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Gold and Silver Production for 1874.

MR. J. J. VALENTINE, General Superintendent of WELLS, FARGO & Co., sends us a copy of the company's annual statement of precious metals produced in the States and Territories West of the Missouri river, including British Columbia, during the year 1874, which shows an aggregate yield of \$74,401,055, being an excess of \$2,142,362 over 1873. California, Nevada, Utah, Colorado and British Columbia increased; Oregon, Washington, Idaho, Montana, Arizona and Mexico (west coast), decreased. The increase in Nevada and Colorado is merely nominal, but in California and Utah it is \$3,100,000, three-fourths of which is to the credit of California.

Statement of the amount of precious metals produced in the States and Territories west of the Missouri river, during the year 1874:

States and Territories.	Gold dust and bullion, by express.	Gold dust and bullion, by other conveyances.	Silver bullion, by express.	Ores and base bullion, by freight.	Totals.
California.....	\$16,015,568	\$1,601,556	\$967,857	\$1,715,550	\$20,300,531
Nevada.....	345,394	34,539	30,954,602	4,117,698	35,452,233
Oregon.....	553,564	55,356	150	.....	609,070
Washington.....	141,396	14,139	.....	.....	155,535
Idaho.....	1,207,667	120,765	551,572	.....	1,880,004
Montana.....	2,581,362	258,136	.....	600,000	3,439,498
Utah.....	83,721	8,372	746,565	5,072,620	5,911,278
Arizona.....	23,333	2,333	400	.....	26,066
Colorado.....	1,500,799	.....	1,745,705	855,000	4,191,405
Mexico.....	84,655	.....	714,223	.....	798,878
British Columbia..	1,487,473	148,747	357	.....	1,636,557
Grand total.....	\$24,114,833	\$2,243,943	\$35,681,411	\$12,360,868	\$74,401,055

Bullion Statistics of Gilpin County, Col., for 1874.

ACCORDING to the Central City Register of January 6, 1875, the bullion product of Gilpin County during 1874 was approximately as follows:

Shipped by the banks, gold:

January.....	\$59,940
February.....	81,445
March.....	97,290
April.....	94,075
May.....	119,135
June.....	118,925
July.....	93,270
August.....	86,710
September.....	93,855
October.....	113,170
November.....	86,370
December.....	125,740
Total.....	\$1,169,925

In addition to this, there was shipped from the works of the Boston & Colorado Smelting Co. the following product, extracted from Gilpin County ores (?):

Silver.....	\$1,103,487
Gold & Copper.....	535,390

Total..... \$1,638,877 currency.

The Scotch Pig Iron Trade.

WE are indebted to Messrs. JOHN E. SWAN & BROTHERS, of Glasgow, for the following notes on this important industry. One cannot help smiling at the advice given our ironmasters, "to supply their customers with imported Scotch pig, and let their own works stand idle." In fact, we are to-day making iron as cheaply in this country as they do in Scotland, where, it is well known, the furnace practice is of the most antiquated and wasteful type. The average price of warrants during the past year was 87s. 6d.—equivalent to, say, \$23 50, American currency—at which price No. 1 Lehigh iron has been selling for some months at the furnaces, or \$25@26 at New York, while gray forge has been sold at the works as low as \$19, at the works, or \$21 at New York, and is now quoted \$23 at New York. Sooner than our Scotch friends anticipate, the United States will be able to export iron, if not in the form of pig, certainly in that of manufactured iron, our superior labor-saving appliances in the manufacture of machinery balancing our somewhat higher wages.

"PRODUCTION OF SCOTCH PIG IRON.—The make of 1874—806,000 tons—has been the smallest since 1855, and was seriously curtailed by disputes, in Spring, with

all classes of workmen. The adaptation of numerous furnaces to the principles of utilizing what was formerly waste heat, and the remodelling and heightening of others, have also interfered with the output. At this day there are 121 furnaces blowing, and 36 out of blast; but it is not expected that many of the latter will be put in operation in their previous state, especially as trade does not take away the existing make. Blackband ironstone is getting scarce in Scotland, and the cost prices of materials of all kinds are much enhanced, so that there is no immediate inducement to increase the output to much beyond its present limits. The largest yearly production was, in 1870, 1,206,000 tons, and it is questionable if we can exceed this for some years to come.

"STOCKS.—The subjoined figures show the actual monthly efflux from, and influx to, the stores, which demonstrate how nearly they were exhausted in October, there being then in existence a balance of only 17,413 tons:

1874.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Received..	8,025	1,960	310	708	21,353	333	400	678	1,295	7,229	10,579	
Delivered..	589	3,272	4,194	7,547	4,689	5,013	16,425	5,927	2,468	2,038	576	770
Stock.....	41,949	40,637	39,753	29,914	25,225	41,565	25,473	19,946	18,156	17,413	24,066	33,875

"The highest cash price this year was, on January 2nd, 109s.; lowest, on April 17th, 71s. 6d.; and the average, 87s. 6d., for G.M.B. warrants.

"As Scotland depends in a great measure for an outlet upon the quantities of iron ordered by foreign countries, the subsidence of the American demand, which has now almost ceased, causes some disappointment to our ironmasters, seeing the panic in that country last year has left an indisposition to enter into any transactions of magnitude. It will be interesting to study the effects of the qualified resolution recently come to by the producers in Pennsylvania, to keep 50 per cent. of their furnaces out of blast during all next year. From a British point of view, this step appears to be the result of a policy proceeding upon the radically erroneous basis, that a country which attracts our working population by statements of enormous wages to be earned there, can possibly compete with this side in ordinary times, especially as the distances for the transit of their minerals and pig iron are far in excess of ours. As labor is such a heavy item in the cost of manufacture, and our men are gradually learning that they must work at least as long hours as their employers, it would evidently pay many of the American masters to close their works and import our relatively cheap Scotch iron for their customers, instead of pushing Congress to maintain the current import duty of about 7 dollars per ton, to prevent the collapse of a trade which upon their recent admission requires 25 dollars per ton to yield them, in their own words, "a living profit," and that at the expense of the whole American nation."

	1874.	1873.
PRODUCTION... From Returns from the Makers.....	Tons. 806,000	Tons. 993,000
CONSUMPTION... In Foundries.....	193,000	230,000
In Malleable Works.....	124,000	143,000
(Quantity of bar iron made—1874, 180,000; 1873, 189,312).....	317,000	373,000
EXPORTS... Foreign.....	296,803	398,859
Coastwise.....	166,104	214,061
By Rail to England, about.....	50,993	81,089
Total.....	513,000	694,000
STOCKS... In Connal's Stores.....	33,875	34,513
At Makers' Works, from returns received from them.....	62,125	85,487
Total.....	96,000	120,000
Average Price.....	87s. 6d.	117s. 3d.
Average Number of Furnaces in Blast.....	96	119
Number of Furnaces in Blast on 25th Dec.....	121	122
Number of Furnaces existing and nearly ready..	157	152
Imports of English Iron by rail and Water.. Tons	200,000	125,000

"Painting on Zinc Without Paint.—M. PUSCHER, of Nuremberg, has lately invented a simple process for coloring sheet zinc, based on the employment of acetate of lead. On applying this substance, mixed with a minium preparation, a reddish brown tint is obtained. The cupola of the synagogue at Nuremberg was thus colored, as an experiment, over a year ago, and, to all appearance, is yet unaffected by the weather. By adding other bases, lighter or darker tints of grey and yellow may be obtained, giving the zinc work the appearance of carved stone. With a solution of chlorate of copper, the preparation turns the sheets of zinc black.

Economy of Fuel in our Anthracite Blast-Furnaces *

By B. W. FRAZIER.

CONTINUED FROM PAGE 35.

WITH regard to the manner in which the working of the furnace is to be improved, I feel obliged to dissent from the views expressed by Mr. CHURCH. He recommends a lower furnace with a narrower top, and that the furnace should be worked with a hot top. In explanation of these recommendations he states that the difficulty lies in the burning of carbon in the upper part of the charge by the carbonic acid formed lower down. Now, it appears to me that the results of the investigations of Mr. BELL and other metallurgists prove that this reduction of carbonic acid by the solid carbon of the fuel takes place almost simultaneously with its formation, and in a portion of the furnace where the temperature is comparatively high, and that, consequently, they furnish no ground for the assumption that carbonic acid could be generated in, and escape from, these hotter regions of the furnace, to suffer reduction in its passage through the charges of ore and fuel in the cooler regions above. Mr. BELL's experiments, especially, have shown that, though the reactions between carbonic acid, carbonic oxide, carbon, the oxides of iron and metallic iron, which take place in a blast furnace, are complex, and the various affinities, which cause them, all increase, within certain limits, with the temperature, yet those affinities, which tend to cause reactions producing carbonic acid, such as the reduction of sesqui-oxide of iron by carbonic oxide, and the dissociation of carbonic oxide, are predominant at lower temperatures, while, on the contrary, the tendency towards the reduction of carbonic acid by carbon or metallic iron increases more rapidly than the preceding, as the temperature increases, and becomes predominant at a temperature somewhere between a dull red and a full red heat, under the conditions existing in the upper part of a blast furnace.

The temperature at which, according to Mr. BELL's experiments, sesqui-oxide of iron commences to be reduced is about 140°-200°C.

Calcined Cleveland ore commences to suffer reduction at about 200°-210°C. The dissociation of carbonic oxide, Mr. BELL thinks, commences probably at the latter temperature. On the contrary, the action of carbonic acid on metallic iron does not commence till a little above 400°C., and at 417°C. the action of hard coke upon carbonic acid is not appreciable.

It is true that, from an experiment made on a furnace at Wear, Mr. BELL infers that a portion of the coke acts at a comparatively low temperature (estimated by him at 500°C.), to decompose carbonic acid, but he attributes this action entirely to soft coke, and, besides, the conditions of the experiment were different from those of an ordinary furnace, as the charging of ore had been discontinued. It is well known that anthracite, from its compact nature, exerts a feebleness upon carbonic acid than coke does. It seems to me, therefore, that we should be justified in assuming that carbonic acid, which has been formed by the reduction of iron oxide by carbonic oxide, in any region of an anthracite furnace where it can exist in contact with the fuel, is not likely to be reduced in its passage through the upper and cooler regions of the furnace.

Mr. BELL has shown that the region of the reduction of the iron oxide of the ore by carbonic oxide is a limited one in the upper part of a furnace.† He estimates it for a Cleveland furnace as the upper twelve or thirteen feet of the furnace.

The upper limit of this region is not attained in any furnace, unless the gases escape at such a temperature, or charged with so much carbonic acid as to be incapable of further action upon the sesqui-oxide of iron.

In the case of the Cleveland furnace, the increase in the proportion of carbonic acid in the gases, and in the case of the anthracite furnace, the diminution in the temperature at the throat, owing to the heat absorbed by the drying and heating of the fresh charges, are sufficient, at least, to render the reducing action of the escaping gases languid.

