	1,424,365
Increase	....		646	73,587

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending June 14, 1873.

	1873. WEEK.	1873. YEAR.	1872. WEEK.	1872. YEAR.
By Railway	29,571 11	499,501 05	25,003 08	520,483 08
" Canal	121 08	2.01 03	....	1,429 03
	29.692 19	504,102 11	25,003 08	521,912 11
Decrease, 1873	19,810 89			

Anthracite Coal Trade for 1872 and 1873.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending June 14, 1873, compared with the week ending June 15, 1872.

COMPANIES.	1872. WEEK.	1872. TOTAL.	1873. WEEK.	1873. TOTAL.
*Phila & Reading R.R†	113,?47	2,040 034	112.271	2,259 945
*Schuylkill Canal	21 214	292.411	2 124	228 311
*Lehigh Valley R. R.	64,472	1,597.418	65.407	1,6?0,?8?
Lehigh & Sus. R. R.	39,406	732,446	42.319	873 146
" " Canal	25. 95	215.404	2?.254	2?6.733
Scranton North	15.403	295.825	21,219	331 ?76
" South	44,462	933.718	47,979	1,040 666
Penn. Coal Co., rail	25,.03	520 483	29.57	498,501
" " canal		1.429	121	2 601
Del. & Hud C. Co. Canal	41 675	389 907	44.4.0	417,736
" " East	13,?60	303,449	10,315	175,660
" " West	8,336	159.719	10,582	203,891
" " South	8,214	112,246	1,283	123,394
Shamokin	12,727	217 783	12 173	247,739
Trevorton	..	....	....	....
Lykens Valley Coal Co.	....	....	....	....
Wyoming North	....	..	....	....
Wyoming South	....	....	....	....
P. N. Y. C. & R. R. Co.	11,722	298,215	14,657	329,696
Williamstown Co'y	....	.....	....	....
Big Lick Col	....	.....	....	....
Total	450,447	8,211,193	458,646	8,540,655
1872			450,447	8.211,193
Increase			8,199	329,462
Decrease				

These figures are for the week and fiscal period commencing Nov. 30

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

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending June 14, 1873.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received:		
From Lehigh Valley R. R.	10,220 00	206,895 00
" Lack. & B. R. R.	540 14	15,862 18
" Pleasant Valley R. R.	2.557 05	87,987 10
" Sul. & Erie R. R.	1,338 19	18,950 15
Total	14 656 18	329,696 03
Same time last year	11,722 07	298,214 16
Increase	2,934 11	31,481 07
Decrease		
Distributed:		
To Lehigh Valley R. R.	15 00	20,352 12
To Lack. & B. R. R.	33 00	575 06
To S. Central R. R.	4,331 18	78,639 13
To Ithaca & A. R. R.	3,432 18	49,583 16
To Erie R. W. Pockets for shipm't.	5,656 15	115,?14 05
To individuals on line of road	125 04	17,271 18
To points at & above Coxton for use of Co.	447 12	14,530 02
To points between Waverley and Elmira	613 12	32.925 11
Total	14,656 18	329,696 03
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	5,984 12	149,129 03
Shipped south from Towanda	12 00	976 08
Northern Central R. R.	....	45 14
Total	5.996 12	150,151 08
Same time last year	8,874 16	1?5,856 13
Increase	.....	.....
Decrease	2,878 04	?5,705 05
Distributed:		
To Erie Railway	5,713 03	130,378 08
To So. Central R. R.	271 09	18,565 13
To Ithaca Valley R. R.	....	149 08
Lehigh Valley, R. R.	5 00	465 10
To individuals on line of Railroad.	7 00	473 05
To points on line of road for use of Company	....	118 04
Total	5,996 12	150,151 08
Grand totals transported		
Anthracite	14,656 18	329,696 03
Bituminous	5,996 12	150,151 08
Total	20,653 10	479,847 11
Same time last year	20.597 03	474,071 09
Increase	56 07	5,776 02
Decrease	.....	

Report of Coal Transported over the Lehigh Canal

For the week ending June 13, 1873.

REGIONS SHIPPED FROM.	TIDE. tons. cts.	LOCAL tons. cts.	TL. WEEK tons cwt.	TL. DATE tons. cwt.
Mauch Chunk Region	3,116 18	3,520 18	6,637 16	64,251 02
Mauch Chunk Region Hazardville				
Beaver Meadow Region	1,423 04	3,810 16	5,234 00	37,692 19
Mahanoy Region	100 13	183 09	284 02	3,487 09
Hazleton Region	2,540 03	6,713 03	9,253 06	61,903 13
Upper Lehigh Region	....	1,109 05	1 109 05	8,773 18
Wyoming Region	2,6.4 05	831 01	3,435 06	35,624 14
Wyoming Region, Hazardville				
Total,	9,785 03	16,468 12	26,253 15	206,733 05
Previously reported	67,398 17	113080 13	180,479 1.	
Total to date	77,184 00	129549 05	206,?33 05	
Corresponding week last year	81,240 12	134163 17	15,404 09	
Increase				
Decrease	4,056 12	4,614 12	8,621 04	

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR. 1873.	YEAR. 1872.
Consumed on line of Lehigh Canal	2,518 07	3,090 05	20,434 07	23,598 04
Passed into Morris Canal to Tidal Points	273 07	138 12	718 15	1,193 16
Passed into Morris Canal to Local Points	931 02	738 02	8,562 14	5,571 07
Passed into Del. & Rar. Canal to Tidal Points.	9,511 16	8,802 10	76,465 05	80,046 16
Passed into Del. & Rar. Canal to Local Points	292 00	573 05	3,729 19	5,583 07
Consumed on line Delaware Div. Canal	1,459 11	1,291 03	9,819 14	13 362 13
Passed through to Bristol	11,247 12	11.261 10	87.002 11	86,048 06
	26,253 15	25,895 07	206,733 05	215 404 09

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, June 14, 1873.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	28,352 09
" Port Carbon	4 609 01
" Pottsville	2.272 .1
" Schuylkill Haven	34.106 02
" Pine Grove	6.027 13
" Tamaqua	13.5 4 16
" Harrisburg	23 19
" Dauphin	5,895 05
Total	92,881 16

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	7,606 15
" Mill Creek "	701 18
" Schuylkill Valley Scales	896 07
" Mt. Carbon "	1.263 17
" Cressona "	7,569 15
" Pine Grove "	1.091-09
" Tamaqua "	1,434 08
Total	20,567 09

SHIPPED WESTWARD VIA CATAWISSA AND WILLIAMSPORT BRANCH AND NORTHERN CENTRAL RAILROAD.

Via Catawissa & Williamsport Br.	40 17
" N. C. R. R. passing Locust Gap	2 217 02
" " " Shamokin	2,930 03
" " " Herndon	....
Total	5,188 02

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,195 09
" Lebanon & Pine Grove Branch	1,074 04
Total	2,269 13

CONSUMED ON LATERALS.

From Frackville Scales	424 03
" Mill Creek "	428 17
" Schuylkill Valley Scales	790 08
" Mt. Carbon "	404 04
" Cressona "	259 11
" Pine Grove "	20 05
" Tamaqua "	469 11
Total	2,793 19

LEHIGH AND WYOMING COAL.

