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African Tools from an English Workshop.

SOME special branches of English iron manufacture are just now having a run of good trade from two diverse sources—the Ashantee war and the famine in Bengal. The immediate effect of the preparations to meet the latter is to occasion an enormous demand for cultivating tools, of the class which the native Indians are alone accustomed to use. These are what are termed "Calcutta hoes," and they are made in three leading sizes—10x3½ inches, 10½x8½ inches, and 11x8½ inches. The workmen in a large hoe manufactory in Wolverhampton were found on a late visit to be principally employed in making the Calcutta hoe, and those singular instruments known as the Zoolian, or Caffre, pick, and the Zoolian, or Caffre, hoe. There were Calcutta hoes heaped in whole pyramids, in different stages of manufacture, throughout almost every part of the works. The orders embraced quantities altogether without precedent, even in the prolonged experience of this old-established firm. Orders for 300 dozens were numerous, whilst personal negotiations were concluded for 5,000 hoes in one lot. Eighteen customers together had ordered no fewer than 2,815 dozen, and another had purchased as many as 1,127 dozen. Twenty customers, therefore, had taken between them 52,300 implements.

This Caffre pick resembles a battledore. The blade is about the size and shape of that of the battledore, and representing the handle there is a small pick, shaped out of the solid metal of which the blade is composed. The hoe is similarly formed, only that the blade is more oval, and that which corresponds with the pick end in the pick proper possesses more the appearance of a spike. To use these implements, the pick or the spike, as the case may be, is driven through a hole near to the feruled end of a long stake. The tool can then be employed, the blade as either a kind of hoe or digger, while the pick or spike is applicable to other purposes for which it is capable.

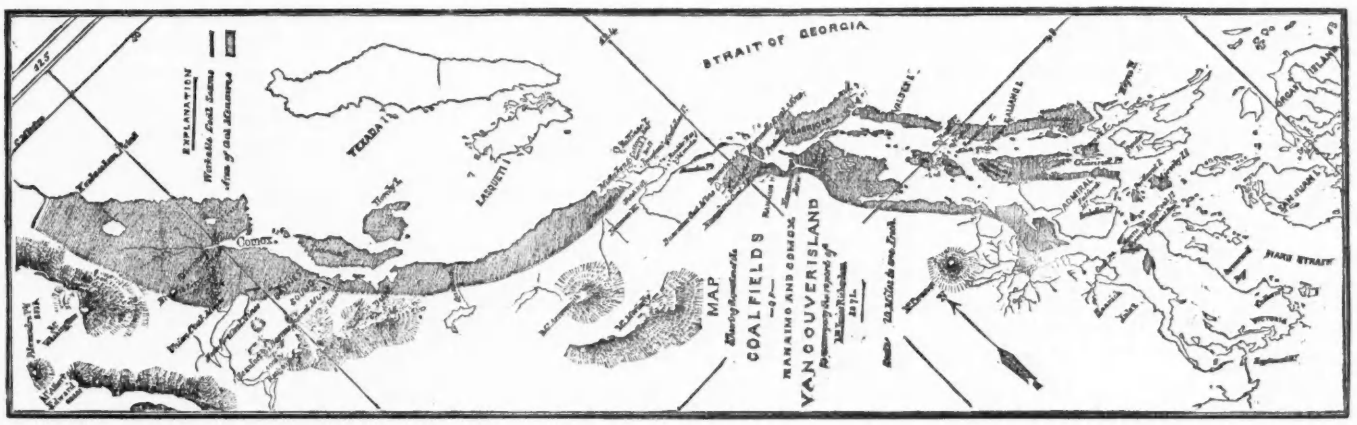
Nor were these the only implements which were being made in unprecedentedly large numbers. There is an extremely handy tool, for which the world is indebted to the Americans, known as the Canadian tomahawk. It is a neat little wedge of iron and steel, having the requisite hole punched through it for the reception of the customary ash handle, and it is getting as familiar to the emigrant and the soldier in the camp as the sheath knife has long been to the mariner. Tucked in a belt, it is always at hand, either to carve a dinner or to cleave an oak. The English Autumn Maneuvres have shown the inquisitive public how deftly it can be handled by the landsman, whether at mess, in preparing for mess, in the numerous domestic requirements of camp life, or in pioneering expeditions.

Vancouver Island Coal Field.

Prepared for the Engineering and Mining Journal by JAMES MACFARLANE.

THE coal field of Vancouver Island consists of a narrow trough, the southwest side of which only occupies the northeastern shore of the Island, the remainder of the field extending beneath the waters of the Strait of Georgia. The crystalline rocks coming apparently from beneath it in Lasqueti, Texada and other islands, and on the main land beyond, are evidently the boundary of the trough on the northeast side. Its boundary on the southwest side on Vancouver Island is manifestly a range of very bold mountains of the crystalline series, which run nearly parallel with the coast, having many points from 4,000 to 7,000 feet above the sea. The field of coal extends, with some interruptions, from a point about fifteen miles north of Victoria, on the southeast, to the vicinity of Cape Mudge on the northwest, with a length of about 130 miles, and is quite narrow, the greatest width being thirteen miles at the Beaufort claim. Coal beds are exposed in upwards of a dozen localities, and in five of them claims have been laid before the government. The general surface of the coal field is rolling, with no elevations rising to a greater height than 800 to 1,000 feet, and in others it is comparatively level. It is mostly covered with forest, but in some parts presents a prairie- or park-like aspect with, grass-covered ground, studedd with single trees or clumps of them. It has a good soil, offers great encouragement to agricultural industry, and may hereafter be thickly settled.

NANAIMO.—For convenience it may be divided into two districts on basins—that of Nanaimo, including some adjacent smaller islands, about 70 miles from Victoria, and the other at Comox Harbor, about 70 miles further northwest, both on the southwest side of the Straits of Georgia. The natural exposures of coal in the Comox basin are much the best, but the Nanaimo district is at present much the more important, coal having been worked there for more than twenty years.



The sales in the last ten years have been 300,000 tons. The production in 1860 was 14,000 tons, of which 6,655 were sold at San Francisco. That of 1869 was 35,802 tons, of which 14,880 went to San Francisco. In 1870, 29,863 tons were mined, and in 1871, 45,000 tons, of which 15,621 went to San Francisco. The production of 1872 and 1873 is not reported, but as the sales at San Francisco in that year were 26,008 tons, there was, no doubt, an increased production. It is probably now the most productive coal region on the Pacific Coast, except, perhaps, Coos Bay. The coal is supplied to the town of Victoria and to steamers calling at that place on their way to San Francisco, Portland in Oregon, and Honolulu in the Sandwich Islands. There is another coal company in the province, from which no returns have been received.

The area of the Nanaimo field is about 90 square miles, extending about 16 miles in length, from the Dunsmine claim to the end of Gabriola Island, with an average breadth of about six miles. In the remaining part of the basin, to the southeast, no important coal seam has yet been met with. But little is known, however, as to that region, and there is every probability of the same seams extending into it. The details of the structure have not been ascertained, and the numerous undulations in the Nanaimo coal field make it difficult to estimate the total volume of the coal bearing rocks; but for the present it may be safe to suppose that the total thickness of the measures will prove to be at least 2,500 feet.

The main working of the Vancouver's Island Coal Company is at Nanaimo, on a six-foot seam, but of varying thickness, from 2½ to 6 feet. The coal is clean and hard, holding thin leaves of carbonate of lime in the cleavage joints. The analysis of this coal by Dr. T. STERRY HUNT shows 51.45 of fixed carbon, 38.40

of volatile matter (how much of this is water not being stated), and 10.15 of ashes. Another bed of coal occurs 140 feet below this, associated with two or three feet of shale, in all seven feet, the thickness of both coal and shale being very irregular. The upper seam is worked on the slope, N.54E., with a very regular inclination of 16 deg. for the first 350 feet, increasing to 70 or 80 deg. in the succeeding 300 feet. The bed then suddenly rises and dips southwesterly at an angle of 20 deg.

The same company have a coal mine on Newcastle Island, about two miles north of Nanaimo. Here there are two beds of coal, one from 3½ to 4 feet, and the other, 57 feet lower, from 3 to 4 feet thick, of clean, hard coal. Both of these seams have been mined, but only the lower one is now in actual working. Dr. HUNT'S analysis of it shows 52.57 fixed carbon, 35.49 volatile, and 11.94 of ashes. Schooners and steamers are supplied with coal at this wharf, as well as at Nanaimo. The northern extremity of Newcastle Island presents bold cliffs to the water, which rise to the height of 100 or 150 feet in some places, and are perpendicular, or even overhanging. These are composed of coarse conglomerate rock, in which rounded masses of various sizes occur up to a foot in diameter, consisting of diorite, quartzite, and other hard materials derived from the crystalline series.

A number of smaller islands in this vicinity must be considered as a part of the Nanaimo coal basin, especially Gabriola Island, ten miles long and three miles wide, east of Newcastle, and two other long narrow islands further southeast, called Valdes and Galiano. All these appear to be a continuation of the same coal-bearing rocks, which characterize this area as far at least as Montague Harbor, which is near the south end of Galiano.

There are also quite a number of other little islands further southeast in this Strait, displaying sand shales belonging to the coal series. Among these are Thetis, Kuper, and Saltsprings Island, as well as the smaller ones called Indian, Secretary, Reed, and Hall, having a range parallel with Valdes and Galiano, with numerous undulations of the strata, the dip changing continually both in direction and amount. Also southward of Saltsprings, or Admirality Island, are situated Moresby, Portland, and Coal Island, all formed of the coal-bearing series. These being all north of the Haro Strait, belong, like Vancouver Island, to the British Government.

COMOX.—The portion of the coal-field called Comox basin, is about 64 miles long, from Cape Mudge to North West Bay, and its greatest width 13 miles at the Beaufort claim. The most promising portion is from Kooshooshun Point to Qualicum River, which may be safely called 40 miles long with an average breadth of over 7 miles and containing about 300 square miles. This portion of the field is separated from that of Nanaimo by 14 miles of the crystalline series besides a space of 20 miles in which no exposures of rock are seen, showing that the general trough is separated into two distinct basins. In this basin coal seams are exposed, and claims have been laid before the government by different parties. The most instructive exposure is on the claim of the Union Coal Company, five miles from the shore, on the south-west side of Comox Harbor. Here are four coal beds, all of them of unusual size. No. 1 or the lowest, being 10 feet thick, without observed impurities ; No. 2, only 3 feet higher, is 6 feet thick, apparently clean and of good quality ; No. 3 is 10 feet higher, and 5 feet 4 inches thick, apparently all of good quality ; No. 4, 15 feet higher, is 4 feet 6 inches thick, of black and shining coal, apparently clean and free from slate. This extraordinary section shows in a total thickness of 53 feet 10 inches of strata, 25 feet 10 inches of good coal or nearly one-half of the whole, in beds of good size for working. The intermediate layers are brown and gray sandstone and the dip of the measures is N. 32 E. 11°. The section was taken in an almost perpendicular cliff which rises on the north side of a small brook, tributary to the Puntledge River, affording the best opportunity for a correct examination. One of these coal beds is exposed at another point down the stream, showing an apparent regularity for at least that distance.

There are reports of coal beds found in other localities, as much as 16 miles further north-west along the coast of Vancouver Island. South of the Union claim is the Beaufort coal mine, a little over 5 miles from the coast. Here, on Bradley's Creek is a seam of good hard coal measuring 3 feet 2 inches, and there is a report of one on Trent River 9 feet thick. The Bayne's Sound mine, farther south-east, shows two coal beds 60 feet apart, the upper one 5 feet 10 inches of clean and hard coal and the other from 5 to 7 feet thick. On Denman's Island, lying on the north-east side of Bayne's Sound, is a continuous exposure for 10 miles of the coal-bearing rocks.

None of the coal beds in the Comox basin have been opened for profitable working. For the facilities of trade, Comox Harbor would afford excellent accommodations to the Union mine, five miles distant and 500 feet above the sea, and for the Beaufort mine, seven miles distant and 700 feet above the sea. Bayne's Sound mine is three miles from Fanny Bay and eight miles from Deep Bay, both being small but safe harbors. All the approaches of the harbors named, as well as the harbors themselves, have a depth of from 5 to 12 fathoms at low water.

Dr. HUNT reports that two specimens of Bayne's Sound coal in the Comox basin, and one from Nanaimo, yield a firm coke. The following are the analyses :

	Carbon.	Volatile.	Ash.
Bayne's Sound Upper Seam	57.48	29.10	13.42
" " Lower "	64.70	29.55	5.75
Nanaimo Upper Seam	51.45	38.40	10.15

The first of the above yields "a firm, dense, shining coke," and the others "a firm coke." There is also a report of an analysis by Dr. HUNT of coal from Nicola River on the main land in British America, showing 74.58 carbon ; 21.51 volatile ; 3.91 ash, and producing "a firm, dense coke." This, containing so large an amount of carbon, must be an unusually good quality for coal of the Pacific coast.

The foregoing account has been compiled from the Report of the Progress of the Geological Survey of Canada for 1871—'72, the examination of Vancouver Island having been made by Mr. JAMES RICHARDSON for ALFRED R. C. SELWYN, the director of the survey. The map attached to the report is re-produced on a reduced scale. The few imperfect fossils collected belong to a flora, about which there has been some controversy as to whether they are Cretaceous or Tertiary ; and it is noted in the report that there are no indications of roots penetrating the upper part of the bed under the coal.