The lower limit to this region of economical reduction is imposed by the rise in the temperature to such a degree that the carbonic acid formed by the reduction of the iron oxide is again reduced to carbonic oxide in contact with the fuel.

The sufficient extension of this region, by causing the temperature to rise gradually as the charges descend, so that the oxide of iron may be deprived in it of as much oxygen as it will part with to carbonic oxide, is one of the requirements for the perfect working of the furnace.

Now, what are the conditions of an anthracite furnace, smelting uncalcined brown hematites and magnetic ores? There is a region of very high temperature in the hearth, and the unusually large quantity of gases developed there, in rushing through the furnace, probably causes a comparatively high temperature to prevail to a considerable distance above the tuyeres.

Near the throat, however, there is a region of low temperature, produced by the absorption of heat in the heating up of the fresh charges, and the expulsion of water from them. The nearer together these opposite regions are, the more rapid must be the rise in the temperature of the charges as they traverse the

*A paper read before the American Institute of Mining Engineers at Hazleton, October, 1874.

† This statement should be restricted to furnaces working under conditions similar to those of the Cleveland furnaces. From experiments made to determine the temperatures at different depths in other furnaces, this region of economical reduction seems to extend in some furnaces considerably lower down than it does in those of the Cleveland district. The experiments made on a charcoal furnace at the Rothehütte, in the Harz, are especially remarkable for the very low temperature existing at a considerable depth in the furnace. They are recorded in the Zeitschrift für das Berg-Hütten- und Salinenwesen in dem Preussischen Staate, Vol. XIX., 1871.

distance between them (the rate of descent remaining constant), and, consequently, the smaller must be the region of economical reduction. If, on the contrary, we increase the distance between these regions of opposite temperature, by increasing the height of the furnace, it seems natural to infer that the region of economical reduction will also be increased in extent, and the working of the furnace improved.

As far as my information extends, these *a priori* reasonings have been confirmed by the general experience in our anthracite blast furnaces. The tendency has of late years been towards the erection of higher furnaces, and I believe that the higher furnaces have been generally found to work better and more economically than the lower ones.

There are other points to be considered in this connection. It is well known that the molecular condition of an ore has a great influence upon the ease with which it can be reduced by carbonic oxide. It is probable that the calcination of the compact magnetic ores used in many of our anthracite furnaces, would, by rendering them more porous, cause them to be more readily reduced. It is very desirable that experiments should be made to determine the relative rapidity of reduction of calcined and uncalcined magnetites.

Two of the reasons assigned by Prof. GRUNER for the very good working of the French blast furnaces, which he cites in his "Etudes sur les Hauts Fourneaux," notwithstanding their comparatively small size, are worthy of the consideration of our iron masters. They are, first, the slender shape of the furnace, which tends to cause uniformity in the distribution of the gases; and, secondly, the small diameter of the hearth, which renders it easier to maintain a uniformly high temperature in it than in a wide one. It is unnecessary for me to urge the importance of the third reason, which he assigns, viz., the attention paid to the proper distribution of the charge, as that has been the subject of considerable experiment and inquiry on the part of our anthracite furnace managers, though there is room, no doubt, in many cases for improvement.

To resume briefly the results of our calculations:

In answer to the question, "What caused the great consumption of fuel in the anthracite furnaces of 1869-73, cited by Mr. CHURCH?" we have seen that it was caused:

First, by their large heat requirement, owing chiefly to the siliceous nature of their ores.

Second, by the imperfect working of the furnaces, due in great measure to the reduction to carbonic oxide, in contact with the fuel, of the carbonic acid produced by the reduction of the iron oxide of the ore; and perhaps, in part, to a wasteful manner of producing the high temperature necessary for the reactions in the hearth.

The remedies proposed for the first evil are:

1. A more careful preparation of the ores.
2. A mixture of calcareous ores with the siliceous ores smelted in the furnace.

The remedies for the second evil, not all proposed with confidence, but suggested for consideration, are:

1. An increase in the height of the furnace.
2. Calcination of the magnetic ore.
3. A more slender shape of the furnace.
4. A narrow hearth.
5. A more perfect distribution of the charge.

We have estimated that, by mixing calcareous ores with the siliceous ores of the furnace, to remedy the first evil, an economy of fuel might, under favorable circumstances, be attained of 13½ cwt. of coal per ton of pig iron, according to the views of Mr. BELL. The economy of fuel to be effected by completely remedying the second evil has been variously estimated at from 8 cwt. to 16 cwt. of coal per ton of pig, and if both evils were remedied at once, it has been estimated that an economy of from 21½ cwt. to 24 cwt. of coal per ton of pig would be effected.

In conclusion, I would remark that in this paper everything has been discussed solely with a view to economy of fuel. I am well aware that the nature of the problem, which every ironmaster must solve for himself, viz., how to produce iron with the maximum of profit, is a complex one, embracing many elements besides economy of fuel; so that he may, in many cases, be obliged to resign himself to a certain waste of fuel as the least of several evils.

The Production and Importations of Lead in 1874.

THE LEAD BUSINESS PRESENT AND PROSPECTIVE.

THE following report has been prepared by Mr. EDWARD A. CASWELL, one of the principal brokers in lead in this market; his knowledge of the business makes his remarks of great interest.

The lead-pipe and shot business has been the field of an uncompromising competition, resulting in such a severe reduction in the price of manufactured lead, that orders pressed in from all points and materially increased our local consumption. The white-lead trade has been marked by no unusual developments. The price of pure ground lead was advanced January 21st, to 11½ cents and reduced again to 11 cents on the 1st of August. The use of American lead for corroding still increases, but rather in the direction of the virgin lead of Missouri than in desilverized brands, the best of which do not yet reach the requirements of our fastidious Eastern corrodors.

The supply from Nevada and Utah, this year, has not been less than last year, while that of Missouri has been greater. The supply from the far West was lessened in the early part of the year, owing mainly to the want of capital and not

to any failure of the mines. In fact, the reports from some quarters are especially favorable, and we may be astonished any day by the striking of a "Comstock lead vein" with the figures running into thousands of tons. About 250 tons of Mexican bullion reached this point, but no definite information can be given concerning future receipts. The expense of bringing it to the sea board, the import duty, and other items do not leave a wide margin. If, however, the U. S. boundary should be extended a few miles only, so as to include those mines within Government jurisdiction, we may get much larger supplies from that quarter. The residents of New Mexico also confirm their oft-repeated statements of large quantities of ore in sight, waiting patiently for a Texan Railroad to bring it to Eastern works, and lastly the same cry is echoed from the land of the Puritans, and Essex County, that has furnished the most perfect specimen of *brass now living*, is also producing lead, and the fishermen of Newburyport may turn from catching smelts to smelting. Disinterested parties well-versed in lead matters, who have visited this locality report these strikes to be of much real value.

It has been impossible to obtain exact figures regarding lead production in each locality, especially in Missouri, where the number of mines and diggings is legion. The totals, however, are easily reached. It appears that the Joplin Co. has produced this year about 2,600 tons of lead, and other firms in the same district as much more. The Porter mines are producing 900 tons per annum. The Frumet has doubled last year's output, and the Mine La Motte reports large quantities of mineral ready for treatment. The mining interests of Missouri generally seem to be inspired with new life at all points, and there is no doubt that the present systematic and scientific work will develop the State a hundred fold more rapidly than the by-gone superficial prospecting.

The totals of American production and importation, as given below, are much larger than the current estimates. The statistics were kindly furnished by Mr. T. H. SELBY, of San Francisco; Mr. N. CORWETH, of Chicago; Messrs. CORWETH & Co., of Galena; Mr. F. W. BILLING, of the Germania Co., and by the superintendents of the other Refining Works. The U. P. R. R. has, with equal courtesy, reported the figures of lead transportation Eastward from Ogden, showing shipments of 3,500 gross tons of pig lead, and 15,000 tons of bullion, which verifies exactly the statistics given independently by the various desilverizing works.

Assuming that the country holds about the same stock on hand now as in January, 1874, these production figures also show our consumption for the past year.

TOTAL UNITED STATES SUPPLY, 1874.

Imported into New York.....	11,750 Gross tons.		
" into other Eastern ports.....	6,250 "		18,000 tons.
United States Government sales.....		4,000 "	
Missouri produced.....	15,000 Gross tons.		
Iowa, Illinois, Wisconsin.....	5,500 "		20,500 "
California, (desilverized lead),	8,000 "	(Utah and Nevada.)	
Salt Lake City,	3,500 "	" "	
Omaha,	5,800 "	" "	
Chicago,	2,200 "	" "	
New York, Newark, Phila.	6,500 "	" "	26,000 "
Total U. S. supply for 1874, from all sources.....			68,500 tons.

The U. S. Government, about the middle of June, authorized the sale of all its pig lead in store, except 2,000 tons—which put into the market prospectively about 7,000 tons of good ordinary foreign lead. The immediate effect of this action was to depress prices lower than they have been for several years. The total sales thus far have amounted to 4,125 tons. The Government business has been conducted in a careful and judicious manner, keeping pace with the market and securing fair prices without injuring trade. It appears that of the 7,000 tons first reported as coming into market the Government had used considerable, so that only about 2,200 tons more will be disposed of, besides 1,500 tons of bullets to be remelted into pigs. It would appear at first sight that our supply would have been inadequate to the demand last Summer had it not been for Government lead, but in reality it was only the fact of that lead being here that checked shipments of domestic to this point and discouraged capitalists from turning their attention to this article.

Another point worthy of note is the increased receipts of lead from San Francisco, which have in 1874 been more than double that of previous years. This fact shows such a severe deflection of the lead trade into new channels that our Eastern refiners may justly regard California with jealous fears as a dangerous competitor.

The refining and desilvering branch of the lead business offers some facts of such deep import that they cannot be overlooked. There are in all about twenty establishments of this kind in the country, and yet among them we note six commercial failures in 1874, besides the fact that two others have stopped work and still two more are offered for sale. The percentage, therefore, of refining and desilverizing works that have apparently found it to be a non-paying business, is nearly one-half—which leads us to one or all of several conclusions.

1st. That the business is overdone. In which case the ones that remain will make it pay, if too many new concerns do not organize.

2nd. That the business is one which requires long and thorough training on the part of workmen, as well as superintendents, in all its branches, and that the money lost in it has been expended in purchasing experience which can only be of benefit to those who still continue to work.

3d. That wastage and shrinkage, loss of interest, and commissions, enter so largely into this business as to deceive and delude novices, and thereby cause them to compete in buying bullion at prices which old stagers know to be ruinously high and devoid of profits. Whatever the truth in the matter may be the

results show that the business must be conducted with more than usual prudence and knowledge.

The importation of lead into New York has decreased about twenty-five per cent. from last year. This is owing to the facts that Government has supplied the demand for ordinary lead, and that much of the corroding lead is now shipped direct to the Atlantic seaports. The demand for ordinary foreign at present comes chiefly from cartridge manufacturers, who receive the drawback on all lead exported in cartridge form.