Received via Silverbrook Junction, Sent East	7,369 15
Cat. & Wpt. " Sent West	9 12
" " Rupert, Cat. & Wpt Br.	47 09
" " Allentown, E. Penn'a Br.	135 05
" " Alburtis, " "	....
" " Oreland, G. & N. Br.	893 05
" " Willow Street R. R.	710 00
Total	9,137 06

BITUMINOUS.

From Harrisburg	5,749 12
" Connecting R. R., G. & N. Br.	....
" Junction R. R.	20 00
Total	5,769 12

COAL FOR COMPANY'S USE.

Anthracite	6,701 04
Bituminous	241 01
Total.	6.942 05

RECAPITULATION.

	Total for Week.	Corres-p'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val. Branch	92.881 16	100 800 14	d 7,918 18
For Shipment by Canal	20,5.7 00	24,151 10	d 3,593 11
Shipped Westward via Northern Central R. R.	5,188,02	5.633 11	d 475 09
Shipped West or South from Pine Grove	2,269 13	2,270 17	d 1 04
Consumed on Laterals	2 793 19	2.649 02	i 144 17
Lehigh and Wyoming Coal	9,137 06	1.964 04	i 7,173 02
Total Anthracite paying freig't	132,838 05	137.509 03	d 4.671 03
Bituminous	5,769 12	9,680 04	d 3.910 12
Total of all kinds paying freig't	138,607 17	147,189 12	d 8,581 15
Coal for Company's use	6,962 05	6 962 05	d .0 00
Total Tonnage for Week	145,550 02	154.151 17	d 8,601 15
Previously this year	2754726 03	2661860 12	i 92 865 11
Total to date	2900276 05	2816012 09	i 84,263 16
SHIPPED BY CANAL.			
From Schuylkill Haven	19,249 00	22,642 10	d 3,393 00
" Port Clinton	2,875 00	1.671 00	i 1,204 00
Total Tonnage per Week	22,124 00	24,313 00	d 2,189 00
Previously this year	206,247 10	275,010 00	d 68,762 19
Total to date	228,371 10	299,323 00	d 70.951 19

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, June 14, 1873.

	WEEK.	SEASON.
By Delaware and Hudson Canal	44,470	417,756
By Railroad, East	10,315	175 660
" West	10,582	203 891
" South	1,283	123,394
Total 1873	66,650	920,701
Corresponding time in 1872:		
By Delaware and Hudson Canal	44,075	389,902
By Railroad, East	1 .950	303,449
" West	8,386	159 719
" South	8 314	262 248
Total	74 735	1 0 5 518
Decrease	94,615	

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 13, 1873.

	Tons. Cwt.	Tons. Cwt.
East	607 02	
West	11.565 09	
		12,172 11
Same time last year		12,726 18
Increase		.....
Decrease		5?4 02
Total amount shipped to date		247,739 05
Same time last year		217,782 11
Increase		29,956 14
Decrease		

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending June 14, 1873, with totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	14,961 04	412,632 04
" Hazleton	49,074 11	1,033,760 05
" Upper Lehigh	5 06	1.9.6 03
" Beaver Meadow	13,794 18	334,287 07
" Mahanoy	10,586 09	215,637 12
" Mauch Chunk	. . .	2,263 19
Total	88,422 08	2 000,697 05
Same time last year	88 949 19	1.9.9,941 16
Increase	527 11	40,755 09
Decrease	.....	.....
Forwarded East from Mauch Chunk by rail	63 407 03	1,600,280 06
Same time last year	64,471 19	1,597,447 16
Increase	1,064 16	
Decrease		2,832 10

DISTRIBUTED AS FOLLOWS.

Local East of Mauch Chunk	829 11	42,710 08
Forwarded East for use L. V. R.	771 10	19,1-2 15
Delivered to Furnaces and Manufacturing Companies	11,9:6 14	377,741 19
Delivered to Cat & Fog R. R	129 14	3,228 10
" " East Penn R. R.	7 : 04	6,(33 10
" " North Pennsylvania Railroad	4,139 07	168,2 1 07
" " Port Del	6,191 14	71,196 12
" " East Amboy Railroad	. . .	. . .
" " Morris and Essex Railroad	4,641 16	152,434 05
" " Bel Del Railroad	23,487 18	483,462 01
" " Central Railroad	11,025 15	286,093 19
Delivered at and above Mauch Chunk for use of L. V. R.R.	921 12	37,085 05
To P. & N. Y. R. R.	10,220 00	203,995 00
To North rn Central R. R.	691 11	8,822 04
To D. H. & W. R. R.	652 07	12,288 18
To L. & S. R. R. at Packerton for rail	262 11	6,851 12
To Individuals at Mauch Chunk	5 07	1.711 02
To Individuals above Mauch Chunk	130 15	8 518 14
To L. & S.R.R., at Penn Hav., for railroad	. . .	1 541 10
Do. for canal	9,753 06	61,503 03
To Lehigh Canal Mauch Chunk	2,845 00	19,160 00
To Catawissa Railroad	. . .	50 00
To L. & B. R.R. at Lack. June	29 15	23,889 10
Total	88,422 08	2,000,697 05

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

Week ending June 14—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	27120 15	5645 16	3582 06	36148 17	821251 19
Upper Lehigh	. . .	3198 03	971 18	4170 01	9 642 11
Beaver Meadow	3515 02	1345 15	2033 14	6894 1:	93838 07
Hazleton	. . .	258 16	9110 11	9369 07	67358 16
Mauca Chunk	2231 04	4038 10	7137 07	13422 01	220794 18
Total	32862 01	14507 00	22835 16	70204 17	1.238866 11
Prev'ly reported	588186 14	472131 16	64063 04	12.2681 14	
Total to date	621348 15	486638 16	93893 00	1298886 11	
Same time 1872	530280 10	354363 12	13.545 15	1017169 07	
Increase	91068 05	1:2275 04	58353 15	281697 04	
Decrease	. . .	. . .	. . .	. . .	

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR 1873	YEAR 1872.
Forwarded East by Rail to Tidal points	32962 01	27412 03	621348 15	530280 10
Forwarded East by Rail to Local points	7689 15	10428 10	205114 14	164 53 04
Forwarded East by Rail use Central Division	1766 17	1625 07	41004 15	35239 03
Forwarded East by Rail use L. & S.	172 10	83 05	5819 16	3963 03
Delivered at and above Mauch Chunk	1216 06	1225 08	33148 08	25112 04
Deliver d at Coalport & Hazard for Canal	23701 19	18329 09	215739 13	154572 17
Delivered to L. V. R. R. at Packerton	223 17	151 09	14266 11	7359 17
Delivered to L. V. R. Rd at Sugar Notch	2193 01		495 2 16	
Delivered to L. & B. R. R.at Plymouth Bridge	211 08	6143 12	1059 1 00	964'2 04
Total	70304 17	65412 03	1298886 11	1017169 07

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday June 14. 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	23,134 00	28.304 15	1,474 07	52,913 00
1872	18,111 05	26,580 17	....	44,692 02
Increase	5,022 15	1,723 16	1,474 07	8,220 18
Decrease	. . .	. . .	. . .	. . .