ORIGIN OF THE WESTERN LIGNITES.—From the irregular thickness, the want of continuity, and the supposed absence of roots in the under clays, some geologists were at first inclined to believe that the western lignites were produced from vegetable material drifted together, and not grown on the spot and submerged, as is the case with carboniferous coal. Such an opinion must have been founded on very imperfect observations. The idea that the clay beds under the lignite coal are without roots, is without any foundation whatever. On the contrary, Professor LESQUEREUX says the under-clay is most generally so full of rootlets that it is impossible to study their species on account of their enormous quantity and superposition. (See *American Journal of Science and Arts*, January, 1874.) Those roots are, he says, rather small, filiform, like bundles of small cords heaped and pressed together, and of the same kind as those now seen floating in rivulets, or in swamps where they indefinitely divide into filaments. Of course, in some cases the heaping of the vegetable matter constituting the lignite, may have begun at the surface of waters, or swamps, whose bottom had already been covered with a bed of clay, and the floating carpet of the surface has been afterwards depressed by its weight to the clay bed, which, in such case would not contain roots. The formation of peat should be studied in order to understand that of coal.

No doubt some beds of lignite are formed from drifted wood, like those at the mouth of the Rhone in France, and consequently they contain half their weight of earthy or sandy matter. But how, he asks, could the material constituting beds of very pure lignite, 9 to 15 feet thick, have been drifted without containing any particles of foreign matter ? Some of these lignites have a proportion of ashes only equal, or even less, than wood, and in extent they were originally at least as extensive, and the beds as powerful, as those of the carboniferous formation. There is no doubt that the methods of formation of the lignite and of the true coal were the same. Professor MEEK also, and all our other geologists who have examined them personally, agree that the Wyoming and Utah coals give every evidence of having been formed by the growth of vegetation on the spot.

GEOLOGICAL AGE.—The age of our Western lignites is a fruitful subject on which our geologists will have occasion to work for years in the collection of facts. Professor HAYDEN, in his Third Annual Report for the year 1869, pronounced all these Western coals to be Tertiary, and it looks now as if he was right. In the Fourth and Fifth Reports, for 1870 and 1871, Professor MEEK'S palæontology proved them to be Cretaceous. On the faith of these reports the writer, in his "Coal Regions of America,"* written at that time, gave them the title of "Cretaceous Coals." But in later reports Professor LESQUEREUX, after personal examination, in 1872 and 1873, arrives at the conclusion that the Tertiary age of the plants, and, consequently, of the coal formed of those plants, admits of no doubt. He thinks the lower lignites are Eocene, the upper ones, those of Carbon and Evanston, he considers Miocene, and above this the formations containing bituminous shale, sometimes called coal, are Pliocene. Other geologists, familiar with the subject, think the lowest beds, as at Beau River and Coalville, Utah, and, possibly, some of the beds lowest in New Mexico, are Cretaceous; but they admit that the group passes up quickly into Tertiary. Most of our geologists think Professor LESQUEREUX has the best of the argument, and that time and future investigations will prove that all the Western lignites are Tertiary. (See his article on this subject in *American Journal of Science and Arts*, for December, 1873).

ELMIRA, N. Y., February, 1874.

IN prosecuting experiments to ascertain the expansion of various substances by heat, the following experiment was tried :— The bulb of a thermometer was suddenly plunged into melted lead. The mercury instantly darted down far below zero. The action was so quick that the point could not be ascertained. This was caused by the sudden expansion of the bulb by heat before it reached the mercury by conduction, this then began to rise very rapidly, and before it had arrived at the top of the tube the bulb was withdrawn. The experiment requires adroitness, for, as we all know, the instant that the mercury touches the top, the bulb will burst. This must be greased before immersion in the fused lead, otherwise a film of the metal will adhere and retain sufficient heat to carry the mercury to the top with a consequent fracture. A thermometer treated in this rough manner afterwards showed an index error of six degress, the mercury having risen to that extent ; but after a few days the equilibrium was partly restored, and the error remained permanently at three degrees.

* The Coal Regions of America; their Topography, Geology and Developments. By JAMES MACFARLANE, 8 vo., p.p. 700. D. APPLETON & Co., New York, 1873, $5.00.

The Silver Mines of Peru.

PROF. JAMES ORTON of Vassar College, who has just returned from a trip to South America, sends to the *Scientific American* the following notes of some celebrated mining districts in that part of the world: "The most famous silver mines in South America, after those of Potosi, are the mines of Cerro de Pasco, sixty leagues northeast of Lima. They are situated on the Atlantic slope of the Andes, over 13,000 feet above the sea, where the prevailing rock is conglomerate. The silver, discovered by an Indian in 1630, occurs in the native state; also as sulphuret mixed with pyrites, with *cobrizo* (a carbonate of copper and lead, with sulphuret of copper), and with oxides, forming what are known in Peru and Mexico as *pacos* and *colorados*.

Hualgayoc, fourteen leagues north of Cajamarca, has long been celebrated for its rich mines; but it is also afflicted with a plethora of water. There are many good mines in the vicinity of Lampa and Puno on the borders of Lake Titicaca; those of Manto, Salcedo, Chupica, and Cancharani were famous in Spanish history. The ores of Huantajaya near Iquique yield from 2,000 to 5,000 marks to the cajon. Masses of pure silver have been found on the surface of the plain, one weighing 800 lb. Rich deposits occur also in the province of Cailloma, north of Arequipa; and at Yauli, San Mateo, and other localities near the Orcya Railroad. Extensive veins have been recently discovered at Chileta, the terminus of the Pacasmayo Railroad, the ore assaying from $60 to $200 a ton.

"But the most numerous and promising silver mines of Peru are, without doubt, located in the department of Ancache, just north of Lima; not because it is a richer region than the eastern cordillera, but because it is the only district which has been scientifically explored. This has been done by the accomplished naturalist, Professor RAYMONDI, under the patronage of Mr. HENRY MEIGGS. The report just published at Lima contains assays of specimens from the most valuable mines in which the silver occurs. It appears: (1). That silver is not very common in the native state. (2). That the minerals richest in silver are pyrargyrite ("rosicler" or ruby silver) and stephanite (brittle silver glance). (3). That the greater part of the silver, however, is extracted from tetrahedrite, galena, and many mineral oxides (*pacos* or *colorados*). The pacos richest in silver ore are those which result from oxidation of stephanite and pyrargyrite; the poorest are found in great part of oxide of iron, in which the silver is minutely disseminated in the native state. (4). It is worthy of notice that the silver ores are constantly associated with antimony. Even the galenas having a cubical structure always contain a small percentage of antimony."

The Government and the Centennial.

The following Executive order has been issued by President Grant:

By the President of the United States:

WHEREAS, It has been brought to the notice of the President of the United States that in the International Exhibition of arts, manufactures, and products of the soil and mine, to be held in the City of Philadelphia in the year 1876, for the purpose of celebrating the 100th anniversary of the Independence of the United States, it is desirable that from the Executive Departments of the Government of the United States in which there may be articles suitable for the purpose intended, there should appear such articles and materials as will, when presented in a collective exhibition, illustrate the functions and administrative faculties of the Government in time of peace, and its resources as a war power, and thereby serve to demonstrate the nature of our insitutions, and their adaptations to the wants of the people.

Now, for the purpose of securing a complete and harmonious arrangement of the articles and materials designed to be exhibited from the Executive Departments of the Government, it is ordered that a Board, to be composed of one person to be named by the head of each of the Executive Departments which may have articles and materials to be exhibited, and also of one person to be named in behalf of the Smithsonian Institute, and one to be named in the behalf of the Department of Agriculture, be charged with the preparation, arrangement, and safe-keeping of such articles and materials as the heads of the several Departments and the Commissioner of Agriculture and the Director of the Smithsonian Institution may respectively decide shall be embraced in the collection; that one of the persons thus named, to be designated by the President, shall be Chairman of such Board, and that the Board appoint from their own number such other officers as they may think necessary; and that the said Board, when organized, shall be authorized, under the direction of the President, to confer with the Executive officers of the Centennial Exhibition in relation to such matters connected with the subject as may pertain to the respective Departments having articles and material on exhibition; and that the names of the persons thus selected by the heads of the several Departments, the Commissioner of Agriculture, and the Director of the Smithsonian Institution shall be submitted to the President for designation.

By order of the President. HAMILTON FISH, Secretary of State.

One of the most distinctive features of American character is its inventiveness, a quality which is carried to an almost phenomenal development. It has made an indelible mark upon every kind of activity, and in fact has decided the method upon which almost every industry is conducted in this country. More than any other nation, we have a distinctive history of inventive development, and the Exhibition which is intended to be a material representation of our progress since we became an independent people, should not fail to include this among the points it illustrates. To accomplish this it will be necessary to secure the cooperation of the Patent Office with the Managing Committee of Exhibition. In order to obtain a full and complete illustration of the state of our arts, manufactures, products of mines, etc., reference to the models of the Patent Office will, in many cases, be desirable, if not indispensable. Otherwise a *history* of our progress in the industries will not be exhibited, at most only the *result* of our labor, and that only, where those who happen to be exhibitors, desire it. The advantages to be derived from a complete exhibition of our efforts towards industrial advancement, of the steps we took, one after another, from the European standpoint towards our present eminence in these matters, cannot be overrated. The beneficial result of our patent system would thus also be practically set forth and the aims of the International Patent Congress materially furthered. Of the advantages which students will derive from such an opportunity of tracing to their sources the developments of the inventive genius, and of making comparisons, it is needless to speak.

This plan can only be carried into effect by an enactment of Congress, requiring the Commissioner of Patents to co-operate with the Managing Board of the Exhibition in classifying the objects offered by exhibitors, and to supply the exhibition with such models from the Patent Office as may be necessary or desirable for a more perfect display of American progress in the arts and industries, the models to be returned to the Patent Office at the close of the exhibition.

A. v. B.

Fatal Snow-Slides in Utah.

THE cañons in Utah furnish again this winter the scenes for numerous snow-slides, accidents which are too often fatal to the life of miners. The Salt Lake *Herald* reports that "on Saturday, a Cornish miner from the Wellington started to go to Alta City, but has not yet been heard from, and it is feared he is buried in one of the slides which came down that day between the Emma and Wellington. Two men are also missing from the Pittsburgh mine, American Fork. It is believed they are buried in a slide near the Miller mine. On Monday, George C. Lee, with two companions from the Teresa mine, Big Cottonwood, were carried down a gulch in Silver Fork, and Lee's body was not found until yesterday. The others escaped with their lives, though they were badly bruised. Lee was an old resident of Cottonwood, and was well known by the miners, by whom he was highly respected. There are reports in circulation of others being missed in different parts of the cañons, but nothing definite is known, and probably the bodies will not be found until the snow melts next Summer."

The Fireless Locomotive.*

BY RICHARD H. BUEL.

THE New York *Tribune* recently, in calling attention to an article on the Fireless Locomotive, said that the inventor of this machine seemed to have taken council of Mrs. PARTINGTON, who inquired why they didn't boil their water at home, instead of using these dangerous steam boilers. Considerable attention seems to have been directed to the action of the fireless locomotive of late, and some remarks on the subject may not be devoid of interest. It was patented by Dr. EMILE LAMM, of New Orleans, about a year and half ago, and locomotives designed in accordance with his patents are now in regular use on one of the railroads in that city. Two experimental locomotives have been built in this vicinity, and accounts of their trial trips have appeared from time to time in the daily papers. Dr. LAMM was a dentist, without any special education or experience as an engineer, but he devoted considerable time to experiments on prime movers that could be attached to ordinary street cars, in the place of horses. He was desirous of inventing a machine that would be cheap, compact, safe, and easily managed. Unwilling to accept the results obtained by previous experimenters, he put all his ideas to the test of practice. His first attempt was with an electro-magnetic engine. He afterwards experimented with ammonia, and his third plan was to employ a reservoir of water immersed in a tank of chloride of calcium at a high temperature. It was while conducting these latter experiments that he observed that the reservoir of water alone retained its heat for a long time, and as there were many practical difficulties in the use of the chloride of calcium, he finally decided upon the plan which is embodied in the present design of the fireless locomotive.

As now constructed, this consists of a reservoir, or tank, capable of sustaining a high pressure, mounted on wheels, and connected in the steam space to an ordinary form of steam engine, the exterior of the reservoir (the steam pipes and cylinders) being protected by coverings from loss of heat by radiation. This reservoir being partially filled with water, is connected at the lower portion to the steam space of a stationary boiler, and steam is admitted, heating the water and equalizing the steam pressure in the boiler and reservoir. The locomotive is then ready to start, and, if steam is admitted to the engines, will continue to move until the water in the reservoir has cooled down so much as not to be capable of furnishing steam of a working pressure. Suppose, for instance, that on starting, the water in the reservoir has a temperature of 400 deg. Fahrenheit, and that at the conclusion of the run its temperature is 250 deg., corresponding to pressures of about 235 and 15 pounds per square inch above the atmosphere respectively. In this case, each pound of the water would give up 150 units of heat, and each pound of water that was evaporated would require about 970 units of heat for its conversion into steam, so that each pound of water in the reservoir would give out heat enough in cooling down, to make about 0.16 of a pound of steam, or a little more than a cubic foot.