The English market, during the year, has experienced wide fluctuations. On the 1st of January, common English lead was quoted at £24, but fell to a shade below £20 before the 1st of June, thereafter rallying to £24, the closing quotation of the year. The production in England has decreased within a few years' time 17,000 tons, or nearly one-quarter, so that peace in Spain, or American industry and railroads must be the means of making good the deficiency, or lead will range from seven to eight cents per pound rather than from six to seven.

In conclusion it may be said that the outlook is brighter than it has been. The effects of the panic have about disappeared; business stands on a firmer basis now than it has any time for three years past, and the country looks hopefully to Congress for honest, wise and speedy legislation in the financial question.

Notes.

Asbestos.—Mr. J. CLEGHORN, of Glasgow, and T. G. PATERSON, of Edinburgh, have patented some improvements in the treatment and preparation of asbestos, and in making various fabrics and articles therefrom. This invention consists in making paper out of asbestos fibre pulp, or a mixture of that with other suitable fibre or material, and cutting this asbestos paper into strips, and, by a first improvement, twisting these into thread, yarn or cord, either with or without being first coated with india rubber; and in twisting two or more of these into larger cords or ropes, either with or without a core of vulcanized or pure india rubber, or of other equivalent or suitable elastic or flexible material, all for making the fluid-tight packings of the stuffing boxes, working and other parts of steam engines and other machinery, pipes, stills and retorts. Second, in plating these twisted asbestos threads into braids, or round or polygonal cords or bands, also for making the said packings and joints of machinery and apparatus. And, third, in weaving the said asbestos thread or yarn into a cloth, somewhat about the texture of canvas, which would withstand the action of the weather and heat, and so be used for the flange joints of pipes and other apparatus, and for coverings, mail and despatch bags, window curtains, also for producing works of art desired to stand against decay and fire and for making wrappers for projectiles. And, fourth, in cutting or forming or making waddings, cartridge cases, and wrappers for the cartridges and projectiles of either rifled or smooth-bored fire arms or cannon, out of the said asbestos paper, millboard, pasteboard, or woven fabric, which would prevent all windage with the least possible amount of friction, from the flexibility and lubricity of the asbestos enabling the barrels to be kept longer clean and be fired oftener than is possible with the appliances at present in use.

Mineral Statistics of Victoria.—We have been favored by the Secretary for Mines, Mr. R. BROUGH SMYTH, with the reports of the Mining Surveyors and Registrars for the quarter ending June. During the three months the total quantities of gold got were 164,934 ozs. 5 dwts. from the alluvial, and 106,905 ozs. 7 dwts. from the quartz, making 271,839 ozs. 12 dwts. in all. The quantity of quartz crushed was 244,865½ tons, which gave an average yield of 11 dwts. 5.80 grs. Of quartz tailings and mullock, 27,066 tons were treated, yielding 2 dwts. 19.38 grs. The quantity of pyrites and blanketings operated upon was 1277½ tons, which yielded 2 ozs. 8 dwts. 6.41 grs. per ton. The number of hands employed in alluvial mining was 18,467 Europeans and 12,484 Chinese; and in quartz mining 15,432 Europeans and 105 Chinese, so that the total number of miners was 46,488. The approximate value of the mining plant is £2,074,972½; there are 106¼ square miles of auriferous ground actually worked upon; and 3367 distinct quartz reefs have actually proved to be auriferous. The report contains a very valuable table, showing the yield of gold from certain parcels of quartz during the quarter in some of the deepest mines in Victoria, with the depth of the deepest shafts now being sunk or recently suspended. There is also a table showing approximately the descriptions, sizes, prices, kinds, and sources of supply of timber used for mining purposes in Victoria. The report on the geology of the country intersected by the Durham Lead, Buninyong, written by Messrs. R. ETHERIDGE, jr., and R. A. F. MURRAY, whilst employed as assistant field geologists, which appears as an appendix, will be found particularly interesting, though facts ascertained since the report was made would no doubt cause some of the conclusions to be modified.

Mineral Resources of British Columbia.—In the year ending the 30th of June, 1874, the exports from British Columbia were of the value of 2,061,743 dollars, the gold dust and bars exceeding a million. The gold exports in the three months ending the 30th of September, 1874, amounted to 407,734 dollars; and in September alone, 190,000 dollars; and these statements are exclusive of gold shipped in private hands. A nugget weighing over 46 oz., and worth upwards of 700 dollars, was recently taken out of Dease Creek; it is stated that this is the largest nugget that has been found in British Columbia. The local Government have sent a party to explore and prospect the head waters of the Stickeen. The north-east end of Vancouver's Island is thought to be rich in minerals, as well as in cedar, fir, and white pine, as Mr. J. COON has ascended Nimpkish river, eight miles, to a lake 15 miles in length, crossed the lake, and ascended Camascena river, finding gold diggings that will pay 3 dollars a day to the hand. On the lake a coal seam was seen, and copper and iron were met with everywhere.

New Pottery Glaze.—M. CONSTANTIN, a chemist, of Brest, has invented, for common pottery-ware, a glaze which is completely inoffensive, and which is destined to replace the lead glaze which, up to now, has been always employed, and which has had the serious inconvenience of producing intoxications more or less mild. Already in 1872, M. CONSTANTIN had produced a glaze comparatively less dangerous by reason of the small quantity of lead which it contained. His mixture consisted of a silicate of soda added to powdered flint, with a very little minimum of red lead. Since that, the glazes accepted at the manufactory of Lanilis, near Brest, do not contain any trace of lead. The two formulas which they use are—(1) 100 parts of silicate of soda at 50 degrees; 15 parts of powdered quartz; 15 parts of Meudon chalk. Or (2) 100 parts of silicate of soda at 50 degrees; 15 parts of powdered quartz; 15 parts of Meudon chalk; 10 parts of borax. The addition of borax makes the glaze more fusible and brilliant; it requires a less vivid fire than the first formula, and it can be colored green by copper and brown by manganese.

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

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THE SCIENTIFIC PUBLISHING COMPANY.

WILLIAM VENTZ, Secretary,

P. O. Box 4404.

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Color-Tests for Temper.

In his interesting articles in *Engineering*, on the principles of shop manipulation for engineering apprentices, Mr. J. RICHARDS makes the following wise suggestion concerning the shades of color which appear in "drawing temper." These shades must be seen to be learned, and the method he proposes is merely a help to the beginner, but one which would doubtless be very useful, and which could be employed with advantage, also, as furnishing an excellent illustration for instructors and lecturers on metallurgy. Says Mr. RICHARDS:

"Procure eight pieces of cast steel about 2 in. long by 1 in. wide and $\frac{3}{8}$ in. thick; heat them to a high red-heat, and drop them into a salt bath. Leave one without tempering, to show the white shade of extreme hardness, and grind off and polish one side of each of the remaining seven pieces. Then give them to an experienced tool-maker to be drawn to seven various shades of temper, ranging from the white piece to the dark blue color of soft steel. On the backs of these pieces paste labels, describing the technical name of the shades and the general uses to which tools of corresponding hardness are adapted. This will form an interesting collection of specimens, and accustom the eye to the various tints which will after some experience be instantly recognized when seen separately."

The Anthracite Production in 1874.

AS THE READERS of the ENGINEERING AND MINING JOURNAL know, we have taken extraordinary pains, during the past year, to obtain full and reliable returns of all the coal mined throughout the country. Up to that time no effort had ever been made to do this, except for the output of our anthracite mines, and for many years past, the Pottsville *Miners' Journal* was the only paper pretending to give even that. At one time, when each colliery made reports direct, the returns published by our valued contemporary were full and accurate, but for some years back the only reports of the coal mined have been obtained from the railroads carrying it, and as these multiplied there were introduced two sources of error, not fully appreciated by the *Miners' Journal*—the one, that of omitting altogether some coal leaving the collieries over new routes; and, secondly, that of counting over twice, or even three times, the same coal as returned by the several connecting roads. We have taken especial pains to guard against both of these sources of error, and, as now presented, our reports are full and reliable.

The result of our work shows that the quantity of anthracite sent to market is considerably greater than is generally supposed, and considerably more than the figures given by the Pottsville *Miners' Journal*, owing to its omission of several important items.

Besides the coal transported for a greater or less distance over the railroads or canals, and reported by these, there is a small quantity sold direct from the mines, and not included in any reports. We have been at pains to get this amount, and find, in cases covering an output of 2½ million tons, that it amounts very nearly to one per cent. of the output. This is much less than is usually supposed, and is, indeed, probably less than was formerly the case, because much of the coal supplying our mining towns and villages is now brought to them by rail, where formerly it was hauled in waggons from the mines.

There is still another item on which little reliable information can be obtained; it is the consumption of coal at the collieries for steam engines, pumps, &c., &c. At the present time, many of the collieries that formerly used the best broken and egg coal, now burn "waste," either "pea" coal or "boney" coal, that is not marketable, and consequently can scarcely be counted as a part of our product of marketable coal. From the best data, and from experience in the region, we are led to estimate the quantity of coal used at the mines and not returned to us, as 6 per cent. of the quantity returned. We therefore add in all 7 per cent. to the quantity given in our returns, making the following totals:

Wyoming Region.....	10,204,764 tons.
Lehigh Region.....	4,580,160 "
Schuylkill Region.....	6,714,074 "
Sullivan Region.....	36,268 "

Total of anthracite mined..... 21,535,266 "

Our estimate of the quantity of coal sold and consumed at the collieries is less than one half that of the *Miners' Journal*, which last year allowed over 16 per cent. for these items, an allowance altogether too great. However, as that journal altogether omitted to report a few million tons which went to market by routes not reporting to it, the total amount given for 1873 was not far from the actual output.

The production of anthracite coal this year has fallen but little short of that of last year's, notwithstanding the great depression which existed in the iron and manufacturing trades that usually consume so large a proportion of anthracite. The Schuylkill region suffered probably as much as the Wyoming, and the report of the Philadelphia and Reading RR. shows the falling off there to be but 3 per cent. The quantity of coal mined on the line of the Lehigh Valley RR. and that mined by the Pennsylvania Coal Company was about 100,000 tons more in each case than in the previous year. The Central RR. of New Jersey lost in tonnage about 107,000 tons; the Delaware, Lackawanna and Western Railway lost the most, or 547,000 tons. The Delaware and Hudson Canal Co. lost 353,000 tons. The Philadelphia and Reading lost about 3 per cent., or there were probably, in all, 1,000,000 tons less mined in 1874 than in 1873, which would make the production in 1873, 22,535,266 tons.

The quantity of coal mined on each of the several transporting companies' lines in 1874 was as follows:

THE PRODUCTION OF ANTHRACITE COAL FOR THE YEAR ENDING DEC. 31, 1874.

Tons of 2240 lb.

Wyoming Region.	Tons.
Delaware and Hudson Canal Co.....	2,399,417
Delaware, Lackawanna and Western Railroad.....	2,502,769
Pennsylvania Coal Co.....	1,338,663
Lehigh Valley Railroad.....	940,987
Pennsylvania and New York R. R.....	57,596
Central Railroad of New Jersey.....	1,519,590
Pennsylvania Canal.....	321,374
Lack. & Bloomsburg, South.....	432,046
Sold and used at the mines.....	691,722

Total output of Wyoming Region..... 10,204,764

Lehigh Region.