YEAR.

1873	218,796 09	618,115 03	59,839 16	876.751 01
1872	230,905 04	549.528 07	....	7:0,433 18
Increase		68,586 16	39,839 16	96,3:7 17
Decrease	12,108 15	....	....	..

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To P. & O. R. R. Co Tons. Cwt.	Total. Tons. Cwt
1873	3,549 13	2,314 15	5,863 11
1872	6,155 12	944 09	7,100 08
Increase	—	1,370 06	
Decrease	2 606 09	.....	1,236 03

YEAR.

1873	38 553 04	52,683 07	86,236 11
1872	73,940 04	7,457 03	81.397 07
Increase		45,226 04	4,839 04
Decrease	46,387 00		

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, June 14, 1873.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	21,219 08	331 276 07
Shipped South	47,878 16	1,040,666 06
Total	69,098 04	1,371,942 13
For the Corresponding time last Year :		
hipped North	15,403 06	295,826 03
ipped South	44,062 02	983,,18 06
Total	59,465 08	1,279,544 14
Increase	9,632 16	92,397 19
Decrease	.....	

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, June 14, 1873.

	WEEK.	SEASON
North	61,2:3 18	1,166,533 19
South	1,283 02	123,393 13
Total 1873	62,577 00	1,289 927 12
Corresponding time in 1872 :		
North	52,148 07	1 160,871 17
South	8,314 09	162,246 06
Total. 1872	60,462 16	1,323,118 03
Increase North	9,145 11	
Decrease No th		5,662 02
Increase South		
Decrease South	7,031 07	38,852 13
Increase		
Decrease	2,114 04	33,190 11

Prices of Coal by the Cargo.

(CORRECTED WEEKLY.)

	AT NEW YORK. June 20		AT PHILADELPHIA. June 20.	
SCHUYLKILL.	R. A.	W. A	R. A.	W. A.
Lump	$- —	$5 45	- —	4 10
Steamer	- —	5 45	- —	4 10
Broken	5 71	5 45	4 35	4 10
Egg	5 85	5 60	4 5:	4 25
Stove	6 15	5 75	4 70	4 40
Chestnut	5 20	5 95	5 85	3 60
Pea	- —	- —	- —	- —
LEHIGH.				
Freight to New York 50 cents.				
Lump, (on board)	- —	5 45	- —	- —
Broken	- —	5 3)	- —	- —
Egg	- —	5 30	- —	- —
Stove	- —	5 45	- —	- —
Chestnut	- —	4 45	- —	- —
Pea	- —	- —	- —	- —
SPECIAL COALS *				
Honey Brook, Le'h W. A.	4 70@5 60		- —	- —
Spring Mountain " "	- —@- —		- —	- —
Sugar Loaf " "	- —@- —		- —	- —
Room Run " "	4 70@5 60		- —	- —
Hill & Harris " "	4 70@5 60		- —	- —
Shamokin " "	4 70@5 10		- —	- —
Lykens Valley " "	4 85@6 10		- —	- —
Broad Top " "	6 60@- 10		5 35	- —

Company Coals.

June, 1873.

	L.	Str.	Gra.	Ke.	Stc.	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 50	4 70
*Lackawana at Weehawken	4 70	4 70	4 90	5 75	5 60	4 70
Wilk'b're at Hoboken	4 55	4 75	4 90	5 10	5 45	4 85
Old Co. Lehigh at Pt. John'n	5 45	—	5 30	5 45	5 50	4 75
New York Coal Exchange	5 35	—	5 20	5 20	5 35	4 65

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

Prices at Baltimore—June, 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	
Tyrconnel f. o. b.	$7 00

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

June, 1873.

George's Creek and Cumberland f. o. b. for shipping $4 60@4 75

Prices at Havre de Grace, Md.

June, 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 00
New York "	7 25
South Amboy "	6 75

Prices of Foreign Coals.

June, 1873.

Duty 75 c. per ton.

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

Liverpool Gas Caking	— —@— —
" Cannel	19 00@20 00
" House	22 00@23 00
" Orrel	20 00@— —

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

PRICES FROM YARD.

Liverpool House Orrel, screened	$21 00@22 00
" Cannel	17 00@ ...

Per ton 2,000 lbs. delivered.

Prices of Gas Coals.

June, 1873.

PROVINCIAL.

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

	Coarse	Slack
Block 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 or 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 @00 00
AT PHILADELPHIA.	
Westmoreland "	7 50 @8 00

Foreign and Provincial Freight

June, 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 50
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.

Freights.—June, 1873

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Phila'a.	Anthracite. From Elis. Pt., Port Johnston, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
Amesbury	3 75	—	—	—	—	—
Bangor	3 25	—	—	2 10	—	—
Bath	3 10	3 00	—	2 25	—	—
Boston	3 00	3 00	—	2 10*	2 25	—
Bridgeport	2 50	2 50	—	1 00	—	1
Bristol	—	—	—	1 40	—	—
Cohasset Nar'ows	3 10	—	—	—	—	—
Derby	3 00	—	—	1 45†	—	—
Dighton	2 65	—	—	1 55	—	—
East Cambridge	2 75	—	—	2 15	2 25	2 25
Fall River	2 50	2 65	—	1 40	1 60	1 65
Hackensack	—	—	—	—	—	—
Hartford	3 10	3 25	—	1 50	—	1 75
Hoboken	2 15	—	—	50	—	65
Jersey City	2 15	—	—	50	—	65
Lynn	—	—	—	—	—	—
Middletown	—	—	—	1 25	—	—
Mystic	—	—	—	1 30	—	—
New Bedford	2 75	3 00	—	1 50	—	1 70
Newburyport	3 25	3 25	—	2 25	—	2 35
New Haven	2 50	2 50	—	1 00	1 20	1 25
New London	2 50	2 60	—	1 25	1 40	1 45
Newport	2 8	—	—	1 40	1 60	1 65
New York	2 25	2 15	—	50	—	65
Norwalk	2 15	2 50	—	1 00	—	1 40
Norwich	2 65	2 60	—	1 35	1 50	1 55
Pawtucket	1 00	3 00	—	1 50‡	—	—
Portland	3 50	3 00	—	2 00	—	— §
Portsmouth, N.H	3 10	3 12	—	2 15	—	—
Providence	2 50	2 6	—	1 40	1 60	1 65
Rockport	—	—	—	—	—	—
Saco	—	—	—	—	—	—
Sag Harbor	—	—	—	1 25	—	—
Salem	—	3 00	—	2 10	—	—
Stamford	—	—	—	1 00	1 20	1 25
Stonington	—	—	—	1 25	—	1 40
Taunton	—	—	—	1 90	—	—
Warren	—	—	—	1 40	—	—
TO RIVER PORTS						55
Albany	3 50					50
Catskill	—					50
Cocksackie	—					65
Cooyman's	—					20
Cold Spring	—					20
Fishkill	—					40
Haverstraw	—					40
Hudson	2 50					65
New York vessels	2 0.					45
Nyack	—					30
Poughkeepsie	2 4					30
Rhinebeck	—					—
Rondout	—					40
Saugerties	—					30
Sing Sing	—					55
Stuyvesant	—					50
Tarrytown	—					60
Troy	—					20
West Point	—					60
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	— — "

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 18 from Pt. Carbon.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 72
O. 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. / Cam. & Am R. R.	1
Shipping Expenses	35
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	84
C. RR. of N. J. Phillipsburgh to Elizabethport	1 06
Shipping expenses	15
Wharfage	20
Total	$2 35

MARKET REVIEW.