This, in brief, is the theory of the fireless locomotive. It is hardly necessary to point out the advantages of this system. It must be evident that the reservoir, which is not exposed to the action of fire, will probably be more durable and less liable to rapid deterioration than an ordinary boiler. The danger of explosion, when the machine is in motion, is very slight, as the greatest pressure is put upon the reservoir when it is being charged at a station, and this pressure is continually diminishing during a run. There is little chance of danger from the oversight of the attendant, and less skilful engineers being required than in the case of ordinary locomotives, the running expenses can be reduced. In many places where motive power is desired for cars, it becomes a serious question how to dispose of the products of combustion, so that they shall not vitiate the atmosphere. The fireless locomotive solves this problem admirably. It may be that this system is not quite as economical as that in which the steam is generated by the combus-

* A paper read before the Polytechnic Branch of the American Institute.

tion of coal in each separate boiler, and probably this can only be determined by experiment. But by having well designed stationary boilers and careful management at the stations where the reservoirs are charged, it is possible that there will not be much difference in the cost of fuel, between the two systems. In the matter of relative bulk, of course, the preference is to be given to the coal burning locomotive, since a good boiler is capable of utilizing about 10,000 units of heat from the combustion of a pound of coal, and in the example cited above, the reservoir utilized 150 units from each pound of water. This is not a matter of so much importance, however, in many cases, as some of the other points, in which the fireless locomotive seems to possess advantages.

The writer, in company with Mr. HENRY L. BREVOORT, recently made a trial trip with the smaller of the two locomotives in this vicinity. By the courtesy of the officers of the company, and particularly through the exertions of the engineer, Mr. GIBSON, arrangements were made to take down considerable data. It was impossible, however, owing to the defective nature of the connections, to determine accurately the temperature of the water in the reservoir, or to observe the variations in the water level. It was found that the water was quite unequally heated in different portions of the reservoir, showing that the arrangement for charging with steam was not as complete as was desirable. On starting, the reservoir was half full of water, but the glass gauge having broken, no further observations could be made. A counter was attached to the engines, and the steam gauge was carefully tested before the trial. The run was made from East New York to Canarsie, and back. During the trip, indicator diagrams were taken from the cylinders, in sufficient number, and under such circumstances, as to give average conditions. It is believed, therefore, that the data, although not as full as could have been desired, are quite accurate, and give the fullest particulars of the practical working of the fireless locomotive, that have yet been obtained.

The locomotive with which the trial was made, consists of a platform set upon a four-wheeled truck, carrying a cylindrical reservoir, 37 inches in diameter and 9 feet long, with a steam dome, 12 inches in diameter and 2 feet high. The shell of the reservoir is $\frac{1}{4}$ of an inch, and the heads $\frac{5}{8}$ in. in thickness. No braces are used in the construction. The steam drum is connected to a pair of vertical engines, fitted with the link motion, each cylinder being 5 inches in diameter by 7 inches stroke. The reservoir is covered with cement and felting, and the steam pipe and cylinders are also felted. The engine shaft has a pinion of 26 teeth, gearing into a wheel of 46, which latter is secured to one pair of truck wheels, which are the drivers. In charging the reservoir, steam is admitted through a two-inch pipe, running the whole length of the reservoir, and perforated with small holes. The dimensions of the reservoir and cylinders, in cubic feet, are as follows:

Cylindrical portion of reservoir	64.64
Steam dome " "	1.55
Volume of cylinder swept through by each piston, per stroke	0.0786
Clearance and passages, at each end of each cylinder	0.0045

At the commencement of the trip, the pressure of steam in the reservoir was 142 pounds per square inch, and at the conclusion, it was 22. During the run, the variations in the pressure were as follows:

3:35	142	4:04	70
3:37	132	4:07	66
3:38	124	4:10	52
3:39	124	4:13	48
3:51	102	4:15	44
3:53	97	4:21	29
3:55	89	4:24	22

81.5 mean pressure during run. Several short stops were made during the run, for the purposes of observation and adjustment, and the power exerted by the engines at different points varied considerably, on account of changes in the grade of the road. The total time of trip was 49 minutes, and the running time 35½. The total number of revolutions of the engine was 5,233, and the average revolutions per minute 147.4. The distance run was 4.4 miles; an average of all the indicator diagrams shows that the mean pressure of steam above the atmosphere, in the cylinders, was 23.01 pounds per square inch, and the mean back pressure, 5.15 pounds. The diameter of the piston rods being $\frac{3}{4}$ of an inch, the mean area of each piston is 19.414 inches—and from these data it is found, by a simple calculation, that the mean indicated horse-power exerted by the engines during the run was 3.61. Knowing the volume of steam required for each stroke and the total number of strokes, it appears that the amount of steam accounted for by the indicator was 1739.4 cubic feet. Owing to a faulty construction of the valve motion, it was necessary to run with full link, and regulate the speed of the engines by throttling the steam, so that the steam was wire-drawn, instead of being expanded. The mean terminal pressure of the steam above the atmosphere, as shown by the indicator diagrams, was 19.86 pounds per square inch, and as steam of this pressure weighs 0.0846 pounds per cubic foot, the amount of steam furnished by the reservoir, accounted for by the indicator, was 147.15 pounds. The amount of steam actually used by an engine, however, is generally in excess of that shown by the indicator, and as the protection of the reservoir from loss by radiation was far from efficient, it is probable that the actual evaporation was somewhat greater. It will be easy to calculate how much water would have been evaporated under the most favorable circumstances, viz: that no heat should be lost by radiation—that the water in the reservoir should be heated, at starting, to a temparature due to a steam pressure of 142 pounds per square inch, and should be saturated with an equal volume of steam at that pressure, and that, at the conclusion, the water in the reservoir should have a temperature due to a steam pressure of 22 pounds per square inch, and should be saturated with an equal volume of steam at that pressure. It will probably be fair to assume the evaporation to take place at a pressure of 82 pounds per square inch, a mean between the initial and terminal pressures in the reservoir. Then, at starting, the reservoir would have 1236.3 pounds of water, each pound of which contained 361.8 units of heat, and 23.2 pounds of steam, each pound of which contained 1224.3 units of heat—so that the total number of units of heat in the reservoir at commencement would be 475,696.6. At the termination there would be 1236.3 pounds of water less the amount that had been evaporated, each pound containing 262 units of heat, and 5.92 pounds of steam, each pound of which contained 1193.8 units of heat—and calling x the amount of water that had been evaporated, the number of units of heat at termination would be $330,956.48-262x$. The number of units of heat available for making steam would be the difference between the number of units at commencement and termination, or $144,740.12+262x$. Each pound of water that was evaporated would require an addition of 951,1 units of heat for its conversion into steam—and by the solution of a simple equation it is found that the number of pounds of water that would be evaporated, is 210.04.

The reasons for the difference between this result and 147.15 pounds, as calculated from the indicator diagrams, have already been given—and it seems probable that the actual evaporation in the reservoir was about mid-way between these two results.

It will perhaps be a matter of surprise to many, that the working pressure of steam in the reservoir was exhausted in so short a time, and may cause doubts as to the value of this system of locomotion. It should be remembered that the general design and construction of the fireless locomotive that has been described, seem expressly intended to render the best system unsuccessful. It may be worth while, then, to devote a little space to a consideration of the engines. From the evaporation, as shown by the indicator diagrams, it appears that the amount of water required by the engines per indicated horse power per hour, was 68·9 pounds or 1 1-10 cubic feet; as already remarked, it is probable that still more water was used. In the time of JAMES WATT, an evaporation of one cubic foot of water an hour was considered a liberal allowance for the production of an indicated horse power in an engine—and the use of so much steam in these engines is evidence of bad design or improper management. It will not be difficult to find reasons for this great waste. Referring again to the indicator diagrams, it will be seen that the back pressure on the pistons was 22.38 per cent. of the mean pressure in the cylinders. By far the greatest waste occurred, however, from wire-drawing the steam, instead of cutting it off at a proper point, and allowing it to expand during the remainder of the stroke. No argument is necessary to show that an automatic cut-off would be the most economical arrangement for an engine working with a continually varying pressure of steam. A comparison of the average conditions in the two cases—1st, that steam of 81.5 pounds pressure should be cut off at such a point as to produce a mean pressure of 23.01 pounds per square inch in the cylinder—or 2d, that steam of the same initial pressure shall be allowed to expand without doing work, until its pressure is reduced to 19.86 pounds per square inch, the terminal pressure—shows that the waste, in wire-drawing the steam, is 99 per cent.—or that, in the case under consideration, if the steam had been cut-off, it would have produced the same effect with an expenditure of 50.25 per cent. of the amount of steam actually required. Hence, with this single change in the arrangement of the engine, all other things remaining the same, the locomotive would have run twice as far.

A new locomotive is now in course of construction, in which more efficient arrangements are made for heating the water when charging the reservoir with steam, a better system of valve gear is applied, and the general design and workmanship are much improved. It is hoped that this machine will demonstrate successfully the merits of Dr. LAMMS' system.

It may be interesting, in conclusion, to consider the case of a fireless locomotive under more favorable conditions, but under such as it is believed can readily be realized in practice. Suppose, then, that a reservoir of the same size as the one which has already been described, is filled to the dome, on starting, with water having a temperature due to a steam pressure of 275 pounds per square inch, and saturated with an equal volume of steam at that pressure,—that, at the termination, the water is saturated with an equal volume of steam having a pressure of 20 pounds per square inch, and has a temperature due to that pressure—that the engines shall be so designed as to develop four useful horse power with an indicated power of 5 1-3 (making an allowance of 25 per cent. for friction), using 25 pounds of water per indicated horse power per hour—and that there shall be a loss from radiation of 5 per cent. of the water evaporated.

Under these conditions, the reservoir would contain, at the commencement, 1,499,754.66 units of heat, and at the termination, letting X represent the number of pounds of water evaporated, it would contain $(905,913.82-258.7X)$ units—so that there would be $(584,840.84+258.7X)$ units of heat available for making steam. Each pound of water would require an addition of 966.4 units for its conversion into steam, so that the amount of water evaporated would be 826.4 pounds. The loss from radiation would be 41.12 pounds, and the steam available for useful work, 785.28 pounds—hence the locomotive would run 5.9 hours before the reservoir required recharging.

It is believed that the foregoing is a fair statement of what may be expected from this locomotive, when properly designed and constructed.

THE COAL TRADE.

NEW YORK, February 5, 1874.

We print in our editorial columns the principal news of the day in this business. A number of reports have been printed in the daily press professing to give the details agreed upon by the companies in combination to control the prices of the year, but we have not seen any correct one. Frequently a paper has published contradictory statements on successive days. Aside from the authoritative weight in regard to prices carried by the circular published by us, the details agreed upon for the government of the trade are interesting. As to the business of the week in this city little is to be said. The companies report "good sales," to which, however, the hearer must add "for the times." A brisk trade is not to be looked for at this season, and the companies are doing full as well as can be expected in face of the mild winter, the heavy sales of last year, and the dullness in manufactures

On and after February 2d, 1874, the office of General Coal Agent of the Philadelphia and Reading Coal and Iron Company will be discontinued, and the duties heretofore pertaining to that position will be performed under the direction of the General Superintendent at Reading.

Fires in the Mines near Wilkes-Barre, Pa.

The Old Baltimore Mine is burning fiercely. Some time ago we announced that the fire had originated by the caving in of a large area, some 6 or 8 acres, of the old mine, burying an engine and boiler under the fall. As it is impossible to get at the seat of the fire it will be impossible to extinguish it, and measures will have to be taken to cut off the fire and prevent it spreading to other parts of the mine.

The Fire in the Lehigh and Wilkes-Barre Coal Co.'s Kidder Slope

is still burning, and but little progress has been made towards extinguishing it, notwithstanding the most energetic and unremitting exertions on the part of the officers and employees of the company. A large number of men are employed at wages varying from $2 25 to $3 50 per day, and though the work is attended with great danger, and a large number have been overcome by the gases from the fire, and some from falls of rock, yet we believe no loss of life has yet occurred. Several somewhat serious explosions have occurred at this fire apparently from the following cause :—The coal vein at the point where it is burning does not produce any fire damp, but as the great body of the coal is burning with an insufficient supply of air, or oxygen, the product of combustion is carbonic oxyd and not carbonic acid. Where water is thrown on these burning coals it is decomposed in part into oxygen and hydrogen ; this latter combines immediately with the carbon of the carbonic oxyd and forms carburetted hydrogen (fire damp), which explodes in contact with the burning coal, and some more of the remaining carbonic oxyd unites with the oxygen and burns, producing carbonic acid, or black damp.

The operation of extinguishing a fire when once fairly ignited in the mines, is so slow and expensive that we cannot expect to hear of the end of this one for some time to come.

Is it not time that the use of underground fires in the coal mines be rigorously prohibited by the Company.

The Prospect Shaft Fire.