Lehigh Valley R. R.....	3,152,651
Central Railroad of New Jersey.....	1,210,662
Danville, Hazleton & W. B. R. R.....	40,687
Sold and used at the mines.....	308,280

Total output of Lehigh Region..... 4,712,280

Schuylkill Region.

Philadelphia and Reading R. R.....	5,370,300
Shamokin and Lykens Valley.....	904,536
Sold and used at the mines.....	439,238

Total output of Schuylkill Region..... 6,714,074

Sullivan Region.

Sullivan and Erie R. R.....	33,896
Sold and used at the mines.....	2,372

Total output of Sullivan Region..... 36,268

Total production of all the regions..... 21,667,386

Report of the Philadelphia and Reading Railroad Company.

The report which has just been issued by the Philadelphia and Reading Railroad Company has many points of interest to our readers. This company is the largest miner and transporter of coal in this country. Its business is probably managed in the most economical and systematic manner, so that it forms, as it were, a standard with which to compare the business done by other corporations.

The report is an exceedingly satisfactory one to the stockholders, showing as it does, that the net profits on the year's work exceeded those of any previous year by \$362,440.

We have not space for the entire report, but make the following extracts:

It might reasonably have been expected that during a period of such stagnation the traffic of the Company would have fallen off very greatly; and yet, notwithstanding the very general suspension of manufactures, the gross receipts of the company are larger than those of any other year except the last, while the net profits are greater than those of any previous year, without exception. As

compared with 1873, the coal tonnage has fallen off three per cent., merchandise receipts have decreased six and one-fifth per cent., and passenger receipts have increased one and eight-tenths per cent. The following table exhibits the comparative traffic of the last three years :

	1872.	1873.	1874.
Number of passengers carried.....	6,383,991	6,790,088	6,964,869
Number of tons of coal—2240 pounds....	6,185,434	6,540,553	6,348,812
Number of tons of merchandise—2000 pounds.....	2,891,400	3,331,194	3,098,831
Number of tons of company's materials—2000 pounds.....	497,571	651,648	493,591
Total tonnage of company (2000 pounds), including weight of passengers and company's materials.....	10,981,657	11,932,262	11,336,261

The receipts and expenses, per through passenger and per ton, including renewal fund, rents of laterals, taxes, interest, &c., and based upon coal tonnage of Main Line only, have been as follows :

1873.		1874.	
Per passenger.....	Cost, \$1 99 6-10	Received, \$2 29 6-10	Cost, \$2 14 4-10
Merch'ise, per ton, ..	76 3-10	1 08 2-10	89 5-10
Coal.....	1 35 1-10	1 71 2-10	1 32 3-10

Including renewal fund, rents of laterals, taxes, interest, &c., and based upon entire coal tonnage of the Company, on Main Line and on the branches or laterals :

1873.		1874.	
Per passenger.....	Cost, \$1 99 6-10	Received, \$2 29 6-10	Cost, \$2 14 4-10
Merch'ise, per ton, ..	76 3-10	1 08 2-10	89 5-10
Coal.....	1 09 7-10	1 39 1-10	1 08

The annual increase of the demand for anthracite coal for domestic uses has been so great as almost to make up for the loss of tonnage resulting from a decreased demand for manufacturing purposes; and nothing can so surely show the permanence and security of this demand for domestic uses as the fact exhibited by the statistics of the past year, viz., that during a period of unexampled depression, when nearly half of the furnaces and rolling-mills were out of blast, and a large proportion of other steam-power mills and factories either idle or working upon short time, the coal tonnage of the Company has fallen but three per cent. below that of the largest amount ever transported.

The monthly receipts show how irregular and fitful the business for the year has been. Up to the 1st of July the profits for the year were \$529,000 in excess of those to the same period of 1873; but in the months of July and August, the absence of demand for coal involved the necessity of repeated suspensions of mining, and the net profits for those two months fell off so much that more than the previous gain was lost. A sufficient recovery was made, however, during the autumn to close the year's business with an increase of net profits amounting to \$362,440 over those of the previous year. Had the traffic kept up to its usual amount in July and August, this increase of net profits would have been from \$1,000,000 to \$1,500,000.

Some estimate of the present capacity of the railroad and equipment may be formed from the fact that in the month of October, alone, 902,985 tons of coal were transported, equal to a weekly tonnage of over 200,000 tons; and that during one day of the same month 48,282 tons were carried.

During the year, the two new iron steam-colliers built at ster, and five of the six built at Philadelphia (to which reference was made in the last report), have been finished and placed in the trade. The following table shows the result of the year's business, as compared with that of previous seasons :

	Tons Coal Carried.	Total Receipts.	Total Expenses.	Net Profits.	Average Rate of Freight received, per ton.
1872.....	127,275	\$355,460 03	\$237,818 26	\$117,641 77	\$2 62
1873.....	135,673	309,296 33	202,111 04	107,185 29	2 32
1874.....	217,340	300,636 26	294,045 41	6,590 85	1 29

The small amount of net profits is due, first, to the expenses attending the receipt and introduction of seven new ships; and second, and principally, to the low rate of freight prevailing during the year. In consequence of the dullness of trade, vessels have been in such plentiful supply during the season that freights from Philadelphia to eastward ports have fallen, in the average, at least a dollar below the usual rates heretofore paid; and the steamers had to submit to the same reduction as sailing vessels. Had the rates kept up to the standard of 1873, the line would have shown a handsome profit. It must be borne in mind, however, that low rates of freight from Philadelphia to New England are of much more value to the Company than profits upon its steam colliers, which carry but about one-tenth of the coal shipments of the Company, and that the increased car service and decreased cost of shipping coal at Port Richmond, due to the certainty and regularity of the supply of steam colliers, already amount to a very handsome interest upon the cost of the fleet. Included in the expenses of 1874 is the sum of \$43,033 05, charged to insurance fund of steam colliers, which is now in credit \$78,900 67.

The following remarks of President Gowen on the mining policy of the Company have an especial interest. A report by the Philadelphia and Reading Coal and Iron Company, showing what it has cost the company to mine coal, what it has received for it, and what percentage of the workable coal is wasted in its mining and preparation for market, would have had still greater interest to a large number more or less interested in the profits or losses of the company.

"The purchase of coal lands made during the year by the Philadelphia and

Reading Coal and Iron Company added to those previously acquired will make an aggregate of 100,000 acres. At present it is not designed to purchase any more, except such few small tracts of intervening lands as may be found to be necessary additions to the present estate. At the time when the scheme of the Coal and Iron Company was first inaugurated, it was not thought necessary for the company to become owners of collieries and miners of coal; it being then believed that an acquisition of coal lands to be worked by tenants was alone sufficient for the purpose designed. An experience of one or two years as landlords showed how utterly inadequate, under existing circumstances, the individual tenants were to develop and improve the estate. But few private persons had sufficient capital to open and conduct a colliery in any other manner than to make it profitable during a few years, after which it was thrown upon the hands of the landlords, who were forced to expend large sums upon it in order to protect it from destruction. Added to this, the depressed condition of the coal trade, resulting from the repeated strikes of 1869, 1870, and 1871, had given little encouragement to individuals to engage in mining, and those who had survived the contests with the workmen had but little capital left to improve their collieries and open new mines for the future. It seemed inevitable, therefore, that if left to individual enterprise, the development of the coal region would be retarded for many years; and nothing remained for the company but to profit by the experience, and to follow the example of the large coal and railroad companies of the Wyoming region, and to become miners of coal upon their own estates.

This policy has been steadily pursued for the last two years, during which a large number of collieries, formerly worked by tenants, have been bought. New ones have been erected, and the old ones remodelled and improved. These works, which have occupied the greater part of two years, are now completed; and of the eighty-two collieries now in operation upon the lands of the company, thirty-seven will be worked by the company itself—the others remaining in the hands of tenants until the expiration of their respective leases. The position occupied by the company as miners of coal required, in addition to the very large expenditure made in purchasing, opening, and improving collieries, a large investment to be made, outside of the coal regions, to enable them to handle and successfully dispose of the product of the mines. Large retail yards in the city of Philadelphia, wharves and shipping facilities in New York and the various eastern ports, have been purchased and erected; and it is believed that no other company now possesses greater advantages than those of the Philadelphia and Reading Coal and Iron Company, in the ability to mine coal economically, and to dispose of a large product to the best advantage; the only improvement yet wanted to complete the system being a depot capable of storing at one place at least five hundred thousand tons of coal, in order to keep the collieries constantly at work and avoid the expense of stopping them whenever orders are scarce, or vessels not in sufficient supply to carry away the product.

"Among the most important of the new works commenced by the company, has been the sinking of two perpendicular shafts or pits in the vicinity of Pottsville, in order to reach and work the large white-ash coal-veins of the southern basin. This work has been prosecuted vigorously until a depth of 1128 feet was reached by the deepest shaft, from which a bore-hole has been sunk into the Mammoth vein at a distance of 1954 feet from the surface of the ground. The shaft will be continued down to the Primrose vein, a depth of 1569 feet from the surface, from which point the seven-foot vein and the Mammoth vein will be reached by a tunnel. The several veins of workable coal opened by these shafts are as follows:

Tracy vein.....	6 feet thick.	Primrose vein.....	12 feet thick.
Diamond vein.....	4 " "	Seven-foot vein.....	11 1/2 " "
Orchard vein.....	6 " "	Mammoth vein.....	25 " "

making a total thickness of coal of sixty-four feet, exclusive of the smaller veins; and, in addition to these veins, there are the coal strata underlying the Mammoth vein, which can be reached in the future, if required, by an extension of the shafts. The extent of territory tributary to these shafts is so great that there can be but little doubt that at least one hundred millions of tons in the several veins already opened can be worked through them, and that for almost an indefinite period the proposed colliery will be one of the most productive known. When it is considered that the deposits of coal thus opened and proved extend throughout the entire length of the southern coal-field, principally underlying lands bought at exceedingly low prices, and heretofore considered by many as comparatively valueless, and which are within one hundred miles of tidewater at Philadelphia, the importance of the developments made by the shafts cannot be over-estimated."

To supply the funds required for the various new works of the Coal and Iron Company, hereinabove referred to, the building of new steam-colliers, the double track upon the Lebanon Valley and East Pennsylvania Railroad, etc., etc., an issue of ten millions of dollars six per cent gold coupon bonds was made during the year. This loan was part of a general mortgage loan of \$60,000,000, authorized by the managers, of which amount \$35,000,000 will be retained for the present consolidated and improvement mortgages, fifteen millions will be reserved for future wants, and the ten millions of dollars above referred to were issued by subscription in London, in July, at ninety per cent in gold. To secure the advances heretofore made by the Railroad to the Coal and Iron Company, the latter Company executed a mortgage of \$30,000,000 to the Railroad Company, which has been transferred and assigned to the trustees of the general mortgage, and in this manner the lands of the Coal and Iron Company are pledged for the payment of the bonds created under the new mortgage.