NEW YORK, June 19, 1873.

IRON.—We have nothing of interest to note in this market. Business is confined within a small compass, and until there is some outlet for the considerable supplies now on the market, but little trade can be looked for. On the whole, the market has a weak tone and prices rather favor buyers. We hear of no sales of either Scotch or American Pig. Old and New English Rails are dull and any quotation would be entirely nominal in the absence of business. Scrap is very quiet; a sale of 200 tons is reported, but the particulars we did not learn.

LIVERPOOL, June 3—(R. R. KELLY & Co.)—The present serious position of the Cleveland district, as regards the non-supply of Ironstone, must necessarily create a good many irregularities in the Iron trade. The make of Pig Iron here is to a great degree stopped, and No. 3 quoted variously, according to character of specifications. Many furnaces are damped down. In South Wales the make of Pig has largely increased, and Rail and Bar orders are coming in freely. The South Staffordshire Iron trade still languishes, manufacturers disagreeing as to value. In North Staffordshire the producing power is greater than the demand for finished Iron. Good Pig Iron may be called scare. Glasgow Pig Iron speculators are fewer, and business is fairly active at an improved price. CONNAL'S warrant stores are reduced below 60,000 tons. Iron Sheets lower.

EXPORTS OF IRON ORE TO ENGLAND.—A trade report from Wolverhampton, dated May 28th, has the following concerning the recent export of Iron Ore from the United States to England:—The prevailing high prices are bringing about extraordinary results. It transpires on 'Change here this afternoon that a consumer in this district is about to import from America 1,000 tons of Strip Iron, wholly made in the country, and that the Railway Axles, also made in the United States, are selling there at £3 per ton under the quotations of the leading English markets. The iron orders are fast running out here, and there is much underselling. Inferior lots are offered in lots of 200 tons at £12 10s. per ton.

LEAD.—Pig is quiet but firm at 6¾ cents gold for Ordinary Foreign; Domestic, 6¼ @ 6⅜ gold, Bar 9¼ cents, Sheet and Pipe 10¼, and Tin-lined Pipe, 16½, usual discount to the Trade.

Withdrawals from bond for consumption 13th, 14th and 15th June—

Pig Lead, Germany.....pigs. 435

COPPER—New Sheathing is steady at 38 cents, and Bolts and Braziers 40. Bronze and Yellow Metal Sheathing 27, and Y. M. Bolts 32. Ingot continues very dull, and prices are lower; we note sales of 75 @ 100,000 lb. Lake, in lots, at 29¼ @ 29¼ cents. English is without movement, and the price is nominal.

SPELTER.—Foreign is dull, but stocks are not urged, prices are steady, at 7⅛ @ 7¼ cents gold for Silesian; Domestic 10 cents currency.

STEEL—The market is steady and firm at our quotations.

TIN.—Manufacturers of Pig, who have held out of the market for a long time past, are now buying moderately, and we note sales in lots of about 1250 slabs Straits at 30½ @ 31 cents. English nominally 30, and Banca 36, all gold. There are no later Cables, but we notice a rather better feeling. It is understood that there is more favorable news from England, and the market has been more active. There are few or no Plates of any kind to be had now at the late extreme low figures. The stock of good brands is very much reduced, but the low grades are relatively plenty. For Coke Tin, Coke Terne, and Charcoal Terne we advance our quotations on the lower figures 25 @ 50 cents per box gold, the market for all kinds closing in sellers' favor. Sales have been made of 1500 bxs. Coke Tin at $8.75; 1150 do. Charcoal Terne, mostly S. T. P., $10 gold; 5 0 do. Charcoal Tin, 500 do. Coke Tin, and 500 do. Coke Terne, on private terms.

Withdrawals from bond for consumption 13th, 14th and 15th June—

Tin from England..... bxs. 2,545

ZINC Sheets are held at 10½; Manganese black oxide is held at 4½; Manganese gray oxide 6 cents.

The demand for Manganese for the purpose of hardening steel is on the increase, and our quotations are fully sustained.

[Despatch to the Associated Press.]

CLEVELAND, Ohio, June 20.—The National Association of Pig-iron Manufacturers met at the Kennard House in this city yesterday. A. B. STONE, of the Cleveland Rolling Mills, president; HARRY B. BROWN, of the Jackson Iron Company, secretary *pro tem.* The most important business before the meeting was the debates and resolutions. The former were of a confidential nature. The resolutions which were carried are as follows:

Resolved, That it is the sense of this meeting that the currency now in circulation is inadequate to the requirement of general business, and we suggest as a permanent remedy, the enactment of a free banking law; and, meanwhile, untill such a law can be enacted, it would, in our judgment, be expedient for the Secretary of the Treasury to reissue $44,000,000 legal tender reserves.

Resolved, That it is the sense of this meeting that in the present condition of the iron trade in this country it is desirable that the production of metal should be curtailed, so far as possible, until a more favorable market is established, and that a copy of this resolution be sent to each member of the association.

After the transaction of considerable routine business the meeting adjourned to meet in Pittsburgh in November next.

METALS.

NEW YORK, June 19, 1873.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb; Railroad, 70 cents ℔ 10 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¼ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 2 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	55 00@56 00
Gartsherrie	—@— —
Glengarnock	47 00@48 00
Eglinton	46 00@— —
Pig, American, No. 1	47 00@49 00
Pig, American, No. 2	44 00@45 00
Pig, American, Forge	43 00@42 00
Bar Refined, English and American	10 00@— —
Bar Swedes, assorted sizes 'gold	—@— —
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ½ & ⅞ 2 sq. & 6 to 12 x ¾ & ½	—@— —
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ½ to 1 in.	90 00@97 50
Bar, Refined, 1¼ to 6 by ¼	—@102 50
Bar, Refined, 2½ to 2⅞ round 1 & 1½ by ¼ & 5:16	—@105 00
Large Rounds	105 00@117 50
Scroll	115 00@145 00
Ovals and half-round	—@145 00
Band	—@115 00
Horse Shoe	—@122 50
Rods, ⅜ to 3-16 inch	102 50@145 00
Hoop	122 50@170 00
Nailrod	9¼@ 9¾
Sheet, Russia, as to assortment (gold)	16½@ 18
Sheet, Singles, D. and T. Common	6½@— 7¼
Sheet, D. and T. Charcoal	7¼@— 8½
Sheet, Galv'd, list 15 per cent, discount	—@— —
Rails, English (gold), ℔ ton	60 00@ 70 00
Rails, American, at Works in Pennsylvania, currency	00 00@— —

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	27 @— 29
Copper, Old, for chemical purposes, 14@16 oz.	—@— —
Copper, American Ingot	29 @— 29¼
Copper English Pig	23 @— 29⅛
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	$— —@— —
Spanish (gold)	6 75 @6 87½
German, do.	6 75 @6 87½
English do.	6 75 @7 00
Domestic do.	6 25 @6 57½
Foreign, Refined	7 37½@7 50
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@— 23
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 14 @— 18½
English Machinery	— 14½@— —
English German (2d an 1st quality)	— 12½@— 14½
American Blister "Black Diamond"	— —@— 11½
American, Cast, Tool do.	— —@— 17
American, Spring, do.	— —@— 11
American Machinery do.	— 11½@— 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
Straits	30¼@31
English	30 @—

PLATES.