One of the most "fiery" mines in the Wyoming Valley is the Prospect Shaft of the Lehigh Valley R. R. Co. (Luzerne Coal and I. Co.) near Wilkes-Barre. The coal is hard and requires the use of powder—as do all our anthracites—to break down ; and though the mine has a very efficient ventilation, yet the quantity of gas issuing from the coal is so great that it frequently ignites and sometimes it has been extinguished only with the greatest difficulty. Last week a "blower" stronger than usual caught fire from a blast, and the most energetic attempts to extinguish it were unavailing. The mine is now being filled with water and frequent explosions have occurred, partly possibly from the same cause given above in the case of the Kidder Slope fire, though probably principally from accumulations of fire damp, which from time to time come in contact with the fire and explode.

It appears probable that some substitute for blasting in "fiery" mines must be found, and in this connection we have before us an exceedingly ingenious French invention for breaking down coal and hard rocks without the use of powder. The machine is in our possession, and will shortly be illustrated in the ENGINEERING AND MINING JOURNAL. The patentee claims that it is much quicker, cheaper and safer than the use of powder. No amount of ventilation can overcome the difficulties which the prodigious amount of fire damp is now introducing into some of our anthracite mines, and the invention of an economical and efficient substitute for powder will be of incalulable benefit to our miners and mine owners.

An Important Circular

has just been issued by the Delaware, Lackawanna and Western Railroad Company, which practicaliy abolishes —while nominally continuing—the auction sales. The Company will make contracts at fixed prices for monthly and season deliveries of coal.

ANTHRACITE COAL Mined for the week ending Saturday, January 31, 1874.

SCHUYLKILL REGION.	WEEK. tons.	YEAR.* tons.
*Philadelphia and Reading Railroad	50,666	149,347
Shamokin and Lykens Valley	11,815	27,996
WYOMING REGION.		
Delaware and Hudson Canal Co	35,721	132,652
Delaware, Lackawanna and Western RR	42,499	194,850
Pennsylvania Coal Co	21 125	88,383
*Lehigh Valley RR	18,720	74,309
Central Railroad of New Jersey	1,575	19,454
LEHIGH REGION.		
*Lehigh Valley Railroad	57,905	227,889
Central Railroad of New Jersey	5,777	39,764
SULLIVAN REGION.		
Sullivan and Erie Railroad	902	2,470
Total	234,990	957,114

*Year beginning January 1st.

Shipments of Bituminous Coal for the Week Ending Jan. 31.

	Week. Tons.	Year. Tons.
Cumberland and Pennsylvania RR.	21,411	84,400
Cumberland Branch RR	2.585	9,077
Philadelphia and Reading RR	6,768	27,534
Barclay RR	4.394	18,093
Huntingdon & Broad Top RR	8.717	31,016
Tyrone Division Penn. RR	....	46,194

WHOLESALE AND RETAIL PRICES OF COAL.

Import Duty on Coal.

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

All slack, or culm, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lbs. per bushel, 40c., gold

Not otherwise provided for, per ton, 40c., gold.

WHOLESALE PRICES.

f. o. b. at Shipping Ports.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
Scranton Sales, Jan. 28	....	4 85	4 75	5 21	5 24	4 40
Scranton at Elizabethport	4 60	4 70	4 80	4 95	5 25	4 60
Lackawanna at Rondout	5 05	5 15	5 25	5 40	5 70	5 05
Pittston at Weehawken	4 60	4 60	4 70	5 70	5 20	4 50
Wilkesbarre at Port Johnston	5 05	5 15	5 25	5 40	5 70	5 05
Newport and Plymouth	....	....	5 33	5 50	5 80	5 10
Susquehanna Coal Co. at Amboy	5 25	5 35	5 35	5 55	5 80	5 15
Lehigh Coals.						
Old Company at Port Johnston	5 85	....	5 70	5 70	5 85	5 05
Sugar Loaf at Port Johnston	5 85	....	5 70	5 70	5 85	5 05
Hazleton at Elizabethport	5 85	....	5 70	5 70	5 85	5 15
Honey Brook at Elizabethport	5 85	....	5 70	5 70	5 85	5 15
Spring Mt. C. Co. at Hoboken	5 85	5 90	5 90	5 90	5 85	5 25
Beaver Meadow at Port Johnston	6 05	....	5 90	5 90	6 00	5 25
McNeal at Port Johnston	5 85	5 85	5 70	5 70	5 85	5 15
Schuylkill Coals at Port Richmond.						
Schuylkill White Ash	4 60	4 60	4 70	4 70	5 00	3 95
Schuylkill Red Ash	....	....	4 70	4 85	5 15	3 95
Shamokin W. and R. Ash	....	....	4 80	5 00	5 15	4 10
N. Franklin	...	....	5 15	5 15	5 05	4 00
Lorberry	....	....	5 50	5 50	5 50	4 35
Lykens Valley	....	....	....	6 10	6 10	4 75

WHOLESALE PRICES.

New York.

	Lump	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
Scranton	5 05	5 15	5 25	5 40	5 70	5 05
Lackawanna	5 70	5 80	5 90	6 05	6 35	5 70
Pittston	5 00	5 00	5 10	5 10	5 60	4 90
Wilkesbarre	5 50	5 60	5 70	5 85	6 15	5 50
Newport & Plymouth	...	...	5 80	5 95	6 25	5 55
Susquehanna Coal Co.	5 70	5 80	5 85	6 00	6 30	5 65
Lehigh Coals.						
Old Company	6 30	....	6 15	6 15	6 30	5 50
Sugar Loaf	6 30	....	6 15	6 15	6 30	5 50
Hazleton	6 30	....	6 15	6 15	6 30	5 60
Honey Brook	6 30	....	6 15	6 15	6 30	5 60
Spr'g Mount. Coal Co.	6 30	6 35	6 35	6 35	6 30	5 70
Beaver Meadow	6 50	....	6 35	6 35	6 45	5 70
McNeal	6 30	6 30	6 15	6 15	6 30	5 60
Schuylkill Coals.						
Schuylkill White Ash	5 85	5 85	5 95	5 95	6 25	5 20
" Red Ash	...	....	5 95	6 10	6 40	5 20
Shamokin W. & R. Ash	....	....	6 05	6 25	6 45	5 35
North Franklin	....	....	6 45	6 45	6 35	5 25
Lorberry	....	....	6 75	6 75	6 75	5 60
Lykens Valley	....	...	....	7 35	7 35	6 00

BITUMINOUS.

WHOLESALE PRICES.

Broad Top	$6 50
Derby	6 50
Kittaning	6 50
George's Creek Cumberland	7 25
West Virginia Gas	8 75
Penn. Gas	9 00
Westmoreland Gas	9 00
Sterling Ohio	10 00
Straitsville (Ohio) Cannel	13 00

RETAIL.

PER TON OF 2000 LBS.

Liverpool House Orrel, delivered	$20 00@$22 00
Liverpool House, Cannel, delivered	20 00@ 25 00

	Grate and Egg.	Stove.	Chestnut.
Pittston Coal, in yard	$5 60	$5 80	$5 00
Delaware & Hudson, in yard	6 00	6 25	5 75
Scranton, delivered	6 75	7 00	6 25
Wilkesbarre, delivered	6 75	7 00	6 25

Atlanta, Ga.—Jan. 19.

Bituminous Coal by car load, per bushel.....35c.@40c.

At Georgetown, D. C., and Alexandria, Va.

George's Creek and Cumberland f. o. b. $4 60@4 75, wholesale.

Buffalo, N. Y.

Anthracite	$6 50@ 7 00
Youghiogheny Gas Coal	6 00
Catfish Lump	4 75
" Nut	3 50
" Nut and Slack	3 00
" Slack	2 85
Connellsville coke	8 00
Beaver Gas Coal	6 50

Baltimore.

Wholesale Prices to Trade.

Wilkesbarre, by cargoes or cars	$6 25@....
Pittston and Plymouth	6 00@6 50
Shamokin Red or White Ash	6 00@6 25
Lykens Valley Red Ash	6 80@....
George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 75@5 00
West Va. Gas Coal f. o. b. at Locust Point	6 50@....
Kanawha Cannel, coarse	13 00@....
Tyrone	7 25@....
Ritchie Mineral of West Virginia	10 00@....

Boston, Mass.—Jan. 28.

The sales of English Cannel are confined exclusively to the retail trade. Scotch and American cannels are weak. Cumberland is quiet, with no change in prices. In gas coals the trade is light, the gas companies having good stocks for the season. There is a fair retail trade in Anthracite, with light stocks.

English Cannel	$26 00@28 00
do do from sh	22 00
Scotch Cannel	18 00@20 00
Lingan	8 25
Caledonia	7 75
Pictou	8 25
Sydney	9 00
Acadia	6 75@ 7 25
Cumberland	7 65@ 8 00
Anthracite	8 50@ 9 00

Chicago, Ill.

We note an advance of 50 cents per ton on Blossburg and Minonk. Anthracite coal is reported firm, and an advance is talked of. The following are the ruling quotations :

Lehigh prepared	$10 00
Lackawanna, Wilkesbarre and Pittston	8 00
Erie	8 00@8 50
Walnut Hill	8 00@8 50
Brooks	8 00
Blossburg	8 50
Cannel	9 00@9 50
Hocking Valley	6 50
Indiana Block	6 50
Barclay	6 00
Kirkland grate	8 00
Minonk	5 50
Wilmington	4 50@5 00
Midway	6 50
Illinois	5 00

Cincinnati, O.

Ohio River, per bushel	8c.
Pittsburgh " "	11c.
Anthracite " ton	$11 00

The following are retail prices delivered to customers:

Ohio River, per bushel	12 c.
Kanawha. " "	14 c.
Pittsburgh, " "	14 c.
Cannel " "	24 c.

Cleveland, O.

The market is steady, with a good demand at the following quotations, for car lots, on track :

Briar Hill	$4 50
Massilion	4 00
Massilion nut	3 50
Chippewa	4 00
Hocking Valley	3 75
Morris	4 00
Cleveland Lump	3 50
Silver Creek	4 00
Anthracite, prepared	10 00
Anthracite, lump	11 00

Detroit.

A good steady business is being done at the following quotations :

Lehigh Lump	$11 00
Scranton nut	9 50
" stove	9 50
" egg	9 50
" grate	9 50
Blossburg	9 00
Willow Bank	8 00
Briar Hill	8 50
Brookfield	8 50
Chippewa	8 00
Massilon	8 00

Indianapolis.

Per 2000 lbs.	
Brazil Block	$5 00
Highland	4 40
" steam	4 00
Brazil nut	3 60
Slack Coke	2 50
Virginia Cannel	9 00
Indiana Cannel	7 20
Steam Nut	3 00
Hocking Valley	6 00
Coke per bush	2 40
Pittsburgh	7 20
Sand Creek	5 00
Anthracite	12 00

Louisville, Ky.

Pittsburgh, afloat	per bushel,	11 cents.
" retail	"	16 "
Kentucky	"	13 "
Indiana and Peacock Pomroy	"	14 "
Anthracite		$10 00@10 25

New Orleans, La.

The supply is sufficient for the demand. Mt. Carbon is retailed at 50 cents per bbl., stock comprises about 3000 tons.

Pittsburgh, wholesale, per bbl	48c.@50c.
" to steamboats	55c.
" to manufacturers	75c.
" " " at retail	$1 00
Virginia cannel, per bbl	1 25
Anthracite, per ton	$12@13

Philadelphia.

The demand has been up to the average, and prices remain the same :

Broken	$5 50
Egg and Stove	5 75
Chestnut	4 75
Pennsylvania and Westmoreland Gas	7 50
Broad Top	5 25
Powelton Sterling	5 25
Derby	5 50

Pittsburgh, Pa.

PITTSBURGH, January 31, 1874.

At eleven o'clock yesterday morning, quite a number of coke operators on the Mount Pleasant and Bradford railroad, as well as a number from this city and vicinity, met in Connellsville, for the purpose of taking such action as would result advantageously to the trade of Western Pennsylvania. It had been understood that the co-operation of the Fayette County operators was assured in the movement, and the parlors of the Smith House were filled by the Bradford, Connellsville, Pittsburgh, and other coke men, awaiting the appearance of the Fayette County delegation, but that Fayette County delegation did not come. Those who visited Connellsville from this vicinity to attend the Convention (?) returned last night feeling a little depressed. We are induced to believe, from statements made by prominent operators, that the movement has not that cordial support which would make it successful; and, for a time at least, it is probab'e the coke men west of the mountains will rely upon invidual effort, rather than a combined action to keep the products of their ovens at living rates.—*The Pittsburgh Daily Despatch.*

Connellsville coal, per ton	$2 00@2 15
Youghiogheny, at Pittsburgh	2 25
Coke on cars " "	3 75
Castle Shannon on Platform, per bushel	9½ c.
Anthracite, nut	7 25
" broken	7 50
" egg	7 50
" stove	7 50
" broken on cars	6 75
" stove " "	7 00

San Francisco.

West Hartley, wholesale	$17 00
Australian, "	11 00@12 00

St. Louis, Mo.

Anthracite, delivered		$13 50
Illinois coal, retail	per bushel,	10@14 cts.
" " manufacturers	"	9@13 "
Big Muddy	"	14@18 "
Trenton	"	12½@16 "
O'Fallon	"	10@14 "

In East St. Louis prices are 4 cents less.

Toledo.

Grate	$9 00
Egg	9 00
Stove	9 00
Chestnut	9 00
Lehigh Lump	11 00
Blossburg	6 50@9 00
Briar Hill	7 00
Bituminous	$4 50 to 6 50 as per quality.