The tonnage of the lands owned and controlled by the Philadelphia and Read-

ing Coal and Iron Company for 1874 was 3,006,774, against 3,218,376 in 1873.

The present annual capacity of the collieries upon these lands may safely be stated as follows :

	Tons.
From collieries to be worked by the Company.....	3,000,000
From collieries leased to tenants.....	2,100,000
Total.....	5,100,000

And although it is not expected that manufactures will sufficiently survive during the present year to require so large a product, it cannot be long before it will be absorbed by the increasing demand, and additional collieries will have to be opened to produce more coal.

When it is considered that the anthracite coal trade of the United States has now reached an annual product of 19,000,000 of tons ; that it has doubled every ten years during the past ; that in ten years it will be 40,000,000 of tons ; and that the Philadelphia and Reading Coal and Iron Company owns at least one-third of all the anthracite coal land of Pennsylvania—but little doubt can reasonably be entertained of the future success of the Company.

Oregon Iron.

THE Oswego Iron works are located on the Willamette River, and the blast furnace has a capacity of about ten tons per day. The Stockton *Independent* having interviewed an intelligent Oregonian, we are enabled to cull these facts from the columns of that journal : The ore is of the best quality, and charcoal being used makes it better still, so that it is in much demand. The ore is about a mile from the furnace, and the lime has to be brought from the Island of San Juan, Puget Sound. The charcoal costs nine cents a bushel. Two and a half tons of ore will make one ton of pig iron, and sometimes a little more. The Central Pacific Railroad Company have tested it for car wheels, and have purchased 150 tons for that purpose. The charges are put in every half hour in about the following proportions : 30 bushels of charcoal, 1,000 lb. of ore, 100 lb. of limestone. The cost per ton of manufacturing iron is about as follows :

Iron ore at furnace	\$10 75
Charcoal, 150 bushels, at 9 cents.....	13 50
Limestone, 500 lb.....	5 00
Superintendence and labor.....	4 00
Total.....	\$33 25

The iron is now selling in San Francisco at \$46 per ton. The *Independent* thinks that pig iron could be manufactured in the foothills near Murphy's at these figures :

Iron ore per ton at furnace.....	\$2 50
Charcoal, 150 bushels, at 9 cents.....	13 50
Limestone, 500 lb.....	25
Superintendence and labor.....	4 00
Total cost per ton.....	\$20 25

—San Francisco Commercial Herald.

The Consumption of Fuel in English Blast Furnaces.

THERE is always some satisfaction in knowing that if we "do not use our coal with the utmost economy" in our furnaces, we are not worse than others. The following table shows how far the average English blast furnace is from attaining the economic standard reached by some of the best works, there and here.

	1872.	1873.
	Coal per ton of pig.	Coal per ton of pig.
Northumberland.....	2 16	2 5
Durham.....	2 7	2 6
Yorkshire, North.....	2 5	2 6
ditto West.....	3 0	3 5
Derbyshire.....	2 18	2 18
Lancashire.....	1 15	2 2
Cumberland.....	2 9	2 7
Shropshire, North.....	3 0	3 0
Staffordshire.....	2 19	2 19
Northamptonshire.....	3 2	2 19
Lincolnshire.....	2 18	2 18
Gloucestershire.....	2 17	3 0
Somerset and Wiltshire.....	2 15	2 14
North Wales—Denbigh.....	2 15	3 3
ditto Flint.....	3 9	2 2
So. Wales—Glamorgan, Anthracite.....	2 16	2 10
ditto Bituminous.....	2 11	2 8
Monmouthshire.....	2 8	2 8
Scotland.....	2 19	2 14

Single Rail Steam Towing on the Belgian Canals.

WE learn from the *Moniteur Industriel Belge* that a system of steam towing is about to be established on the Bourgogne canal, over a distance of about 150 miles. The tow path will be laid with a single rail weighing some 16 pounds to the yard, and fixed on traverses placed 3·2 feet apart. The locomotive has four wheels, two of which are placed directly along the axis of the vehicle, one in advance of the other, and two, one at either side. The former pair are directing, the latter driving wheels. The directing wheels are grooved, and fit the rail ; the others have rubber ties which give purchase on the macadamized road, and which press thereon only to the extent of 0·07 pounds per square inch. By means of simple mechanism, the weight of the machine may be thrown either upon the driving or directing wheels at will. In the first case the maximum, and in the last the minimum, of adherence is obtained, to suit the conditions of a loaded or empty boat. A single road is to be used, with relay engines provided

at suitable distances. Each locomotive tows one boat ; and when a meeting takes place of two traveling in opposite directions, the engines change boats and retrace their paths.

This single rail system has already been satisfactorily tested for short distances on the Belgian Canals, and the projector, M. Larmangat, has obtained a government concession for its extended construction for forty years. The locomotives are to weigh 4 tons each, and will travel at the rate of 3·1 miles per hour, with full boats carrying a cargo of 150 tons each.—*Scientific American*.

Notes.

Chinese Coal.—The British Acting Consul at Newchwang states in his report this year that the native coal supplied at that port was repeatedly tried in 1873 by foreign trading steamers and by men-of-war, and that the result was, on the whole, extremely satisfactory. Mr. PRINGLE, engineer in Her Majesty's ship *Thistle*, which took on board a ton of coal procured from Pen-hsi-hu, for the purpose of trying it, reports it superior to any Chinese or Japanese coal he has ever seen. It ignited rapidly, kept steam very well, left very little deposit in the tubes, and no clinker on the furnace bars. It burnt away quickly, but this would probably be prevented by mixing it with a more bituminous coal, such as our north-country coal. Mr. McLEOD, chief engineer of the British steamer *Saku*, made two trials of this coal, 40 tons each time. He reports it as looking very much like Welsh coal, and being principally an anthracite coal, with very few traces of the bituminous kind visible in it. He found it ignites slowly, and in order to have steam ready at the time ordered, he had to mix some Kelung (Formosa) coal with it. It required a strong draught. He says : "I have no doubt at all that, in the district where this coal came from, there is steam fuel to be procured superior to any I have seen in either India, China or Japan." Several other steamers tried it, and the engineers speak well of it as a really superior coal, but it is stated that it often ignites with difficulty from being mixed with incombustible matter. The Consul observes that the Chinese do not get further than the outcrops, and these may be unfit for steaming purposes, while the middle of the seam is good steaming coal. He thinks the probability is that far finer coal than has yet been supplied in Singtze may be brought to light by the skill and science of foreign engineers. In Formosa, coal has long been dug to some extent from Kelung Hill, notwithstanding prohibitions issued from time to time at the instance of the gentry and people, who feared that "the pulse of the dragon" (geomantic influences) would be injured. The so-called superstitious objections seem to have been directed entirely against foreigners.

Formation of Coal.—FROM some recent facts which have been brought to the attention of the Geological Society of Germany, it is regarded as probable that vegetable matter may, under certain conditions, be converted into coal much more rapidly than most geological chemists have assumed.

The facts in question show that in one of the old mines of that country, some of the wood originally employed as timber has become so far altered as to assume most of the characteristics of a new lignite, or brown coal. It appears that certain of the levels in the ancient workings of this mine are filled with refuse matter, consisting chiefly of fragments of clayslate, more or less saturated with mine water, and containing, here and there, fragments of the old timbering. This wood, when in the mine, is wet, and of leathery consistence, but on exposure to the air it rapidly hardens to a solid substance, having most, if not all, of the characteristics of a true lignite. It breaks with a well marked shell-like fracture, and the parts which are most altered present the black lustrous appearance peculiar to German "pitch coals." At the same time, chemical examination of this wood shows that it stands actually nearer to true coal, in some of its elements and qualities, than do some of the younger tertiary lignites.

This instance, therefore, is regarded as proving that pine wood, when placed under highly favorable conditions, may be converted into a genuine lignite, within a period which, from what is known of the history of the mine in question, cannot have extended beyond four centuries.

Economy of Fuel in Furnaces.—M. FOUCAULT, in a report to the Industrial Society of Rheims, combats the idea that the smokelessness of a fire can effect a notable saving in the amount of fuel burnt. He alleges also, on the other hand, that a considerable loss of economy is produced by smoke-consuming apparatus. He brings, in support of his opinion, the long series of observations made by the Industrial Society of Mulhouse, which have proved that, with the ordinary boiler furnaces, it is only necessary to consume from 125 to 150 cubic feet of air for each pound of coal, while furnaces, for the most part, pass twice that quantity. If the draught be reduced in quantity much smoke is evolved, but the products of combustion, circulating more slowly, part with their heat more readily to the boiler flues. It is further proved that the best means of reducing the loss of heat by the chimney is the use of feed-heaters in the flue, so as finally to reduce to 200° the products of combustion, which are often discharged as hot as 400°. Feed-water heaters, well set, will produce an economy of from 11 to 20 per cent., with a reduced draught. The conclusion is that furnaces with large area and suitable feed-heaters are the most economical in all respects. But in order to obtain the best results much care is needed in stoking. A little at a time and often should the coal be spread over the front of the fire, and the bright coal pushed back to the bridge. At the same time, the least possible quantity of cold air should be admitted.

Boiler Iron Impaired by Heating and Chilling.—It is well known that repeated concussions produce a change in the texture of wrought iron, causing it to pass from the fibrous to the crystalline state. It is not so generally known that a similar change takes place, superficially, at least, when fibrous wrought iron is heated very hot, and suddenly cooled. Professor KICK, whose experiments in iron are well known, heated the best Styrian boiler-plate in a muffle furnace, not to a red heat but nearly so, and then chilled it. On breaking, it was found that the exterior layer, to the depth of about one millimetre, was crystalline, while the inner portion exhibited the same fracture as before heating. In a second experiment another piece of the same material was heated to a bright red heat, dipped in water and broken. In this case, also, the surface layer was crystalline, but more distinctly so than before. The plate tested was ten millimetres (two-fifths of an inch thick). If the experiment is made with thin plates, the change of texture, as might be supposed, extends all the way through the plate. Since the change from a fibrous to a granular structure is attended by a corresponding diminution of strength, this fact may be deserving of notice in the management of steam boilers. If boilers are left empty for some time after blowing out, between hot walls, and then fed with cold water, there must be, in addition to the injurious contraction, a molecular change on the inner surface of the boiler.

Explosives—Gun-cotton.—The Special Committee on Gun-cotton, of which Col. YOUNGHUSBAND, Royal Artillery F. R. S., Superintendent of the Royal Gunpowder Factories, Waltham Abbey, is president, has closed its proceedings, and presented its final report to the authorities at the War Office. The Committee has thoroughly examined the qualities of gun-cotton, lithofracteur, and dynamite, with special regard to their utility for warlike purposes, and the general questions on which the report treats, are those of manufacture, storage, and use of these several explosives. The Committee finds that gun-cotton is a most valuable explosive agent for military and naval purposes; that, as it is capable of being manufactured in a wet state, there is no danger attending the process; and that, as it can be stored wet, it can be safely conveyed on board ship or warehoused without risk. It is also found that gun-cotton, though fired by detonation, is not exploded by being struck with a bullet. In these respects, gun-cotton is reported to have contrasted favorably with the other explosives mentioned, which, although tolerably safe to store and transport when fresh, are not so secure from danger under all circumstances.