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

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

Plates, Foreign (gold) p. 100 lb.	7 62½@—7 87½
Plates, Domestic p lb.	9 @—11

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

Sheet per lb.	—10¾@11

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, June 20, 1873.

The following reports from the San Francisco Stock Board, are dated June 16th and 20th. The market has a downward tendency, with the exception of slight advances in Belcher, Raymond and Ely, and Meadow Valley. A dividend of $1 per share has been declared by the Meadow Valley Mining Co., payable June 16th.

	June 16.		June 20
Sarage	138	—	124
Crown Point	113	—	108
Yellow Jacket	63	—	65
Kentuck, "New Issue"	11	—	—
Chollar Potosi	60	—	55
Gould & Curry "New Issue"	13	—	11½
Belcher "New Issue"	89	—	88
Imperial	6½	—	6⅝
Raymond & Ely	60	—	63
Meadow Valley	22	—	25⅝
Eureka G. V.	21	—	21
Ophir	—	—	—
Hale and Norcross	—	—	—

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.

CONTENTS FOR THIS WEEK.

WE regret to say that the report of the late meeting of the American Institute of Mining Engineers must be again omitted this week. There are so many errors and misty places in the short-hand reporter's work, that it has been found necessary to send the report of the proceedings to those who took part in them, for revision. This has caused such delay that we cannot proceed with our usual promptitude. We will here say that there is a field in this country for the scientific short-hand reporter. Great learning is not required, and no one expects to obtain a combination of a TYNDALL and a HERSCHEL at $25 a meeting. But there is no reason why some person who knows enough of science and scientific terms to keep his head clear when a plain iron master speaks of a furnace, or an engineer talks of a mine, should not take up the stenographic art as a pursuit. It would pay, we are certain, for there is a very general complaint from all lecturers and speakers on scientific and industrial subjects, that no amount of money can procure a fair report of even the simplest discussion.

THE Cleveland strike which threatened to involve 30,000 workmen in disaster of indefinite extent has been happily settled by agreement. The men return to work at the old rates pending the decision of an arbitrator who is "to determine whether their wages are to be advanced or reduced, and to what extent, measured by the standard of wages now prevailing in such industries of the North of England as he may deem it reasonable to consider in making his award." They also agree not to restrict the output, a most valuable concession to the masters, and one which relieves them from one of the chief difficulties they have labored under during the past few months. This one concession by the miners will about double the output of the Cleveland mines, for the extraction per man, instead of six tons a day, had been restricted to 2½ to 3 tons. What must be additionally gratifying to English masters, is the fact that the news of the agreement was everywhere received with satisfaction by the miners, who, after a fortnight of inaction, appear to have formed more moderate views of the situation.

IT is a fact worth noticing that the experience of English manufacturers during the last year has brought about a very serious change of views upon the grave question of the causes of England's manufacturing supremacy. After assuring us for half a century that there was something of Divine preference in the strong control England had of the world's markets, and that what was not due to ate belonged to the native superiority of English workmanship, and was, therefore, just as exclusive a monopoly as the Divine part, we are told, that, after all, it is because English workmen took less pay, than those of our own country. It is the *Colliery Guardian*, one of the most sensible papers in England, which says: "The pre-eminence of our own country as the workshop of the world was almost wholly due to the abundance, and consequent cheapness of labor. Our rivals in new and undeveloped fields of industry felt this difficulty to be almost insurmountable. * * * It may be that we, in this country, have relied too much on this cheap labor supply, and have paid too little regard to the wonderful scientific progress in the provision of labor-saving machinery which our transatlantic rivals have been making. No human foresight, however, could have predicted the strange revolution which has taken place in the English labor market during the last two years. We have referred time after time to the mischief which could not fail to result from the extravagant demands of the laboring classes, but sooner than we could have anticipated that mischief has become apparent." For our own part we look upon England as in some respects less able to sustain reverses in trade than our own country. With all the preponderance of wealth there is really less elasticity there than with us. The very extent of the facilities for doing work shows that a large trade is necessary to sustain them. English manufacturers will probably find in other quarters a compensation for the trade lost here, but the transition cannot fail to be a hard one. The same paper from which we have quoted the above, says: "The aspect of the iron trade, especially in the inland districts, presents something very much akin to stagnation, and it is clear that in a very short time, without some speedy and unlooked-for change takes place, the furnaces, mills, and forges must in many cases cease operations. The masters aver that, in the present condition and temper of the labor market, nothing can avert this serious collapse in trade. Short time—especially in Staffordshire—is already very prevalent both in the coal and iron trades, and the earnings of workpeople are, of course, restricted."

THE English papers are just now commenting with a good deal of feeling upon the fact that an English firm have ordered 1000 tons of iron from Pennsylvania, and that steel railway axles cost £3 a ton less in the United States than in England. A correspondent of the *Ironmonger* reports that the chain trade of South Staffordshire with this country has almost ceased. "At this period of the year," he says, "we have usually been doing a great business in the lighter goods with the United States and Canada, and South America. The quotations have, however, lately so greatly advanced that nothing is now being done. It has not been an unusual circumstance for an order to the extent of 5,000 dozen to reach one of the merchant firms of Wolverhampton, but that firm is now getting scarcely an order, customers' communications intimating that the chains can be got in America at under the quotations of English makers. The high prices which have been necessitated in the past two years by the advances in iron have greatly stimulated the industry in the United States, and team and draw chains and haimes are now being produced in immense quantities in St. Louis. The rise in these goods in this country, as compared with the quotations a little over two years ago, is from 100 to 130 per cent." Other proofs of our increasing ability to supply our own wants are mentioned, and the *Ironmonger*, editorially, says: "In iron *per se* the successful competition of the American manufacturers is even more conspicuous, and that which has often been mentioned as an altogether improbable event seems likely to occur. We have information to the effect that one of the firms in the heart of South Staffordshire who use large quantities of strip iron, are at this moment making arrangements to obtain from the mills of Pennsylvania no less a quantity than 1,000 tons of strip to be brought across the Atlantic, and to be used within sight and sound of the mills and forges whence at one time the Americans could alone obtain their iron. If this be so, the days of MACAULAY'S New Zealander upon London Bridge would, in the matter of the supreme sovereignty of the British iron trade, be nearer at hand than most people are disposed to imagine." On the other hand, the English are learning from us to diminish the size of some of their unwieldly tools, and they are copying our better models. They are making American axes and putting American handles to them, and report that in Australia the English article is not only cheaper but of better quality. According to their accounts, we are certain to lose the Australian trade in axes—the supply of which is said to be at present the most active and profitable branch of the edge tool manufacture in Sheffield.