Halifax, N. S.

Sydney Coal, per chaldron	$8 50@9 00
Victoria " "	....
Gowrie	7 50
Little Glace Bay	7 50
Albion (at Cunard's wharf)	7 50

Toronto.

Scranton, all sizes, per ton	$7 50
Lehigh prepared, " "	8 50
" Lump	9 00
Bituminous	7 50
Blossburg	7 00

Montreal.

Scotch Steam, 2000 lbs. ex yard	$8 00@8 50
Lower Port, do	7 00@8 00
New Castle Grate, ex yard	9 00@11 00
Welsh Anthracite, per 2000 lbs	9 00@10 00
English Coke	—@—
Lump Lehigh, per 2000 lbs	9 00@9 50
Grate	8 00@—
Egg, American Anthracite	8 75@—
Stove, " "	9 00@—
Chestnut " "	8 50@—

Miscellaneous.

	Coarse.	Slack.
Block House, f. o. b. at Cow Bay	$2 50	$1 25
Gowrie	2 25	....

The shipments from the Provincial Ports have ceased for the season, and will not be resumed before next Spring. Our quotations, therefore, are merely nominal.

	Coarse.	Culm of Coal.
Pictou.....nett	$3 00	$1 50
Sydney	3 25	1 00
Lingan	2 75	1 00
Caledonia	2 75	1 25
Cumberland Coal, f. o. b. at Baltimore	5 00	....
Cumberland Coal, f. o. b. at Georget'n	4 60	....

FREIGHT RATES ON COAL FROM PHILLIPSBURG TO POINTS ON RAILROADS IN NEW JERSEY.

Central Railroad of New Jersey.

Springtown	$0 55	Flagtown	1 70
Bloomsbury	65	Ricefield	1 70
Valley	75	Three Bridges	1 70
Asbury	85	Bound Brook	1 50
Hampton	90	Flemington	1 75
Junction	90	Dunnellen	1 55
Glen Gardner	1 00	Plainfield	1 60
High Bridge	1 05	Fanwood	1 60
Annandale	1 10	Westfield	1 60
Lebanon	1 20	Cranford	1 60
White House	1 25	Elizabeth	1 60
North Branch	1 35	Communipaw	1 50
Raritan	1 45	Bergen Point	1 50
Somerville	1 45	Jersey City	1 50
Neshanic	1 70		

From Mauch Chunk, $1 15 additional.
" Upper Lehigh, 1 74 "
" Ashley, 2 04 "

Delaware, Lackawanna and Western Railroad—Morris and Essex Division.

Stewartsville	$0 60	Whitehall	1 40
Broadway	60	Boonton	1 40
Washington	75	Paterson	1 30
Port Murray	90	Bergen Junc	1 45
Hackettstown	1 00	Clifton	1 45
Waterloo	1 15	Morris Plains	1 65
Andover	1 95	Morristown	1 65
Newton	2 25	Madison	1 70
Stanhope	1 20	Milburn	1 80
Drakesville	1 25	Summit	1 80
Chester	1 80	South Orange	1 75
Ironia	1 75	Chatham	1 75
Succasuna	1 55	Bloomfield	1 65
Vanatta	1 55	Orange	1 65
Port Oram	1 40	Montclair	1 75
Dover	1 40	Newark	1 62
Rockaway	1 50	Hoboken, for consumption	1 80
Denville	1 60	Hoboken, for shipment	1 26

Pennsylvania Railroad—Amboy and New York Division.

Jersey City	$2 61	Howell	2 22
Newark	2 88	Farmingdale	2 32
Waverley	2 42	Prospect Plains	2 00
Elizabeth	2 36	Cranberry	1 96
Linden	2 30	Hightstown	1 90
Rahway	2 26	Imlaystown	2 04
Uniontown	2 20	Sharon	2 00
Campbell's	2 12	Davis	2 08
New Brunswick	2 02	Cream Ridge	2 10
Voorhees	2 30	Hornerstown	2 10
Middle Bush	2 34	New Egypt	2 04
East Millstone	2 46	Cookstown	2 00
Dean's	1 88	Wrightstown	1 94
Monmouth Junc	1 82	Pemberton	1 96
Rocky Hill	2 14	Birmingham	2 06
Plainsboro	1 74	Kwansville	2 04
Princetown Junc	1 72	Vincentown	2 30
Princetown	1 98	Smithville	2 02
Lawrence	1 64	Mt. Holly	1 98
Morrisville	1 54	Lumberton	2 22
Tullytown	1 66	Medford	2 32
Bristol	1 74	Haines port	2 02
Schenck's	1 80	Hartford	2 10
Cornwell's	1 84	Moorestown	2 16
Torresdale	1 88	Stiles	2 22
Holmesburg Junc	1 94	Merchantsville	2 26
Holmesburg	2 16	Windsor	1 84
Rowlands	2 18	Newtown	1 78
Bustleton	2 22	Yardville	1 70
Frankford	2 02	White Hill	1 66
Kensington	2 08	Bordentown	1 64
South Amboy	2 22	Lewistown	1 90
Mantau	2 16	Florence	1 74
Old Bridge	2 00	Burlington	1 84
Spotswood	2 02	Beverly	1 90
Jamesburg	1 94	Delanco	1 94
Englishtown	2 08	Riverton	2 02
Manalapan	2 10	Camden	2 18
Freehold	2 16		

Twenty cents per ton less when 5 cars at a time are consigned to one party, provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

Pennsylvania Railroad—Belvidere Division.

Manunka Chunk	$1 00	Lambertville	1 30
Belvidere	92	Moores	1 30
Hutchinson's	76	Titusville	1 30
Martin's Creek	67	Somerset Junction	1 30
Warren	67	Greensburg	1 30
Carpenterville	67	Asylum	1 30
Edingers	67	Trenton	1 30
Riegelsville	67	Woolsey	1 60
Holland	76	Pennington	1 64
Milford	90	Marshall	1 68
Frenchtown	1 00	Hopewell	1 73
Tumble	1 10	Barbers	1 45
Point Pleasant	1 15	Ringoes	1 50
Bull's Island	1 20	Copper Hill	1 55
Prallsville	1 25	Flemington	1 60
Stockton	1 25		

Twenty cents per ton less when 5 cars at a time are consigned to one party, provided that where the reduction makes the rate $1—a ton, or less, the rate will be $1.

The rate of freight, including wharfage and shipping expenses, from Mauch Chunk to South Amboy, Elizabethport, Port Johnston and Hoboken, is $2 46.

Rate of freight from Mauch Chunk to Newark, $2 47; to Philadelphia via. North Pennsylvania RR., $2 00.

Philadelphia and Reading Railroad.

RATES OF FREIGHT FROM SCHUYLKILL HAVEN.

Landingville	$0 50	Phoenixville	1 50
Auburn	54	Perkiomen Junc	1 54
Port Clinton	71	Valley Forge	1 56
Hamburg	81	Port Kenedy	1 58
Shoemakersville	86	Bridgeport	1 65
Mohrsville	88	Rambo's	1 67
Leesport	92	Swede Furnace	1 68
Tuckerton	96	West Conshohocken	1 70
Reading	1 04	Egbert's	1 75
Exeter	1 14	West Manayunk	1 92
Birdsboro	1 18	West Falls on Schuylkill	1 92
Monocacy	1 20	Nicetown	1 92
Douglasville	1 24	Belmont	1 92
Pottstown	1 31	Philadelphia	2 02
Limerick	1 40	Richmond retail yards	2 02
Aramingo	1 42	Richmond for shipment	1 92
Royer's Ford	1 43		

From Mt. Carbon, 7 c. per ton additional.
" Port Carbon, 8 " "
" Tamaqua, 15 " "
" Pine Grove, 20 " "

Chestnut and Pea Coal 25 c. per ton additional, unless released by shipper.

Ithaca and Athens Railroad.

RATES OF FREIGHF FROM STATE LINE.

Factoryville	$0 10	Vanettenville	0 60
Spencer	70	West Denby	80
Newfield	85	Ithaca	75
Bingham	40	Ithaca for reshipment	53
North Spencer	75	Strattons	85

Rate from Lackawanna Junction to State Line, $2; for shipment, $1 34; for all points on L. & A. & Cayuga Lake Railroad, $2.

Rate from State Line to Cayuga Bridge, for Rochester and Charlotte, $1 02; Buffalo, 93c.; for all other points on New York Central Railroad, $1 06; Cayuga Bridge, local, $1 44.

Through rate from L. & B. Junc. to Buffalo, via I & A. C. L. Railroad and N. Y. C. Railroad, $3 80; to Rochester as above, $3 32.

Freights.

PORTS.	From Elizabethport, Port Johnson, South Amboy and Hoboken.	From Philadelphia.	From Baltimore.
Amesbury	....	....	....
Bangor	....	....	3 50
Bath	....	....	2 75
Boston	2 15	2 60	2 60
Bridgeport	90	2 90	2 25
Bristol	....	....	....
Charlestown, Mass	2 15	....	....
Chelsea, "	2 15	....	....
Davenport	....	....	....
Derby	....	....	....
Dighton	....	....	2 30
East Cambridge	....	....	....
Fall River	1 30	2 00	2 25
Hackensack	....	....	....
Hartford	1 40	....	3 00
Hoboken	50	1 30	1 75
Jersey City	50	1 30	....
Lynn	2 10	....	....
Middletown	....	....	....
Mystic	....	....	....
New Bedford	1 40	2 00	2 25
Newburyport	....	2 75	2 75
New Haven	90	1 50	2 25
New London	1 10	1 65	2 25
Newport	1 35	2 00	2 25
New York	....	1 30	2 00
Norwalk	90	....	....
Norwich	1 15	....	2 75
Pawtucket	....	....	2 75
Portland	2 00	2 60	2 60
Portsmouth, N. H	2 25	2 75	2 75
Providence	1 40	2 00	2 25
Rockport	....	....	....
Saco	....	....	2 85
Somerset	....	....	....
Sag Harbor	....	....	....
Salem	2 15	....	2 75
Stamford	90	....	....
Stonington	1 10	....	....
Taunton	....	....	....
Warren	....	....	2 00
Washington	....	....	....
Warscham	....	....	2 75

There is very little coal being shipped from Philadelphia, and rates of freight are very irregular.

TOWING.

There is scarcely anything doing in this line; we give below a few present rates asked :

To Elizabethport, full loads and return	$18 00
To Port Johnson " " "	16 00
To New Haven or Bridgeport	75 00

Harbor Towing ranges from $4 50 to $5 00.

IRON MARKET REVIEW.

Import Duties.

The following are the duties in Gold on Iron:

Flat Iron, not less than 1, nor more than 6 inches wide, nor less than 3-8, nor more than 2 inches thick. *Round Iron*, not less than ¾ nor more than 2 inches in diameter, and *Square Iron* not less than ¾ nor more than 2 inches square, per lb..... 9-10 of 1 cent.

Flat, round or square Iron of larger or smaller sizes than the above-mentioned, per lb.....1 35-100c.

Provided, that all Iron in slabs, blooms, loops, or other forms, less finished than bars, and more advanced than pig iron, except castings, shall pay the same as iron does *Provided*, that none of the above iron shall pay less than 31½ per cent.

Railroad Iron	63c. per 100 lb.
Boiler plates, or other plate iron not less than 3-16 of an inch thick, per lb	1 35-100
Scrap castings per ton	$5 40
" wrought " "	7.00
Pig Iron per ton	6.30

Iron ore 10 per cent. *advalorem*.

NEW YORK, Feb. 5.

The iron trade is very quiet, and prices stand the same as last week, with the tendency still undetermined. Makers are holding for higher prices, but will not mention figures for future deliveries. We can learn of no further furnaces going into blast. The market for Scotch Pig is very quiet, with a fair stock. We learn of a sale of 300 tons American gray forge on private terms. There have been small transactions at the following quotations:

AMERICAN PIG.	
No. 1, Foundry Anthracite,	$35@36
No. 2, " "	33@34
Grey Forge,	29@31
White and Mottled,	24@27
SCOTCH PIG.	
Glengarnock,	42@43
Coltness,	45@
Eglinton,	41@42
RAILS, English (gold)	58@60
" American at mill,	62@65
SCRAP—Wrought,	42@45
" Cast,	28@32

BALTIMORE, January 31, 1874.

The following are the closing quotations on Iron for the week:

Baltimore Forge	$55 00@$60 00
No. 1 charcoal Pig	55 00@ 60 00
No. 1 Anthracite Pig	35 00@ ....
No. 2 " "	33 00@ ....
No. 3 " "	30 00@ 31 00
Scotch Pig, from yard	41 00@ 42 00

BOSTON, January 31, 1874.

Scotch Pig is steady at $46@$50, including Eglinton and Coltness brands, with sales confined to small lots from store. There has been more inquiry for American pig, and prices are well sustained, with sales of No. 1 at $40@$41, and No. 2 at $37@$38. The demand is not large, but is steadily increasing, and the outlook is encouraging. English rails are quoted at $65@$68 gold, and American at $70@$75 currency, but these prices are merely nominal, as there are no sales.

CINCINNATI, January 31, 1874.