The Selby Smelting Works, located at San Francisco are said to be the largest of the kind in the United States, having a capacity for refining over 2,000 ton rebellious ores per month, separating therefrom the silver, etc. These ores, crude bullion, come from Eureka, Cerro Gordo, and other notable mines of the Pacific coast. Only about 10 per cent. of the refined lead extracted is used on this coast, the remaining 90 per cent. shipped East for a market. Of this surplus, 7172 ton Selby's Pig Lead has been shipped this year to New York and 222 ton to China, and more of the surplus is being sent off as occasion offers for a low rate of freight as ballast for steamers, etc. There are only about 120 tons refined lead per month sold or used on this coast. The Selby Shot Tower supplies nearly all the Drop Shot consumed on the Pacific slope, and the same parties furnish nearly all the sheet and pipe lead used on this coast, having quite a monopoly of this trade. The "Selby" Pig Lead has attained a high reputation in New York for its purity in the matter of white lead paint manufacture, and this, by the way, is an interest that we, on this coast, ought to have inaugurated at an early day.

Exports of American Machinery.—There is a steadily growing export demand for American machinery. The Burleigh Rock Drill Company, of Fitchburg, Massachusetts, have just shipped three large air-compressors to furnish motive power for running drills and pumps in the silver mines among the mountains of Peru and Chili. Some American locomotives and some machinery have been sent thither previously, and chiefly to Callao and Valparaiso. Locomotives and machinery have gone to Rio Janeiro; axes and saw mills up the Amazon; sugar mills and evaporators to Buenos Ayres; gas fixtures and chandeliers to St. Petersburg; passenger railwaycars and saws to England and the continent; arms to the same destination; scales and sewing machines everywhere. And thus, step following step, a beginning is even now made in some departments sufficient to show that foreign appreciation of our manufactures is great enough to promise them a market when the conditions of labor and living are such that we can fill it.

A New Powder for Heavy Guns.—It is said that the German Government has just adopted a new kind of prismatic powder for its heavy guns, which is far superior to that used in England and Russia. The powder hitherto used by the Germans was similar to the Russian, and was proved to be more effective than the English in some trials made with an 8-in Woolwich gun and a Prussian 72-pounder on the artillery shooting ground at Tegel. The new powder consists of hexagonal prisms like the old, but the prisms are pierced with one hole only instead of seven, and the specific gravity of the powder is raised from 1.65 to 1.68. According to the *Baltic Gazette*, the results produced by this improved powder are extraordinary, and a Prussian 28-centimetre gun loaded with it is equal to an English 11-in. gun with the ordinary powder.

COAL TRADE REVIEW.

Import Duty on Coal.

Anthracite free. Bituminous, per ton of 28 bushels, 80 lb. to the bushel, 75c., gold.

All slack, or culm, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel, 40c., gold. Not otherwise provided for, per ton, 40c. gold.

This is the only report published that gives a full and accurate return of the production of our Anthracite mines.

NEW YORK, Jan. 22, 1875.

The Production of Anthracite Coal for the week ending Jan. 16, 1875, was as follows:

Region	Tons of 2240 lb.	WEEK. TONS.	YEAR* TONS.
Wyoming Region.			
Delaware and Hudson Canal Co	48,344	88,675	79,803
Delaware, Lackawanna and Western R.R.	34,598	24,041	54,067
Pennsylvania Coal Co	24,041	20,116	42,227
Pennsylvania and New York R.R.			
Central Railroad of New Jersey	1,104	4,850	
Pennsylvania Canal	7,811	15,448	
Lackawanna & Bloomsburg	7,811	15,448	
Sold at the mines by L. & W. O. Co.		135,914	285,070
Lehigh Region.			
Lehigh Valley R.R.	2,932	62,900	
Central Railroad of New Jersey	932	9,000	
Danville, Hazleton & W. B. R.R.	377	377	
	3,309	73,277	
Schuylkill Region.			
Philadelphia and Reading R.R.	8,175	26,019	
Shamokin and Lykens Valley	2,275	11,544	
	10,450	37,563	
Sullivan Region.			
Sullivan and Erie R.R.	201	548	
Total of all the regions	149,974	396,458	

* Year beginning Jan. 1.

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

The Production of Bituminous Coal for the week ending Jan. 16, was as follows:

Region	Tons of 2000 lb., except where otherwise designated.	Week. TONS.	Year. TONS.
Cumberland Region, Md.			
Tons of 2240 lb.	19,194	42,219	
Barclay Region, Pa.			
Barclay R.R., tons of 2240 lb.	6,080	13,591	
Broad Top Region, Pa.			
Huntingdon & Broad Top R.R.	3,361	5,881	
Clearfield, Region, Pa.			
Snow Shoe	1,201	2,423	
Tyrone and Clearfield	10,277	17,524	
Allegheny Region, Pa.			
Pennsylvania R.R.	3,877	6,202	
Pittsburgh Region, Pa.			
West Penn. R.R.	3,177	7,554	
Southwest Penn. R.R.	60	122	
Run, and Westmoreland gas coal, Pa. R.R.	13,203	27,131	
Pennsylvania R.R.	6,168	9,840	
Kanawha Region, W. Va. to Dec. 12.			
Chester and Ohio R.R.	2,122	4,022	

The Production of Coke for the week ending Jan. 14

Region	Tons of 2000 lb.	Week. TONS.	Year. TONS.
Tyrone and Clearfield	14	28	
Allegheny Region	14	28	
West Penn. R.R.	1,440	2,656	
Southwest Penn. R.R.	8,544	16,850	
Gas Coal, Penn. R.R.	380	1,270	
Pittsburgh Coal, Penn. R.R.	1,596	3,216	

Receipts at Fort Richmond, none; shipments, 55,000 tons; and balance on hand 131,000 tons.

Returns from Greenwich, Philadelphia.

	Bituminous	Gas Coals.
Receipts	1,659	50
Shipments	1,824	60
On hand	1,710	.....

The receipts of coal by the Michigan Southern RR. at Buffalo for the week were 4,466 tons.

The exports of coal from Baltimore this year amount to 1,142 tons, as compared with 94 tons in 1874. The exports for the week amounted to 5,734 tons.

Production of Bituminous Coal, 1874.

Tons of 2000 lb.	11 Mos.	Dec.	12 Mos.
Blossburgh Region.	775,119	21,269	796,388
Barclay Region.	319,715	17,357	337,072
McIntyre Coal Co.	132,788	6,135	138,923
Broad Top Region.	268,000	16,693	284,693
Cumberland Region.	2,308,617	102,278	2,410,895
Clearfield Region.	643,725	59,445	703,170
Allegheny Region.	199,815	15,279	215,094
Pittsburgh Region.			
West Penn. R.R.	183,288	10,720	194,008
Southwest Penn. R.R.	7,321	550	7,870
Gas Coal, Penn. R.R.	831,817	79,189	911,006
Pittsburgh Coal, Penn. R.R.	411,006	8,220	419,226
Saw Mill Run R.R.	79,536	8,096	87,632
Cleveland and Pittsburgh R.R.	273,205	18,516	291,721
Pittsburgh, Cincinnati and St. Louis R.R.			
Erie and Pittsburgh R.R.	553,902	50,536	604,438
Pittsburgh, Fort Wayne and Chicago R.R.	260,972	9,176	270,148
Chicago R.R.	182,410	12,263	194,673
Castle Shannon R.R.	105,661	..	..
A. Y. & P. R.R.	907	..	..
Pittsburgh and Connellsville R.R.	266,105	..	..
Monongahela Nav. Co.	1,848,656	..	..
Keeling & Co.	147,546	..	..
Wetzel & Gormley	11,877	..	..
J. W. Carlin & Co.	3,817	..	..
St. Louis Region.			
Tenn. Coal & R.R. Co.	72,596	8,902	81,498
St. L. A. & T. H. R. Co. Belleville Branch	154,132	..	..
B. & S. I. R.R.	85,123	..	..
Illinois and St. Louis	170,792	..	..
Indiana North and South R.R.	5,851	..	..
Evansville & Crawfordsville R.R.	13,155	3,948	..
Ohio & Mississippi R.R.	105,314	..	..
Kanawha Region.			
Cheapeake and Ohio R.R.	116,912	..	..
Warrior Region, Ala.			
South and North Alabama R.R.	23,395	..	..
Cahaba Region, Ala.			
South and North Alabama R.R.	3,085	..	..
S. R. & D. R.R.	12,221	..	..
Chicago B. & Q. R.R.	249,178	..	..
B. & M. R.; B.R.	60,752	..	..
Union Pacific R.R. Co.'s mines	131,327	..	..
" " " other mines	81,174	..	..
Summit County R.R.	17,412	..	..
Keokuk & Des Moines R. R.	3,786	..	..

There is a better demand for stove and chestnut coals, and they are bringing better prices; but for the other sizes the demand is light, and prices are a matter of negotiation. There is a heavy demand for chestnut coal from the line trade.

The leading item of interest of the week was the transfer of the Delaware and Hudson Canal Company's retail yards to Messrs. WARD, TALBOT & OLYPHANT, who, in last Sunday's papers, announced that they were "prepared to deliver coal in any quantities at the following prices at the yards: Grate, \$6; e. g. \$6; stove, \$6 20; chestnut, \$5—cartage extra, according to distance. Steamers, grocers and manufacturers will be liberally dealt with." As will be observed, they offer coal at retail at less than the Company's wholesale price at Hoboken,

and the wording of their card would indicate that "steamers, grocers and manufacturers" would receive still lower quotations. This might lead those not acquainted with the trade to suppose the Delaware and Hudson Canal Company were not desirous of supporting the Combination. This supposition, we think, is unfounded; the fact being that the company is simply doing openly what other members of the Combination have been doing in a quiet way—viz., closing out last year's stock at the best figures obtainable before commencing the new year's business. Naturally this action has created much ill feeling on the part of the other companies, and it was even stated that it would probably break up the Combination. The very large profits of the past year's business—greater than those of any previous year—were due entirely to the union of the companies; and however sore they may feel over this "breach of good faith," or independent action, their interests are so evidently dependent on combination, that we see no probability of the present *entente cordiale* being destroyed, though it may be a little shaken by it.

The offence appears to be rather in making public the reduction, than in selling the coal at these prices; for the Combination pretends to hold to November rates, though everyone knows that this coal is being sold every day at a heavy discount from these.

The combined companies held a meeting in this city yesterday, at which this matter was discussed, and it is said to have closed with much more harmony than was expected. We have not learned the action of the meeting, but are given to believe that the Delaware and Hudson Canal Co. have shown an inclination to adjust the matter. Another meeting will take place next week, for a further consideration of the subject. There is not the confidence expressed in the soundness of the Combination that there was two months ago, and considerable doubt is still expressed of its existing through the summer.