A New Manual of Coal.

THERE is no subject of study which at first sight is more appalling than that of the "coal question" from whatever side we approach it. Its literature is very voluminous and much of it is also out of print and difficult to obtain. Forming portions of State geological surveys, which have in many cases been cut short when still unfinished, their fragmentary character adds to the perplexity of the student; and this bewilderment is increased by the diversity of nomenclature and the lack of a convenient key. When we turn from the Scientific aspect to the business relations of coal mining and selling, we find ourselves brought face to face with such problems of national importance as the economy of railroads, the settlement of the country, and the progress of industry. If long study and practice alone can make a competent professor of geology, it is equally true that only great experience in business and the capacity to handle great subjects can fit a man for undertaking the task of producing a book upon coal, its production and use in all their ramifications, which can lay any claims to the authority of a

standard work. Such a book Mr. MACFARLANE* has undertaken to give us, and in reading it we recognize the fact that he is well fitted for the task.

The plan of the work comprises first, a general survey of the subject; second, a discussion of anthracite in each one of its developments; third, a discussion of bituminous coal; fourth, Triassic coal; fifth, Cretaceous coal and sixth, an appendix in which are contained papers on the origin of coal, the rocks in which it is found, the conditions of success in the coal trade, combustion, the iron ores of the coal regions and finally statistics. In reading it, we were struck with the industry exhibited in gathering together all that is known on the geology of each State and in so connecting the surveys of neighboring States that the extent of the different beds shall be traced out as clearly as our information allows it to be done. The author shows, in fact, unusual ability, both in the minute details of the geology of individual basins and in grasping and explaining the broader features of the subject.

It would be merely misleading to quote any portion of the work, in order to show its quality. It bears evidence that all existing authorities have been carefully studied and compared, and is as we said before, a monument of patient industry in this respect. It is more than this, for it is also a model of condensed statement. The scattered facts published in so many surveys, magazines, and "proceedings" have been solidly framed together, and wherever these facts have already been assembled by previous writers, Mr. MACFARLANE has not hesitated to quote freely.

The author's familiarity with the business of mining and selling coal has given to the whole work a practical cast which makes it especially valuable as a manual, not of coal geology alone, but of coal as a mineral useful to man. The chapter on the conditions of success in the coal trade comes very opportunely at a time when investment in coal lands is more general than ever before. The statement of the requirements for success in mining coal is not, however, confined to this chapter; among the chief of those requirements are the quality and position of the coal, subjects which are treated of in discussing each basin or field, so that throughout the book there is a vein of criticism leading up to this full exposition in the appendix.

Mr. MACFARLANE'S "Coal Regions of America" is, in fact, altogether the most careful and the most intelligent manual of the coal deposits of this country that has ever been published. It cannot fail to be of great interest and advantage to every one occupied with the subject, either as student or operator.

Arctic Travel.

WE print in another column the lively letter of Mr. VIVARTTAS to the Editor, on the subject of popularizing (!) Polar expeditions. It is a little startling to hear a man propose to build a bower over the Pole and charging an entrance fee for the sake of making it popular. Our readers know that we have not encouraged Polar expeditions in the past, and if we now say a good word for them it is because they are presented in a new light. Mr. VIVARTTAS, who is both a sailor and an engineer of practical experience, takes the sensible view that the Arctic traveller will encounter and must overcome two media in his way; one a fluid—the ocean, and one a solid—the ice. Hitherto navigators have provided only one means of continuous progress—a ship, and as this is fitted only for water transport, progress became a battle, and a losing one, from the day thick ice was struck. Our correspondent proposes to make the journey *over* instead of through the ice and to do this he would put his ship on skates and make an ice boat of her. The idea is far less chimerical than it appears at first sight.

In the first place, the provisioning, etc., would be calculated for a short voyage, and the vessel would be no more than a yacht in size. It would be made flat-bottomed, and when ice was encountered could easily be hauled up and placed on skates or runners. The future problem would be one that is resolved every winter by the ice boats that run on the rivers in all the cold parts of our country. The Arctic voyager could not, however, hope to rival the wonderful speed of the fancy ice boats of the Hudson river, a speed which rivals that of express trains. Salt water ice is softer and rougher than fresh water ice, the smooth parts could not be picked out so carefully, but the vessel would have to make her way over rough ice or smooth as her lot befel. Under these circumstances the navigator could not count upon a steady progress of more than six miles an hour.

But the point is that the progress would be steady. There would not be a rapid and exhausting run of five or ten days with dogs, but a steady advance of the whole expedition, mile by mile, night and day. The continual presence of the ship, with its provision for comfort, would certainly be a great advantage, and relieve the crew from those exhausting and cheerless journeys which are now the bugbear of Arctic expeditions.

As to the incentive. Mr. VIVARTTAS holds that whatever may be the fate of scientific inquiry, any effort which engages the interest of the people at large because it offers the people at large a full command of the advantages secured, will succeed. He says that whoever sets out with the idea of making the pole a summer resort is certain of success, for that is a thing which engages the sympathy of the whole community. The new scheme for Arctic travel accordingly comprises two points; first to reach the pole by combining the two known methods of water transportation—the ship and the ice boat; and second, to lessen the dangers of Northern travel by making it continual, the incentive to which shall be a hotel romantically situated upon the axis of the earth. Gentlemen who wish to incorporate, under the laws of the State of New York, a North Pole Hotel Company, had better apply to Mr. VIVARTTAS. We have no doubt they would find him ready to make personal trial of his scheme.

* THE COAL REGIONS OF AMERICA, their topography, geology, and development, with a colored map of all the Coal Regions and numerous other maps and illustrations. By JAMES MACFARLANE, A. M. New York, D. APPLETON & Co.

The Henry Clay Colliery Disaster.

THE Shamokin *Herald* gives the following account of this affair, which confirms the report in this journal last week: "The slope is supplied with air by means of a steam fan that forces air in or from the air hole as desired. At the time of the accident the air was forced down the air-way. It appears that on Tuesday the air was not coming in some parts of the slope as good as usual and about 1 o'clock C. DRUMHEISER, the inside boss, told the repair boss that he would go among the old works and examine the bradish to see if it was all right. The bradish had frequently been injured by falls of rock heretofore, and Mr. DRUMHEISER supposed it now needed repairing. After he had been gone some time a terrible explosion occurred, which the miners supposed was caused by several kegs of powder being ignited, and word to that effect was sent out. It is said the repair boss sent word to many of the miners to go out but they said as it was only powder smoke they would load their wagons. A runner at the foot of the slope was the first to discover the real danger, when he found two mules lying down and the driver insensible by the side of them. He called to some miners who were working near by to come to his relief. These men sent word out, of the state of affairs, when JOHN S. HAYS, outside boss, DAVID MUIR, ENOCH MAGINSKI, and another person undertook the dangerous task of affording relief, which resulted in two of them losing their own lives in the noble attempt of rescuing others from their peril. They ran along the way until they found a miner lying insensible upon the ground. They picked him up and started for the foot of the slope, but soon were so overcome with the poisonous air that they were obliged to drop their man and seek their own safety. Before leaving the man, HAYS called several times for relief, but none coming, he said to MUIR, "Davie, run for your life," and they all started, but soon were overcome and fell to the ground. MUIR heard HAYS fall and exclaim, "Oh! Davie, I am gone if I am not helped," and remembers nothing more. At this time NICHOLAS MCARTHUR, who has charge of the upper drift, hearing of the disaster, ran to the fan, reversed it so that the air would be pumped out instead of forcing the poisonous current along to those who were giving relief. He and some others then went down the slope in search of the sufferers. They soon came upon the Polish miner that the other party had been compelled to abandon, and brought him forward to good air. Returning, they found MUIR who recovered in a few hours. They then returned and found HAYS lying in the gutter, in about six inches of water, in which he is supposed to have drowned, and ENOCH MAGINSKY lying on the ground suffocated. These four were hoisted up as soon as an engineer could be found.