There is an improved demand in mill grades. The principal movement for the week has been in foundry irons. Car wheel grades have been in so light demand, that the quotations cannot be considered more than nominal. The market, as a rule, has been quiet in all grades, with a firmer feeling. We have comparatively no change to note in the following quotations:

HOT BLAST CHARCOAL.	
Hanging Rock No. 1, per ton	38@40
" " No 2 "	35@37
" " Forge	30@32
Tennessee No. 1	37@38
" " Forge	30@32
Alabama No. 1	38@40
Missouri No. 1	38@40
" No. 2	35@37
HOT BLAST STONE COAL.	
Missouri No. 1	37@38
" Forge	30@32
Ohio No. 1	35@40
Ohio Forge	30@31
COLD BLAST CHARCOAL.	
Hanging Rock Car Wheel	60@66
Missouri " "	58@60
Tennessee " "	55@60
Kentucky " "	55@60
Georgia " "	55@60
Alabama " "	55@60
Machinery and Forge	55@57
Blooms	105@116

DETROIT, February 3, 1874.

The market for Pig Iron is rather quiet, with but very small sales to report. We quote:

Scotch pig net	$46 00
Lake Superior pig net	44 00

LOUISVILLE, February 2, 1874.

A tame and even heavy market for pig irons has continued through the week, and the position of affairs is unsatisfactory. The demoralization of labor limits the demand from workshops, and the consumption for railroad purposes is very small. Prices are unsettled, but there is no positive decline noted.

Hanging Rock Foundry X No. 1	$40 00@$41 00
No. 1 Charcoal	40 00@ 41 00
No. 2 Foundry	35 00@ 37 00
No. 3, or mill	30 00@ 31 00
No. 1 stone coal foundry Missouri red, short	40 00@ 41 00
CHARCOAL CAR-WHEEL IRON.	
Ohio Hecla	65 00@ ....
No. 1 Red River cold Blast	60 00@ 61 00
Nos. 3 & 4 Red River and Cottage	60 00@ 61 00
Nos. 5 & 6 White Iron	60 00@ 61 00
TENNESSEE CHARCOAL CAR-WHEEL IRON.	
No. 1 Dover cold blast	56 00@ 58 00
No. 2 " " "	56 00@ 58 00
White and mottled	56 00@ 58 00

PHILADELPHIA, February 3, 1874.

Pig iron attracts very little attention. The settlement of the coal strike has caused a better feeling, and there is rather more demand, but the volume of business is small. Sales of 1200 tons No. 1 Foundry, at $35, No. 2, $33@$34, and 1300 tons Forge at $30, at the furnace. We quote White and Mottled at $26@$28. New rails sell at $63 50@$65 00, at the mills; 8000 tons old rails sold at $40@$41; 230 tons sold at former figures. Scotch pig is selling at $44@$45 for Eglinton and Glengarnock.

PITTSBURGH, PA., February 3, 1874.

The market is rather unsettled, makers and buyers being generally apart, and when buyers meet the makers, an advance is almost immediately made. We note no material change:

No. 1 foundry	$34 00@$36 00—4 mos
No. 2 foundry	30 00@ 32 00—4 mos
Grey forge	30 00@ 32 00—4 mos
Close and medium Gray	29 00@ 30 00—4 mos
White and mottled	27 00@ 29 00—4 mos
Hot blast charcoal mill	37 00@ 40 00
Hot blast charcoal foundry	40 00@ 45 00—4 mos
Hot blast car wheel	60 00@ 63 00

The English Iron Market.

LONDON, Jan. 16, 1874.

It is very generally admitted that there is at existing quotations a very small margin of profit, and not until fuel falls and the arrangements for labor are reconstructed can there be any reduction in prices. There is no doubt that there are grounds for the belief that there are in existence an abundance of orders which, under favorable conditions, would be placed at once; but it is impossible to predict how many must of necessity be kept back in consequence of prices being too high to admit of their being given out. The demand for railroad iron for foreign account is sure to be large, but the orders will not probably be in the market until later on, and makers will have to wait until Spring, when the northern ports open. The report from Wales is to the effect that there is not much doing in the way of fresh work. The men are busy stock-taking, but the expectation for the future is hopeful.

In the north of England strong confidence is expressed, because not only are prospects deemed hopeful, but orders have been received which have afforded some employment to rail mills, which were getting very slack of work, and others which had been idle altogether have been able to resume work. Here, as in South Wales, the general complaint is that at present prices profits are very small, but the hope is expressed that either the necessities of buyers will compel them to pay full rates, or that alterations in the value of fuel and labor will put the trade upon a more satisfactory footing. The following are quotations:

North of England iron rails, £11 5s.@£10 5s., according to section; No. 1 Pig 95s., No. 3 do. 86s. 6d., No. 4 do. 82s. 6d.

The Pig iron market is strong, owing to increased demand for Scotland. The demand is becoming of importance, as may be gathered from the fact that last year the shipments northwards exceeded those of the previous year 32,000 tons.

The market for Scotch Pig opened last Monday at 108s., and closed to-day at a nominal quotation of 106s., business having been done down to 105s. 3d. The following are quotations:

				No. 1 s. d.	No. 3 s. d.
G. M. B., at Glasgow	deliverable	alongside		107 6	105 6
Gartsherrie	"	"	"	114 0	107 6
Coltness	"	"	"	117 6	109 0
Summerlee	"	"	"	112 6	107 0
Carnbroe	"	"	"	111 0	107 0
Monkland	"	"	"	108 0	106 0
Clyde	"	"	"	108 6	106 0
Langloan, at Glasgow	"	"	"	115 0	107 6
Calder, at Port Dundas	"	"	"	112 6	107 6
Glengarnock, at Androssan	"	"	"	112 0	107 6
Eglinton	"	"	"	107 6	105 0
Dalmellington	"	"	"	108 0	106 0
Carron, at Grangemouth, selected,	"	"	"	112 6	—
Shotts, at Leith	"	"	"	112 6	108 6
Kinneil, at Boness	"	"	"	107 6	103 6
Govan, at Broomielaw,	"	"	"	108 0	106 0

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, Feb. 4, 1874.

We have advices from the San Francisco Stock Board, dated the 3d inst. With the exception of an advance of 50c. per share in Raymond & Ely, the list has materially declined. The report is as follows:

	Feb. 4.		Feb. 4.
Savage	95	Belcher "New Issue"	99
Crown Point	91	Imperial	6¼
Yellow Jacket	74	Raymond & Ely	30½
Kentuck, "New Issue."	26½	Meadow Valley	10¼
Chollar Potosi	68	Eureka V G	9¾
Gould & Curry "New Issue"	21	Ophir	—
		Hale & Norcross	—

Boston Stock Market.

BOSTON, Feb. 4, 1874.

The general tendency of copper stocks is downward. We annex the prices bid at the Board this A. M.:

Calumet and Hecla Co*.	141	Rockland	2
Copper Falls	26¼	Phœnix	15
Central*	25	St. Clair	3
Quincy*	41	*Ex-dividend.	
Ridge	9		

Coal and Iron Notes.

A. GARRISON & Co., of Pittsburgh, recently shipped to Belgium a large pair of their celebrated chilled rolls for a manufactury in that country.

P. L. WEIMER, of the firm of P. L. WEIMER & Bros., is about erecting new machine works at Lebanon. The old establishment will also soon be started.

A NEW IRON FURNACE is to be built at Sheridan, Lebanon County, by Wm. M. KAUFMAN & Co., present owners of the Sheridan furnace at Sheridan station. Ground was broken on the 17th. The size of the furnace will be 65 feet and 16 feet at the bosh.

NEW JERSEY'S two hundred iron mines yielded last year 672,000 tons of ore, of which 150,000 tons were manufactured into pig iron. The value of the product is about $3,000,000. In 1867 the product of the mine was only 300,000 tons.

ANOTHER fine deposit of iron ore has been discovered on the South Mountain, in Longswamp township, Berks County.

THE blast furnace of RAWLE, NOBLE & Co., at Erie, is to hereafter make Charcoal Iron, instead of bituminous coal smelted.

THE Secretary of the Treasury has directed that hereafter American steel shall be exclusively used on the public works under the charge of the Treasury Department. Heretofore English steel has been used.

THE Knowles Steam Pump Works, at Warren, Mass., have just finished two $1,000 pumps, for the new Boston post office building.

WORK has been resumed in all the works of the Bethlehem Iron Company, Pa., except the new steel mill.

THE ENGINEERING AND MINING JOURNAL.

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

CONTENTS FOR THIS WEEK.

PRIVATE advices from White Pine inform us that a large body of wonderfully rich ore has been struck in the South Ward Beecher, at a depth of considerably more than 200 feet. Specimens have been obtained, worth $3 per pound. The indications are favorable for extensive bodies of good ore at greater depth than any yet reached. The central shaft in the Aurora has struck a small ore-body of promising appearance. Altogether, it seems likely that White Pine is not quite "played out," after all.

THE Iron and Steel Association held a special meeting in Philadelphia on Wednesday. The Secretary's report showed that the proprietors of 385 furnaces had reported to the Association, and that of these, 247 were in blast and 138 were blown out; stock on hand, 308,430 net tons; number of hands out of employment, 12,522. Thirty-six per cent. of the furnaces connected with the Association are therefore blown out, and if this proportion holds good for all the 650 furnaces reported at the end of 1873, there must be in the country 416 furnaces in blast, and 234 idle; the number of hands unemployed would be about 21,000, and the amount of stock on hand, 520,000 tons. Of the 57 rail mills in the country 50 have been heard from. Of these, 10 were running full time, December 31, 1873, and 7 were on half time; 33 were idle, and of these 10 proposed to resume in January. The number of hands entirely unemployed was 11,490, and those on half-time were 10,150. There were (December 31) 36,744 net tons of rails on hand. There was also in the port of New York 40,000 tons of foreign rails unsold. These figures are the first general view we have had of the iron trade in its relation to the panic, and they show how severe were the effects of that storm. Prices for rails had averaged 25 per cent. below those of last year. As to ores, the shipments from Lake Superior were 952,055 tons in 1872, and 1,163,057 tons in 1873, an apparent increase of 211,002 tons. But it is to be remembered that the shipments in 1872 were really used up in that year, while it has been estimated that of the product mined last year nearly one third was still in the hands of the companies when December closed. The price of Lake Superior specular, which began the year with $12, fell to $10 after the panic, and it is thought will be $9 this year. Iron Mountain (Mo.) ore, which was $10 in St. Louis last year, will be $8 this year.

GOVERNOR HARTRANFT of Pennsylvania, in his first message, lays before the Legislature a proposal for a geological survey of that State. He recommends that "a geological survey of the State be made under the superintendence of a commission to be composed of ten scientific or practical gentlemen representing different interests and localities, who understand the necessities for this survey and under whose direction it shall be conducted, the commission to serve gratuitously and to have the selection of a geologist who shall receive such compensation as may be fixed by law." The Governor also appears to rank himself among that school which holds that a geological survey should include a thorough examination into all the resources of a state which have any reference to mineralogical details, since he recommends the analysis of soils and subsoils, and a systematic classification of them. This is certainly an important work and we should be delighted to see it undertaken by a prosperous and progressive State like Pennsylvania. But it requires a liberal provision for the survey, and it is not the fashion with Legislatures to grant supplies sufficient to carry out even strictly geological work in the most thorough manner. If the Legislature will do what is needful in the matter of a grant, it can obtain any amount of accuracy and completeness desired. Otherwise those who have charge of the work will be forced to choose between one or the other branch of activity.

WE have received the Indianapolis *Sentinel*, containing an address by Prof. Cox on the possibilities of that city as a manufacturing center. Commenting on the fact that nearly half the ore smelted in Pittsburgh came from Missouri, the Professor pointed out that all of this crossed the Indiana coal fields, and could have been reduced 430 miles nearer home. He estimated the cost of a 60-foot furnace, capacity about 10,000 cubic feet, built in the most approved manner, with blowing engines, hot blast ovens, and other machinery, at about $100,000. He also gave the following estimate of expenses in smelting iron ores at Indianapolis.

Three tons block coal at $2 75.....	$8 25
One and one-half tons Clarke County ore, at $3.....	4 50
Seven-eighths ton hematite ore, at $9.....	7 87
Limestone	1 00
Labor, etc.....	4 00
Total.....	$25 62

The address is printed with a map showing that the capital of Indiana has within a radius of *two hundred miles (!)* a larger population than any other city west of New York. Two hundred miles radius makes a pretty neat little circle and as it brings Cincinnati, Louisville and Chicago within the sphere of the Indianapolis attraction, we have no doubt the calculation is true. Professor Cox is not responsible for this little bit of gasconade, which is made exquisitely humorous by the fact that the "map" is borrowed from the advertisement of a coffin manufacturer. The consumption of pig iron has been said to mark the grade of civilization attained by a community; here we see how interdependent the industries may be, and that a ton of pig may be no more significant of local prosperity than a gross of coffins.