Wages throughout the country, with the single exception of the anthracite and Cumberland regions, declined within the last year from 30 to 50 per cent.—a greater reduction than was effected in England. It is scarcely possible that these two regions can long be able to form an exception, when so many miners are out of work and are anxious to find employment at much lower rates of wages than the anthracite miners are now rejecting.

At the recent meeting of the miners and operators of the Lehigh region, at Hazleton, it was shown that the average of miners' wages was about \$4 per day—the lowest being \$2 50, the highest \$6. The proposed reduction against which the men are now striking would still leave their wages about twice as much as that of skilled labor in other industries, and there is a strong feeling among the members of industries depending, in a large measure, on cheap coal for success, that both the rates of wages at the anthracite mines and the charges for transportation should be largely reduced, and the price of coal made very much less than it was during the past year.

The Delaware, Lackawanna and Western Railroad Company announce their 134th auction sale of Scranton coal, to take place on the 27th inst., at which time 25,000 tons will be offered.

In Bituminous Coal there is but little doing. We hear of Clearfield Coal offered at \$5 50, alongside, in this city. Although this coal has not the established reputation for steam purposes of the Cumberland Coal, and is not of equal quality, yet, on account of its lower price, it has been able to secure many casual orders, and we are informed that some of the lines of steamers that have heretofore used Cumberland coal, have been induced to take sample lots of this coal to test. If these are satisfactory, it will undoubtedly be a strong competitor to Cumberland Coal in this market.

Freights are very irregular, and it is almost impossible to give reliable rates, although it is safe to say that they are materially advanced.

mation, were quoted at £82 10/ in London. Messrs. VIVIAN YOUNG and BOND, under date of January 1st, say:—"Early last month, under the influence of heavy charters and dearer money, the price of copper fell about 30/ per ton. This decline in price brought in buyers, and large transactions in bars took place at £85 10/ to £86 10/ for good ordinary brands, causing a firmer market. But advices of heavy charters for the first half of November (2000 tons fine) brought about a reaction, and bars declined in price from £84 to £84 10/. Some purchases, on speculation mostly, were again made up to £85 10/ for good ordinary brands; but news from Valparaiso to 16th were received on the 19th ultimo, advising the charters for the half of December as 2700 tons, followed on the 22d ultimo by the announcement that the charters for all November were 5000 tons, instead of 3700 tons, as had been previously reported. This depressed our market, which closes quiet, with bars at £83 10/ to £84 for good ordinary brands.

"In Australian sorts, the transactions during the month have not been important, and prices have declined, some business having been done in Wallaroo at £93. English has not been very active, and in unmanufactured, business has only been possible in second-hand parcels at prices considerably below smelters' quotations. There is a small demand for India sheets, which has been met by manufacturers at £95. In furnace stuff, about 2500 tons of Regulus, and 1500 tons of ores, mostly to arrive, have been bought by the smelters at 17/ and 16/ 9d. for the former, and at 16/ 1 1/2 d. for part of the latter, the balance having been on private terms. The demand for yellow metal has not been quite so good."

The quantity of Chili Bars, Ores and Regulus in stock at, and afloat for, Liverpool, Swansea and Havre, and of English and Foreign Copper in London, is thus estimated in Fine Copper:

	1st Jan., 1875.	1st Jan., 1874.	1st Jan., 1873.
Stock.....	19,752	28,311	32,378
Chili produce shipping and afloat per mail advices.....	9,400	7,700	9,900
Total.....Tons	29,152	36,011	42,278
	1st Jan., 1875.	1st Dec., 1874.	1st Nov., 1873.
Stock.....	19,752	19,500	20,589
Chili produce shipping and afloat per mail advices.....	9,400	7,350	8,000
Total.....Tons	29,152	26,850	28,589
Chili produce chartered for per Cable advices received up to date....	5,300	3,200	2,100
Australian produce afloat.....	1,600	900	600

Tin.—This market is without change, the prices of last week, viz., Straits, 22 1/2 c.; L. & F. 21 1/2 c.; Refined, 22 c.; Banca, 26 c. @ 26 1/2 c., being firmly maintained, while the London market has declined to £93 for Straits and £99 for L. & F. There have been no important transactions in pigs, while in plates there has been a fair jobbing demand at \$10 for I. C. charcoal; \$9 for charcoal ternes; \$7 87 1/2 @ \$8 for coke tins; \$7 25 for coke ternes—prices all gold. Our London advices dated Jan. 1st say:

"English is quoted a shade higher. For foreign sorts there is still a strong speculative demand, and since 24th inst., a considerable business has been done, though without any important rise in values, which closed yesterday about 1/ per cent, above those ruling on the above-mentioned date. The inquiry continues to run principally on Straits, the available quantity of which being at present very small, renders it difficult to effect large purchases, especially of parcels actually on the spot.

"The stock of Foreign Tin in London and Holland is thus estimated:

	Jan. 1, 1875.	Jan. 1, 1874.	Jan. 1, 1873.
	Tons.	Tons.	Tons.
Foreign tin in London.....	2895	2010	956
Banca tin in Holland.....	488	614	1076
" in Company's hands.....	3738	3592	2078
Billiton tin in Holland.....	1000	800	468
	8121	7016	4578

Quantity of Straits, Banca, and Billiton tin afloat for Europe..... 2000 1500 1800

Quotations on the same dates being for Straits:

	£95 10/	£115	£140 per ton.
According to the Board of Trade returns the exports of Tin Plates during the first eleven months of the following years were:			
	1874.	1873.	1872.
	113,200	113,000	111,250 tons."

Lead.—The sales of the week have been mostly in a small way, with Domestic at \$6 6 1/2 @ \$6 12 1/2, and it is said \$5 will procure a round lot. In Foreign there have been sales of 75 tons at \$6 75. Stocks of Domestic are constantly on the increase, which, with lots being forced upon a market where there is but a slight demand, has a very weakening effect.

Spelter and Zinc.—Domestic is exceedingly quiet at 6 1/2 c. currency. Best Silesian is quoted at 7 1/2 c. gold, and common, at 7 1/2 c. We note a sale of 5 tons. There is but little doing in sheet zinc, which is quoted at 9 c. @ 9 1/2 c. gold.

Antimony.—This article is in light stock and quiet at about 12 1/2 c. gold.

Manganese.—N. B. Manganite, black oxide, 2 1/2 c.; Virginia hard manganese, 2 c.; Georgia soft manganite, 3 c.

Quicksilver.—This article is without change, the quotations being \$1 65 per lb., in this city; \$1 55 in San Francisco, and £26 per flask (75 lb.) in London. The San Francisco Commercial Herald says: "Supplies are with us steadily accumulating, and prices inclined to ease off. Shippers and others offer \$1 50, but holders are not yet prepared to accept the situation. The present nominal quotation is \$1 55."

FINANCIAL.

Miscellaneous Stocks.

New York, Jan. 21, 1875.

The market for the following stocks during the week under review has been unusually active at prices nearly the same as those reported last week. We note sales of the following stocks within the limits of the quotations below:

	Highest.	Lowest.	Closing.
100 shares Maryland Coal Co.	—	—	—
200 shares of the Consolidated Coal Co.	—	—	—
1000 shares of the Delaware and Hudson Canal Co.	—	—	—
100 shares of the Spring Mountain Coal Co.	—	—	—
600 shares D. L. & W. R. R. and 100 shares of Quicksilver Mining Co.	—	—	—
At an auction sale to-day, \$12,000, D. & H. Canal Co., 7 per cent. registered bonds, 1884, sold at 105 1/2.	—	—	—
	Highest.	Lowest.	Closing.
Pennsylvania Coal Co.....	248	245	245
Consolidation Coal Co.....	43	42	42
Spring Mt. Coal Co.....	—	65	67
American Coal Co.....	50	—	—
*Maryland Coal Co.....	—	—	17
Cumberland Coal and Iron Co.....	48	—	—
N. Y. & Nova Scotia Iron Co.....	116	—	—
Dell., Lack. & West. R.R. Co.....	108 1/2	107 1/2	108
New Jersey Central R. R. Co.....	107 1/2	107	107
*Delaware and Hudson Canal Co.....	118 1/2	113 1/2	113 1/2
Quicksilver Mining Co. pref'd.....	43	—	—
" " " " Common.....	34 1/2	34 1/2	34

*Ex-dividend.
The Delaware and Hudson Canal Company has declared a semi-annual dividend of 5 per cent., payable February 1.
Messrs. Brown Bros. & Co. have purchased \$5,000,000 of the New Jersey Central Consolidated first mortgage bonds, \$3,000,000 of which are brought out in London, and the remaining \$2,000,000 are being sold in the home market.

PHILADELPHIA, Jan. 21st, 1875.

We note a slight advance in nearly all of the stocks dealt in on the Philadelphia Stock Board. The aggregate sales in this market during the last five days, including to-day, are as follows:

17,700 shares of Lehigh Coal and Navigation Company at from 49 1/2 to 50 1/2.
6,500 shares of the Philadelphia and Reading Railroad Company at from 54 1/2 to 56 1/2.
875 shares of the Lehigh Valley Railroad Company at from 61 1/2 to 62.
78 shares of the Minehill Railroad Company at from 51 1/2 to 52 1/2.
1,600 shares of Catawissa Railroad at from 18 1/2 to 19 1/2.
200 shares of Catawissa Railroad Preferred at 36 1/2.
The transactions in the various securities for the period under review have been as follows:—\$33,500 Reading Railroad 7's New Convertible Bonds, at from 102 1/2 to 103; \$11,000 Lehigh Navigation, gold loan, at from 99 1/2 to 101; \$2,800 Lehigh 6's, 1884, at from 100 to 100 1/2; \$2,100 Reading Coal and Iron Co. Debenture Bonds at from 78 1/2 to 82; \$2,000 Pennsylvania Canal 6's at 70; 200 Pennsylvania and New York Canal 7's at 104, and \$12,000 Reading Coal and Iron Company Mortgage Bonds Tamaqua Tract, at 88.
The Buck Mountain Coal Company announces a dividend of 3 per cent., or \$1 50 per share, payable on the 25th instant.

	Highest.	Lowest.	Closing.
Reading R. R. Co.....	56 1/2	54 1/2	56 1/2
Lehigh Valley R. R. Co.....	61 1/2	61 1/2	61 1/2
Little Schuylkill R. R. Co.....	—	—	47 1/2
Catawissa R.R.....	19 1/2	18 1/2	19
" " " " Preferred.....	42	41 1/2	42
Huntingdon and B. T. R.R.....	8 1/2	7	8 1/2
" " " " Preferred.....	14 1/2	13 1/2	14 1/2
Minehill R.R.....	51 1/2	51 1/2	52 1/2
Lehigh Coal and Navigation Canal.....	50 1/2	49 1/2	50 1/2
Morris Canal.....	50 1/2	50	50 1/2
" " " " Preferred.....	128	126	128
Pennsylvania Canal.....	12	—	—
Schuylkill Navigation Canal.....	7 1/2	7	—
" " " " Preferred.....	14 1/2	14 1/2	14 1/2
Susquehanna Canal.....	7 1/2	7	—
Westmoreland Coal Co.....	91 1/2	—	—
Buck Mountain Coal Co.....	33	—	—

Gold and Silver Stocks.