Conditions under which Super-Silicated Cast Metal is Produced in Blast Furnaces.

Managers of blast furnaces, especially such as have had to produce cast metal destined for the Bessemer process, have been called on to study the conditions under which the so-called "hot" cast-iron is produced, containing silicon to the extent of 1½ to 2½ per cent. Some have even manufactured extra silicated cast-iron containing 7 to 8 per cent. These latter pigs have a quite peculiar aspect. The color of the recent fracture grows lighter as the proportion of silicon augments; the grain becomes larger, but flat, slightly rounded, without any projecting points or ridges. Its lustre recalls that of pure silicon. The finger in passing over the fracture experiences a sensation quite different from the touch peculiar to pigs rich in graphitic carbon. Thus, in the works which produce these extra silicated cast-irons, they are known under the name of "glazed pig." The following is the analysis of pig-iron of this nature manufactured at Towlaw, near Newcastle:—

Carbon	2.39	
Silicon	5.73	
Sulphur	0.12	
Phosphorus	0.13	
Titanium	0.02	
Nickel and cobalt	0.04	
Manganese	1.33	
Iron	90.21	99.97

The author has studied the production of extra silicated pig-iron at the works at Heerdt, near Düsseldorf. In consequence of an accident to the tubes, which led the air to six tuyeres of the furnace, it was necessary to work during eight days, blowing only through three with a feeble pressure. The temperature of the blast was extremely high, and the charge of minerals was much diminished. The fusible matters in this charge, and which were to form the slag, were in the following proportions:—

Silica	50	Oxygen 26.0
Alumina	16	Oxygen 17.6
Lime	33	
Protoxide of manganese	1	

Proportion of the oxygen of the silica to that of the bases—

$$\frac{26.0}{17.6}$$

With this charge a viscid slag was obtained, which, when once cooled, was, like all slags rich in alumina, vitreous and translucid; its color was an opalescent whitish blue. The melted iron was very liquid, and excessively hot: it flowed in the

channel of sand with a homogeneous appearance, without the least bubbling up and without sparks, like melted lead. It filled the moulds exactly without adhering to the sand. When cold it was very brittle, and less sonorous than usual. Its analysis showed :—

Silicon	7.90
Phosphorus	0.73
Carbon	2.60

This is a characteristic "glazed pig-iron." The consumption of coke was 2,100 kilos, to 1,000 kilos of metal. In works which employ aluminous minerals, like those of Aveyron which use that of Mondalagac, containing—

Alumina	11.5
Silica	10.0
Lime and magnesia	15.0

highly silicated pigs are ordinarily produced, which waste much in puddling. This production of pig-iron with an aluminous charge is always accompanied with a high consumption of coke. At the St. Louis works near Marseilles, which commonly yield pure grey pig-irons with slags containing—

Silica	33.0
Alumina	15.0
Lime	50.0
Magnesia, manganese, etc	2.0

the pigs generally contain not more than 1 to 1.5 of silicon. To obtain extra hot Bessemer pigs, containing 4 per cent. of silicon, the charge is modified so as to have—

Silica	40.0
Alumina	19.0
Lime and magnesia	41.0

The conditions for obtaining extra silicated pig metal are slow working at very high temperature and siliceous, and at the same time highly aluminous, charges. Great heat is requiredfor the alloy of silicon and iron produced, which is more infusible than the common carboniferous cast-iron. The operation must be slow, in order that the reduction of silica in presence of carbon and iron may be extensively effected. The proportion of lime must be reduced, lest its affinity for silica might interfere with the reduction of the latter, and the alumina is increased to neutralise further the basic action of the lime.—*Samson Jordan, in Chemical News.*

CORRESPONDENCE.

The Arctic Regions.

TO THE EDITOR—SIR : The recent arrival of a portion of Capt. HALL'S polar expedition, with the information of the fate of Capt. HALL himself, and the doubt in regard to that of his vessel. raises once more the question, *Cui bono?* as referring to these expeditions. In truth, a careful balancing of the arguments on both sides shows a record of misery and waste of life on the one hand, far outweighing the increase of happiness or any material good to either the explorers themselves, or the public in general, on the other. In the language of the day, the pole is largely in arrears in its account with humanity.

The case admits of no argument ; all of the knowledge obtained as yet, would be dearly paid for by the grief of one woman. But Lady FRANKLIN'S case is one of hundreds, except in the favor which fortune has shown to her in other parts of the world. So the case stands at present ; and now the question is, how long will it remain so, for men are not disposed to sit down and acknowledge themselves defeated ; more men will take the risk, more women will grieve, and the pole will be visited in due time. Two questions, however, must be considered, and should be settled definitely before the expedition starts. The first of these, as mentioned before, is the *Cui bono?* the object to be attained ; the other, the means and method of attaining it. Of the object then : Is it to be like the discovery of the Northwest passage, a barren "I did it," for some one man, otherwise scarcely heard of? Is it to be a few meteorological notes, an establishment of the tides where no clams grow—items never valued after leaving college? These would never pay the debt already accrued. A more definite and palpable increase of happiness to man must be located there before the polar game shall be worth the candle. In plain terms, what is the Pole good for? In the way of useful material, perhaps some oil, whalebone, or fur ; but that list is now filled up by the whaler just as far as his present methods and means can make it pay. The discovery of regions that he cannot afford to visit, would be only another Northwest passage to him, neither saving his fleets nor increasing their yield. Who then is to be benefited, and how, since for its own sake the problem is not worth solving? But give men an object, a motive, say for example, to locate a route for summer tourists, a watering place, with its attractions and excitements ; then men, and what is of more consequence, women, will take an interest in the work, it will be done and a trip to the North Pole will become a summer's pleasure. A summer's pleasure, for the real distance from New York to the Pole on the great circle is not more than three thousand miles, being less than that to Paris. Nor need more than four thousand miles be traversed on the passage. This, at an average speed of six knots per hour, would require only about twenty-eight, say thirty days going, and thirty days returning, leaving of the summer's pleasure thirty days for dancing around the Pole ; and of this distance three-fourths may be made in open water, at an average speed of ten knots per hour, thus requiring about twelve days, leaving eighteen days in which to traverse a thousand miles of water, ice or snow, as may be. This demands an advance of only the average rate of fifty-six miles per day, or two and a quarter knots per hour.