IN the last month of 1873 a Mining Association was formed in the City of Mexico under the name *Sociedad Minera Mexicana.* Its field of operations will be similar to that of our own Institute, but will probably be somewhat broader, including chemical, mineralogical, and other subjects, which in the more populous United States are under the care of special societies. The society took its origin from a meeting held at the house of Don MAURICIO LEVEK, in February 1873, at which a committee was appointed to draft a constitution, and similar details were arranged. This work completed, the society had its first regular meeting in the Engineering School, December 21. An able and interesting address was delivered by the engineer, Sr. D. JOSE SALAZAR ILARREGUI, and officers were chosen as follows: President, DON BLAS BALCARCEL, Minister; Secretary, Sr. D. M. GUTIERREZ; Treasurer, Sr. LEVEK. Sixty-five resident and eighty-five corresponding members are enrolled in the first catalogue of the Society. This organization can have the most beneficial effect upon the condition of mining in our neighboring republic. An excellent mining paper—the *Revista Minera*—already exists under the editorship of Don MAURICIO LEVEK, and is the organ of the new Society. Under these circumstances the mining activity of Mexico, already very important, is in a fair way to receive important aid. The State offers a noble field for the prosecution of mining. Having been worked in times when the ability brought to bear upon it sufficed only to scratch the surface, and reap the easiest fruits of labor, the country is full of mines which have been worked down to the water level and left with a great amount of treasure untouched, but in a condition which demands the best engineering skill for its development. In metallurgy, too, the Mexicans have much to learn. There, as often in our own country, a man is both miner and smelter, and the fruit of this individual mode of working forms a much more important fraction of the country's total bullion product than in the United States. The methods pursued are often of the rudest kind and can be very much improved by a little instruction. But the history of mining in that country shows that the improvement must come from Mexicans and not from foreigners. From one cause and another foreigners are not a success in Mexican mines, but intelligent Mexicans have presented to them a field of operations which they can enter more confidently than any others, and where they can employ foreign capital with the best prospects of success to themselves and the investors.

The Coal Companies' Programme.

WE publish below a copy of what is probably the most important contract ever made, affecting the coal and allied interests of this country. It is in the form of an exceedingly carefully drawn arrangement between the six great corporations which own or control our entire Anthracite coal mines, regulating the production and price of a commodity which is as absolute an essential to our national exist-

ence as the supply of our bread stuffs. According to this programme the price which we are to pay for this commodity is not to be dependent on the law of supply and demand, but is to be determined beforehand by a combination, or monopoly, which may give us—as it does now and proposes doing during this year—coal at a moderate and fair price, or may make the charge exorbitant and oppressive. It has the power—what is to prevent it? The heads of these corporations, who are among the ablest men engaged in business in this country, are certainly not going to precipitate matters, and their first care will be to treat the public so fairly that the opposition their course of action must bring from the "middle men," will be answered by a direct and tangible benefit to the consumers. But, supposing that this combination continues to maintain itself so long, what will be the price of Anthracite five or ten years from now?

We have had ample opportunity for studying the coal trade during the past seven or eight years, and appreciate the evils resulting from the violent fluctuations in prices, and from the strikes and lock-outs which have during that period injured, directly or indirectly, so large a part of our people. There can be no doubt that the stability which this agreement among the companies has given to the trade during the past year has been of very great benefit to every interest affected, the consumer no less than the producer. The prices at which coal has been sold, and at which it is proposed to sell it this year, are such that they can give no reasonable cause for complaint, but we would not be a faithful organ of the great industries we represent did we not call attention, at this early day, to the fact that we have here the germ of a gigantic monopoly, which will have the power, if it pleases its directors to wield it, to oppress the industries which use this commodity.

The programme of the combination indicates clearly that, for the present at least, we are to be supplied with cheap coal; for the present prices may fairly be termed moderate.

Not the least important part of this remarkable document is that which tells us the producers and consumers are to be brought together, and no "middle men" or wholesale dealers shall be allowed to go between them. Theoretically this should reduce the cost of coal to the consumer by at least a portion of the profits hitherto absorbed by the middle man, but practically it will probably result in the large companies making that much more on their coal, and the consumers will continue to pay at least as much as at present.

This programme will, of course, excite a large amount of opposition from the middle men, and doubtless the daily newspapers will be loud in their denunciation of monopolies, and will, as is their custom, discuss this subject in the most profound ignorance of its merits or bearings.

We shall revert to the subject again. At present we merely invite the attention and opinions of those interested in the matter, and shall be glad to have it discussed in our columns. The information which we give can be relied on as correct.

The following is the document which we have received from Philadelphia; it was read at the recent meeting of the Lehigh Operators at Mauch Chunk:

NEW YORK, Jan. 21, 1874.

[*Confidential.*]

TO ARIO PARDEE, ESQ.:—The undersigned committee report the following plan for the government of the Anthracite Coal Trade to competitive points for the year 1874:

I. Tonnage to competitive points for ten months, from February 1st to November 30th, 1874, inclusive, to be ten million tons, and to be distributed among the six interests in the same proportion as that adopted in February, 1873, for the business of last year, viz:

To the Philadelphia & Reading R. R. Co....	25.85	per cent.	=2,585,000 tons
" " Lehigh Valley R. R. Co.....	15.98	"	" 1,598,000 "
" " New Jersey Central R. R. Co. Interest	16.15	"	" 1,615,000 "
" " Delaware & Hudson Canal Co.....	18.37	"	" 1,837,000 "
" " Del., Lackawanna & Western R.R. Co.	13.80	"	" 1,380,000 "
" " Pennsylvania Coal Co.....	9.85	"	" 985,000 "
Total.....			10,000,000 tons

II. That a standing committee of six, composed of one representative of each interest, be appointed for the season, to meet monthly, or oftener, at the call of the chairman, to determine prices and all questions relative to tonnage to competitive points, and to have power, from time to time, to permit an increase, or require a curtailment of shipments to competitive points, with a view of regulating the relative demand and supply, provided that any increase or diminution of shipments be based upon the percentage of allotment above mentioned, so that each interest shall be entitled to its proper proportion of the aggregate competitive tonnage, whatever the same may be.

It is recommended that prices shall open in March, 1874, at an average of 15 cents per ton above the opening prices of 1873, and thereafter advance as follows: say, in April, 5 cents; May, 10 cents; June, 10 cents; and July, August, September, October, and November, each 15 cents; and that season prices be established so as not to be more than 30 cents below the average of the year.

The prices to be established so as to admit the White Ash coals of the Reading Railroad Company, Lackawanna, Scranton, Wilkes-Barre, and Pittston coals upon equal terms to customers in New York harbor. It being understood that any interest may demand for any or all of its coal a higher price than that agreed upon by the committee.

III. In establishing prices, it is understood that they be fixed at the respective shipping ports of Port Richmond, Elizabeth, Port Johnson, South Amboy, Hoboken, Weehawken, Newburgh, and Rondout, and that no freights, deliveries or demurrages be guaranteed by any party, except with the previous approval of the Committee of Six.

IV. No commission whatever to be allowed upon coal sold at yearly prices, and no contracts at yearly prices to be made with any one but consumers and retailers; and then only upon the condition that all cargoes of coal so sold shall be received by the purchaser and taken upon the wharf, and not sold or transferred afloat.

No sizes to be sold at yearly or season prices, except lump, steamboat, broken, egg, and chestnut, and egg *only* to consumers. No commissions exceeding 15 cents per ton to be allowed to any party buying at monthly circular prices, and then only to such as purchase at least 25,000 tons of coal per annum.

V. All coals sold at yearly or season prices to be sold by written contracts, deliverable in equal monthly proportions, beginning either on the 1st of March or 1st of April, and ending at any time after the last of November, and any failure to take all or any of one month's proportion to work a forfeiture *pro tanto* of each succeeding month's proportion.

VI. All deliveries of coal upon monthly allotments, at monthly circular prices, to be charged at the circular price current in the month in which the delivery is made, and under no circumstances whatever shall coal, delivered in one month, be charged at the circular price of any preceding month, unless the purchaser had a vessel at the shipping port ready to receive such coal before the expiration of the month in which the delivery was to be made.

VII. The terms of contract for the sale of coal at season prices and by monthly allotments at circular prices, to be approved by the committee of six.

VIII. No allowances to be made for impurity of coal, imperfection in preparation, short weight, or any other reason, without the approval of the Committee of Six, to whom all such claims are to be reported.

IX. The Committee of Six to have power to call for monthly or other reports from each interest upon any subject over which they have control, and to have authority, if they desire, to examine the sales and tonnage books and accounts of any company or corporation.

(Signed) F. B. GOWEN, THOS. DICKSON, } Committee.

The Pittsburgh Blast Furnaces.

THE history of the great blast furnaces in Pittsburgh, short as it is, has been so crowded with incident as to form already quite a noteworthy feature in our iron metallurgy. This history has been anything but an agreeable one. "Isabella No. 1" is blown out and under repairs, its bell having sunk in on the morning of December 13, 1873, carrying with it one man, who was killed, and injuring another severely. The accident was caused by the giving way of the brick work which supported the bell, and, we believe, the abrasion of the charge is given as the reason for the failure of the brick work. It seems hardly possible that abrasion could have been serious enough at that height to weaken the lining of the furnace, unless the lining was destroyed from top to bottom. The collapse may have been due to insufficient thickness of the arch forming the dome. When the bell is hung from a frame placed just at the edge of the hopper, the whole weight of the bell and charge rests upon one point of support, and that is small in area and placed where the masonry is thinnest. Such a disposition requires an attention to the masonry work which is sometimes disregarded, the thickness of the arch at this point being too small to withstand the constant shocks and the great weight resting upon it. A better mode is to hang the lever which carries the bell from supports placed nearer the outer walls. In the present case, future accidents of the kind are to be guarded against by the introduction of cast iron brackets underneath the top plates and firmly fixed in the ring wall. This precaution is a good one, and the damage caused by the sinking of the bell is usually so great as to warrant the use of every means of prevention. The "Isabella" is not the only one of these Pittsburgh furnaces which has suffered this mishap. The "Soho" met with a similar accident last winter.

Both of the Isabella furnaces have suffered from leaky hearths, the melted iron running down into the foundation. The evil was caused as usual by digging down to the flues in the masonry and pouring in a "slip" made of clay and water, thus chilling the iron in the cracks and filling them up.

When we turn to the "Lucy," we have a record of vexations which are enough to appal those who know what it is to wait on a furnace in difficulties. It has chilled twice, the last time owing, it is said, to the too free use of a very rich ore from the Republic mine. The remarkable remedy employed to relieve the furnace on the first occasion has already been described in this paper. The experimental trial of two banks of tuyeres was spoken of in the paper of Mr. PECHIN, published in the ENGINEERING AND MINING JOURNAL, June 10, 1873. As might have been expected, it failed. The height of the tuyeres above the sole is one of the most important dimensions in a furnace. If a second row of tuyeres is introduced, the effect is to increase this height up to the middle line between the two rows of tuyeres. If it was right before, it is wrong after the change. As to the effect upon the run of the furnace, there would either be no effect at all or it would probably tend to produce a slag rich in iron. That is to say, if carbonic oxide were made at the lower tuyeres it might be transformed to carbonic acid in front of the upper row, and though this could not exist as such for any considerable length of time, the intensely hot iron coming down at this point might be partially oxidized, the oxide would not have opportunity to be again reduced, and must necessarily enter the slag. These are but suppositions, and the real effect of a double tier of tuyeres may be different from that set forth here; but at all events, that effect is not advantageous, as more than one experimenter has proved.

The trials above enumerated are by no means to be set down as peculiarly incidental to the management of large furnaces as opposed to small ones. On the contrary, the close of the year 1872 and the beginning of 1873 saw a remarkable prevalence of disaster among American blast furnaces. Along the Hudson River and in all parts of the country the furnaces were breaking down or chilling up, blast ovens were exploding, and, in looking back over the current notes of that day, there seems to have been as marked a season of disaster as there was in railroad travel immediately after our war, or within the past few months in England. The cause of this apparent phenomenon is well known to have been the eagerness of ironmasters to take advantage of the high prices and sharp demand for iron. Furnaces were overburdened. Rich ores were bought,

the burden was increased to the utmost, and the consequence was the numerous accidents. The history of that period of blast furnace practice in the United States is one which ironmasters will do well to ponder. Those furnaces which were overworked and yet pulled through without serious injury to the plant, or without costly accidents and vexatious delays, just at the crisis when time was not to be lost, were few in number. Iron makers undoubtedly made a great deal of money at that time, but it is doubtful if those furnaces which suffered serious interruption did as well as they would have done by making a few tons less per week, but running steadily. Furnaces which suffer like those we discussed in the early part of this article, age rapidly, and blast furnace plant is now so costly that it pays to preserve it.

CORRESPONDENCE.

Mr. Cazin Rejoins.

DENVER, Col., Jan. 24, 1874.

TO THE EDITOR—SIR :—The ideas expressed by Mr. ENGELMANN concerning the One-Plunger Jig prove that he never yet had an opportunity to see it work ; but he certainly does not stand alone in his doubts. I myself, when first constructing the machine, anticipated some difficulty ; but it turned out that the invention surpassed the expectation of the inventor. In nearly every instance, when I start a new machine, I meet the same views as were expressed by the chief engineer at the Granby Lead Works, in presence of their superintendent, Mr. KINGSTON, viz : "I expected to see that long plunger pound heavily, until the belt was put on and I saw it move. I now understand why it moves so softly, because it just makes the water work in a kind of natural wave, the water itself helping its motion. I do not see any difference in the motion of our engine since that jig is connected to the main shaft."