SAN FRANCISCO, Jan. 20, 1875.

The following list, with but few exceptions, has recovered from the downward movement noted in our last, owing, undoubtedly, to the appreciation of the favorite stocks (except California), which seems to effect the whole market. California was quoted yesterday, the 19th inst., at \$510 per share, which was a still further decline of \$100 from the quotation in our issue of the 16th inst.; to-day it has advanced \$80 per share, being still \$20 lower than reported last week. The singular movements of this, as well as other stocks on the San Francisco list, indicate that either the reports of discoveries on the property which they represent are unreliable, or that

the prices of the stocks are controlled by speculators and are not dependent on their intrinsic value.

It is evident that some of the outside investors in California must have suffered a heavy loss, when we consider that the aggregate decline of this stock, from the 6th to the 19th of January, inclusive, amounted to over \$25,000,000. We note a slight decline in Savage, Imperial, and Crown Point, these being the only exceptions to a general advance of the list. Consolidated Virginia and Ophir are, respectively, \$25 and \$24 higher than last reported.

Quotations, January 20, 1875:

Gould & Curry.....	65	Overman.....	881
Savage.....	146	Raymond & Ely.....	32
Chollar Potosi.....	80	Eureka G. V.....	8
Ophir.....	251	Best & Belcher.....	75
Hale and Norcross.....	60	Kentuck.....	23
Crown Point.....	44	Meadow Valley.....	7
Yellow Jacket.....	149	Alpha.....	36
Belcher.....	52	Sierra Nevada.....	21
Imperial.....	17	Union Consolidated.....	93
Consolidated Virginia.....	650	Mexican.....	67
California.....	590	Caledonia.....	26

Copper Stocks.

BOSTON, Jan. 21, 1875.

The quotations of the following list are nominally unchanged, as compared with our last. About 50 shares of Calumet and Hecla changed hands during yesterday's operations of the Board at our quotations. 20 shares of Quincy were sold at \$44 per share, which comprised the sales for the day.

Allouez.....	6	Pewabic.....	—
Calumet and Hecla Co.....	144	Phoenix.....	12
Copper Falls.....	9 1/2	Quincy.....	43 1/2
Central.....	27	Ridge.....	7 1/2
Franklin.....	—	Rockland.....	1

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

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

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

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

IV. Blank proposals for membership can be had on application to the Secretary.

V. The first volume of Transactions of the Institute will be sent by the Secretary to any address, on the receipt of five dollars.

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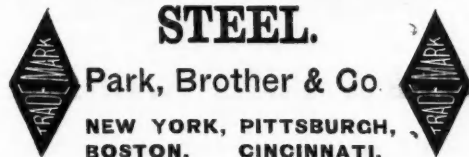
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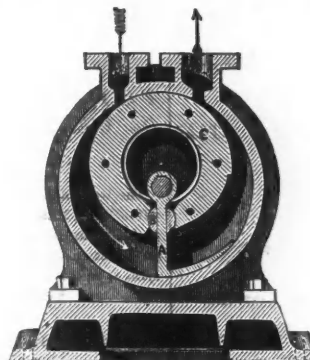
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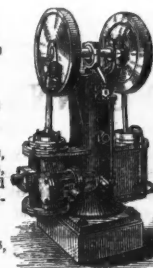
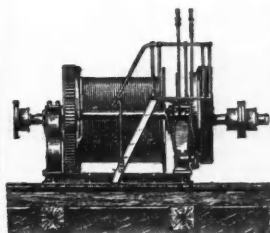
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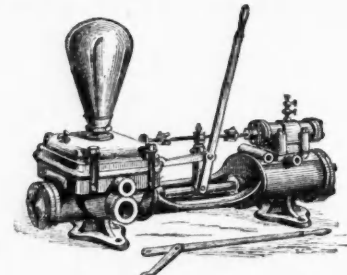
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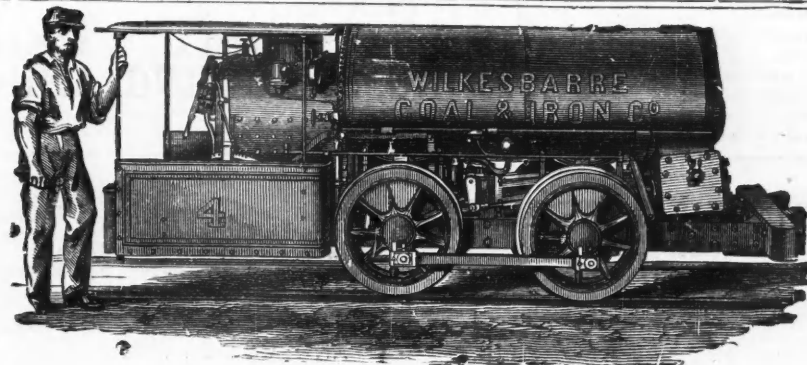
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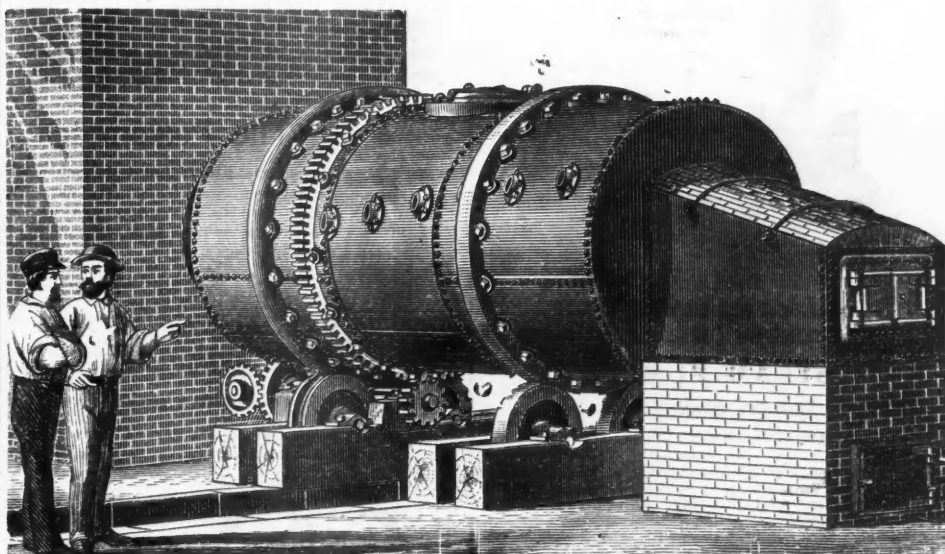
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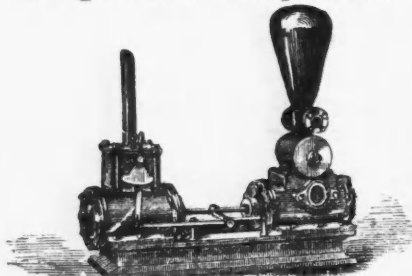
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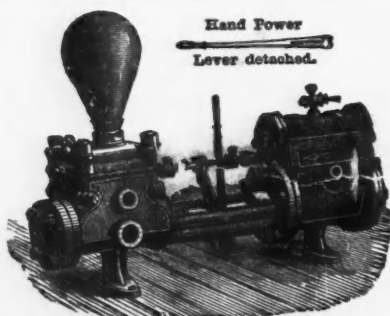
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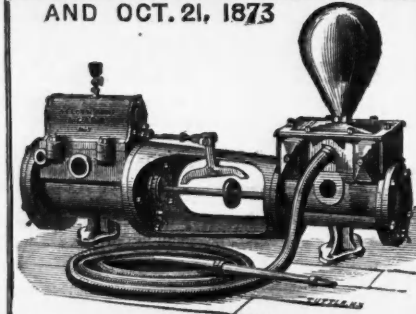
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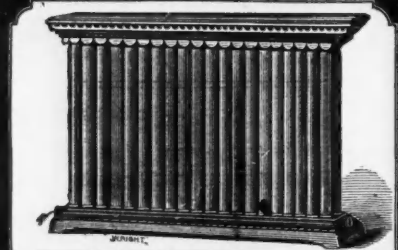


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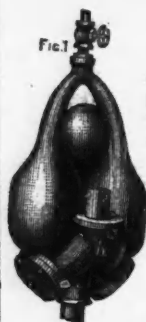
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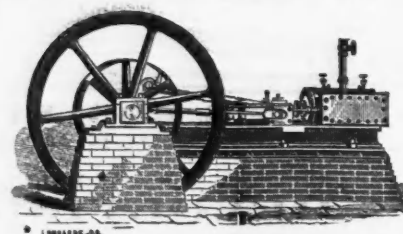
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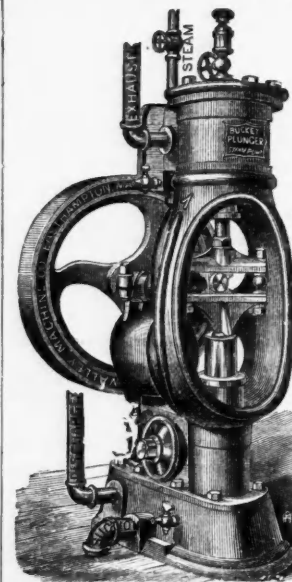
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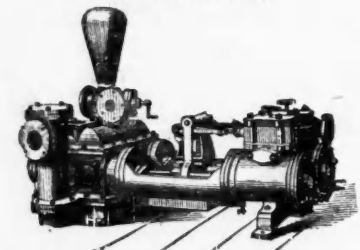
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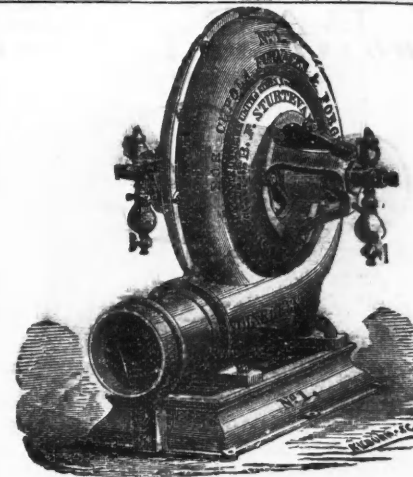
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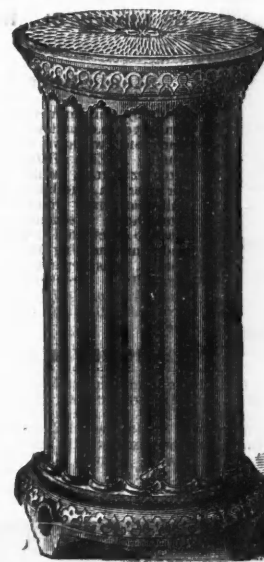


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