Having thus defined the requirements of the voyage, the next thing to be considered is the means and manner of fulfilling them, and this demands a careful examination of the obstacles to be overcome. Naturally, the first obstacle brought forward is the climate—the intense cold. That cold, however, is not deadly, but, on the contrary, it is healthy, and these same survivors of former expeditions have lived in it, year in and year out, and that on food that would have poisoned them in any warmer place. Our programme requires it to be endured for no more than eighty or ninety days, and that at the chosen season. The next difficulty is the trouble of finding the way, where the compass fails ; but navigation makes the value of the compass, not the compass that of navigation. And no good navigator, in any region, trusts his compass, without from time to time proving it by reference to guidons far removed from earthly influence ; and in the Arctic, the same methods are open to him—the sky is clear, and God's lighthouses are well attended. The currents will be mentioned, but the current that drifted men at the average rate of about eight miles per day, is not an insurmountable obstacle to able-bodied seamen.

This brings us to the great stumbling block ; a lump of ice, a field of snow, these are to be overcome ; mark the word. In times past, men thought the water an obstacle to be gone through, and went through it just as far as they could wade. Since then, the water has been surmounted ; gone over. Even now the railway engineer, being compelled to keep his track to grade, his train to track, finds that hills, whether of earth, or of ice and snow, must be gone through, which the Canadian, with ice-boat and sleigh, goes gaily over ; even the steamboat of the Mississippi crawls over the sandbar. In general, water is the great lubricator, and in moving heavy weights upon the face of the earth it has no equal, while ice and snow are but frozen water, the lubricating quality of which is not impaired by freezing. Evidently the craft in which the North Pole will be reached, must be just as capable of passing the ice in the proper way as of passing the water. It must be a ship for one part of its voyage and and an ice boat for the other.

For propelling both steam and wind should be used, and the sails should not be, as in the American steamers, like the wings of an ostrich, of no use but to steady the roll. They should be carried until the spars spring, to save coal, whatever the character of the track. Of the trip, the open water work would vary but little from an ordinary sea voyage.

When ice is met with, the vessel must accommodate herself to the character of the field to be traversed. The floe must be mounted and passed over with but little loss of time, and without in any way disturbing the cargo or ship. The precipitous bergs, and also hummock ice, must be avoided, even if the distance is somewhat increased. Snow must be gone over and not through, and whether its foundation be ice or land, a fair rate of speed must be maintained. On upgrades, as mounting a floe or a snow-clad hill, the rate would be slow.

The vessel for this work carrying only crew, provisions, and means of advance, need not be large, and can be handled with comparative ease ; the crew being always on board in comparative comfort, would be always on hand cheerfully, for a full stomach makes a good temper and resists the cold.

The dog-train should be reduced to its proper level of pleasure excursions, and piloting, never out of sight of the ship ; an ornament, not an essential.

The whole problem is simply one of engineering, and involves no greater hardship than a winter on Mount Washington, or an old time passage of the great plains! Yet, where FREMONT ate his mules in the snows of the Wahsatch Mountains, the scream of the locomotive may be heard, and where HALL ate Walrus, Prince Momus may hold carnival. Many of the matters to be considered are already familiar to us in other places, more of them might be so, and a vessel of similar construction, built for freight, might bring grain into Buffalo almost as cheaply in midwinter, as in midsummer, *if men desired it.* In this sentence lies the main difficulty in the way to the pole.

What do you want of the Pole? As shown above, if the object is broad enough to enlist the sympathies of mankind, it is not difficult of attainment, but if it be confined to a desire for notoriety, or the doubtful benefit of another myriad of words to be studied in the school, and forgotten in the world, then is the object unworthy of the effort, and that fact is a cause of failure more disheartening and more effective than danger or hardship. But make the object broad enough, let it be definitely and positively to bring those regions within the everyday life of ordinary men, leave no chance for a divided aim to paralyze the leaders while on the voyage, and the difficulties are no more than are overcome in common life, and either pole may be reached without one half of the risks now ran, or one-half the trouble now taken to organize an inherent failure.

Yours, Very Truly, ALOHA VIVARTTAS.

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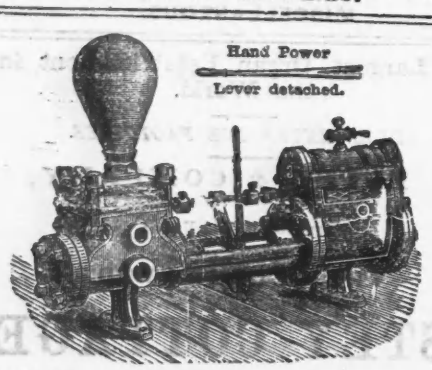

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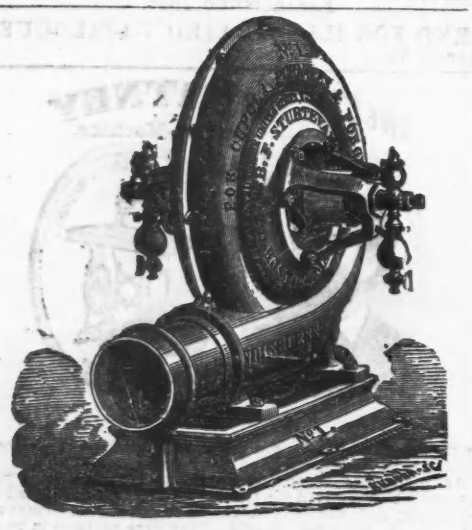

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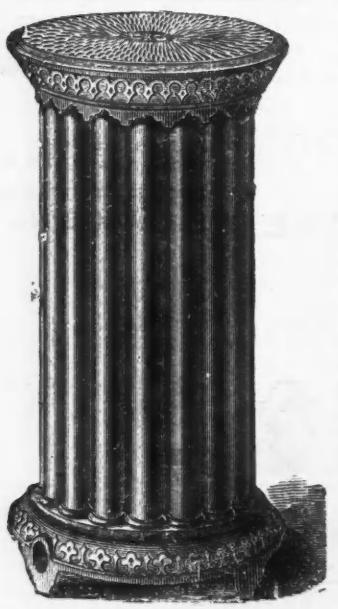

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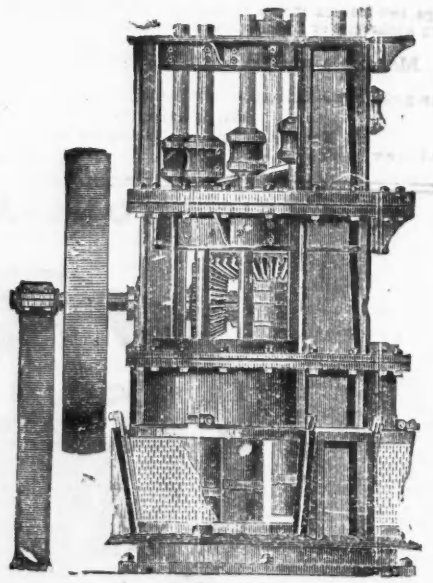

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