The "One-Plunger" is an object of study, even for those whose theories prove in this case a source of prejudice. It consists of a piece of timber 5 inches by fourteen inches, and 14 to 16 feet long ; and neither appears "clumsy," nor is it "braced" at all, nor does it "vibrate." I accept thankfully Mr. ENGELMANN'S recommendation of my jig for all grains under 1-25 of an inch in diameter ; and would feel the greatest pleasure, should he favor me with a visit in the mountains, at the Caribou Mine, in trying to make him also a full partisan of my apparatus, as I confidently think he would become after testing it himself. F. CAZIN.

Quartz Mining in Montana.

RADERSBURG, Montana, January, 1874.

TO THE EDITOR—SIR : Radersburg is a bright, busy little mining camp of about 250 inhabitants. Placer mining was not as prosperous last season as heretofore, owing partly to the small amount of snow which fell during the preceding winter, and partly to the bad management of the ditches. The placer ground of this camp is limited in extent, and after one more season will probably be exhausted, with the exception of Charity Gulch, which is owned exclusively by a single company. The reliance of the camp for permanent wealth is therefore in the quartz veins. The Keating mine continues to be the principal property. It is opened by both shafts and tunnels. There are three of the former, 250 feet apart, from the middle one of which levels are now running north and south, 337 feet below the surface, in the undecomposed iron pyrites. There are also levels in progress at the bottom of the north shaft, the ore in which prospects well. Messrs. KEATING and BLACKER have made two runs of two weeks each on the iron pyrites from the Keating mine. The result shows that blanket sluices outside of the mill save more gold from this quality of ore than do the batteries and plates. One mine saved $156 of rusty gold by washing blankets fifty yards from the mill. This gold had run over the regular sluices attached to the mill on the outside. It is said that KEATING and BLACKER will have upwards of five thousand tons of free ore (not sulphurets) on the dump of the Keating mine, by the middle of March next. This mine is kept developed in advance of the capacity of the mill, and it is estimated that the ore in sight would run the mill six months without opening another level. Steam hoisting-works will be erected on the mine in the spring, and it looks as if, under the present management, the profitable production of gold from this property would last for years to come. The fineness of the gold from the Keating lode is somewhat remarkable, ranging from 890 to 930 thousandths.

The Pearce lode also is owned and worked by KEATING and BLACKER. This vein has been opened with one shaft 96 feet deep, and levels north and south. Its average width is 18 inches. The ore is decomposed, and yielded in the last run $15 per ton.

The Leviathan, also owned by KEATING and BLACKER, is to be worked by an incline of 60 degrees, made out of the old main shaft. This firm owns several other ledges and employs 70 men. It is universally acknowledged to have "a good thing" in its quartz interests in Radersburg district. The Keating and Blacker mill is now in process of renovation, receiving a new cam-shaft, cams and mortars. The cam-shaft is 4½ inches in diameter, and the cams are twice as heavy as the old ones. The mortars weigh 1500 pounds each, and are 6 inches thick at the bottom. This mill will be the finest in the Territory, when finished.

The Hidden Treasure, owned by RICHARDS and DOBSON, is opened with shaft and tunnel. The shaft is 78 feet deep, and the tunnel has been run on the vein into the hill from Ohio Gulch for the distance of 700 feet. From the floor of this tunnel, a winze has been sunk 65 feet and levels run south. The average width of the vein is about 8 inches, and the yield of the quartz, exclusive of specimen rock, is $10 per ton. This company has a five-stamp mill run by an overshot wheel 18 feet in diameter. It is situated a short distance below the mouth of the tunnel, and is only run about three months in the year, by reason of the insufficient supply of ore.

The Nighthawk lode, owned by WEBB & Co., is opened by two shafts and north and south levels. The average width of the vein is 14 inches, and the quartz, which has been hitherto extracted without the use of powder, yielded in the last run $22 per ton.

The Metropolitan lode, owned by J. W. WEBB, has two shafts, 68 feet and 73 feet deep, respectively, with two levels running south from the south shaft. This is a pocket lode, and has furnished from several large and rich pockets, some very fine specimens, and ore yielding an average of $65 per ton.

On the Ironclad lode, C. G. HALLBECK has commenced working the discovery claim, and will soon start his mill on the new process of N. L. TURNER, who claims that he can save 85 per cent. of the assay value from sulphurets. NAVE & BROS. are taking out ore from the Ironclad and intend to send 50 tons to be worked by the Turner process. The same is the case with HALLBECK and ALLEN, on the Allen lode.

Most of the mines in this district are owned and worked for personal profit by permanent residents ; and to this fact is chiefly due the continued productiveness and progress of the district. PIONEER.

Remarkable Discovery of Platinum.

A REMARKABLE occurrence of platinum has been discovered in some Mexican minerals by V. FERNANDEZ, who read a paper upon the subject before the Society of Natural History in the city of Mexico. The minerals, which were found near Jalaca, were pyrite and marcasite very much altered ; hardness variable, but in the best preserved crystals 6 ; color and texture also variable ; some crystals preserved a kernel of unaltered sulphide. The only gangue was composed of a few quartz crystals, with a very little clay and pyroxene. A strong microscope showed, in addition to the iron mineral and gangue, a small quantity of metallic scales, white in color, and also irregular particles of a green mineral with resinous lustre. The metal was determined as platinum, and the green powder as a *natural double chloride of platinum and ammonium!* Experiments by one gentleman gave astounding results : 13-18 per cent. of the metal, but Signor FERNANDEZ obtained by cupellation, buttons, dull grayish, and brittle, which weighed 0.058 grammes, or 0.0328 per cent. of the mineral. These buttons, on treatment with nitric acid, gave a solution containing lead and iron, but retained 53 milligrammes weight. Treated with a mixture of nitric and chlorhydric acids the buttons gave a minute residue of heavy black powder, and a solution which proved to be platinum chloride. Further trials proved that the green powder above referred to contained one-half of all the platinum present, though it did not form more than one per cent. of the mineral by weight. This green powder was found by Senor FERNANDEZ to be of a composition identical with that of the artificial ammonio-chloride of platinum. At last accounts some Mexican gentlemen were estimating the prospects of success in exploring the deposits, an enterprise concerning which we are unable to speak, as the accounts give no description of the geological or other relations of the mineral. Those who were most conversant with the subject seemed to doubt the existence of this remarkable mineral in quantities sufficient to serve as an ore of platinum.

Accidents in the Mines of the Wyoming Valley, Pa., 1873.

THOMAS M. WILLIAMS, Esq., Inspector of the Wilkesbarre District, and PATRICK BLEWITT, Esq., Inspector of the Scranton District, report the accidents in the mines of their respective districts for the year 1873, as follows :

	WILKES-BARRE.		SCRANTON.	
	Killed.	Injured.	Killed.	Injured.
By Explosion of Fire-damp	6	14	3	17
" Falls of Rock	2	7	21	48
" " Coal	9	14	12	27
" Falls down Shafts	3	1	3	..
" Explosion of Blasts	4	12	2	10
" Mine Cars—inside	13	28	2	35
" " " —outside	6	2		
Miscellaneous—under ground	0	10	2	25
" above "	3	3	..	
Burnt with Powder	..	1	..	..
By Mules	..	..	..	12
	46	92	45	174

The quantity of coal mined in each district has not yet been returned.

An Exposed Swindle.

THE Utah *Weekly Tribune*, of January 31, gives the particulars of what may be another attempted swindle in the way of doctoring average assays.

It appears that "Mr. J. B. SCOTT, of Detroit, Michigan, and President of the Oxford and Geneva Mining Company, of Little Cottonwood, attempted to bribe the foreman of the Pioneer Sampling Works in Salt Lake City, to so prepare samples of a lot of 100 tons of ore as to give 100 ounces of silver and forty-five per cent. lead, giving as a reason to the foreman that he had arranged to sell stock in Detroit provided this 100 ton lot of ore could be made to appear of high grade ; the consideration for the perpetration of the fraud was to be $300. Mr. WALLACE, the foreman, it appears referred the matter to Mr. MACKINTOSH, the pro-

prietor of the works, who immediately consulted with Mr. SMITH, Mr. LOUNSBURY, and other gentlemen" who agreed to the public exposure which has already been made in the daily papers.

On the other hand, Mr. SCOTT furnishes to the same paper a counter-statement, claiming that his action was taken to expose the dishonesty of Utah samplers in general and of Mr. WALLACE in particular. The honest indignation of both parties to this little game has a ludicrous appearance; and Mr. SCOTT, at least, has found that "setting traps" is an operation full of peril for the fingers.

Lake Superior Iron Ore Items.

THE number of blast furnaces in the Shenango Valley increased last year from 11 to 33. Many of these are now out of blast, and some have still on hand a stock of iron sufficient to supply the demand for several months yet.

THE price of No. 1 Specular ore from Lake Superior, for 1873, was $12@$12.50 per gross ton, delivered free on board at Cleveland; this was an advance of from $4 to $5 on the prices of former years. The price for 1874 has not yet been fixed, but it is expected that it will not exceed $10, and may possibly be less. This ore yields from 65 per cent. to 70 per cent. in the furnace; the poorer ore yields 40 per cent. to 45 per cent.

THE production of Lake Superior ore, during 1873, is estimated to have been some 1,200,000 tons. Except some greater improvement occurs in the iron trade than is now expected, the production will probably not exceed 1,000,000 tons this year.

THE outlook for the iron business in the west, for the present year, is considered rather discouraging by many of our prominent furnace men. While all conceed that the brilliant future of our iron industry is assured, yet most persons look upon the present year with many misgivings, the fact being that the iron business has been overdone under the stimulus of the high prices during the past two years; but when it is said that our furnaces have not made 2 per cent. on their capital during the past year, it sounds too much like the cry we have heard many times already, just previous to an application to Congress for higher protective duties.

Engineering and Mechanical Notes.

THE annual meeting of the Association of Rail Mill Owners took place at Columbus, Ohio, January 4th, with DAVID MATHIAS, of the Superior Mills, Pittsburgh, in the chair. The mills of Pittsburgh, Wheatland, Youngstown, Cleveland, Newark, Columbus, Cincinnati, Indianapolis, Chicago, Springfield, Illinois, and St. Louis were represented. A long discussion was had about the wages to be paid employees during the present year, in which all present took part. The association is divided into two sections—those mills lying east of Columbus forming one, and those west the other, the employees of the latter receiving higher wages than the former. After canvassing the subject at length, a schedule of prices was arranged to be paid to each class of skilled laborers in each section, the reduction averaging about fifteen per cent. from the prices of last year. The meeting adjourned to come together Tuesday, January 20th, at Cleveland, when representatives of labor unions connected with the mills, and all skilled labor employed in them, were invited to be present and take part in determining finally the amount of wages to be paid each class of hands. The mill owners represent that they will be able to continue work if concessions are made by the employees, and what they want is to have the whole arranged satisfactorily to all parties.

THE Omaha Smelting and Refining Co., of Omaha, Neb., shipped for the year 1873, $1,100,000 (coin value) of gold and silver, and 4,760 tons of refined pig lead, valued at about $600,000. Total, $1,700,000.

MINING SUMMARY.

Utah.

DRY CANYON MINES.

Correspondence of the *Utah Mining Gazette* of Jan. 29.

MAHOGANY HILL.—This hill is situated on the north side of Dry Canyon, opposite its mouth. The canyon extends from north-east to south-west, and the mountains run parallel with it. The mountains are quite steep, and on each side of the canyon are series of cliffs of rocks out-cropping in such a way as to show that they once were joined together on a horizontal plane, and by their upheaval have been thrown into the position they now have. These cliffs of rocks on the north side of Dry Canyon face to the south and run the whole length of the hill, from the mouth of the canyon, nearly up to the Mono Mine. The veins of ore follow the course of the hill and these cliffs, and run the same course, but generally lie on top of, or between, the great strata. These cliffs are the country rock of the district and are limestone proper. Very little quartz is found on the hill, and no rock of any other kind. All the mines are in quartz as a gangue, and this sometimes forms a stratum coming to the surface above the veins. I make these remarks a prelude to what I shall say about the mines on the hill and the prospects there. The first discovery on the hill was the Mineral Point Lode, it being about 500 feet east of the Summit Peak, and from this mine the hill at first took its name, and was called Mineral Point Hill, until last year. The next discovery was the Dusenbury, near by the Mineral Point Lode. Next, the Swansea Lode, early in 1870. A number of other mines were discovered the same year, and in 1871 were discovered the Nabob, Rip Van Winkle and other mines in the foot hills. Nothing was ever accomplished by all these discoveries, except the expenditure of considerable money in working them. During the year 1873 a new era dawned upon this hill, by the opening up of such mines as the Florilla, Queen of the Hill, I. X. L., Mount Savage, Homestead and others, high up on the hill. The facts established by the discovery and working of these mines are, that the veins of ore run from the south-west to north-east extending from the Nabob and Rip Van Winkle mines, in the foot hills, to the Mono, Kearsarge and the mines on Snow Storm and Shoo Fly Hills. It is true, there is a break in this, but it is only a small one, and occurs where the mines pass from Mahogany to Snow Storm Hill, by dropping down a little to the south. Second. That the mines on this hill are all of a good grade of ore, some of them quite high; as for instance, in the Mount Savage, Homestead and I. X. L., samples of ore have assayed up to $1,000. The Nabob and Rip Van Winkle have also furnished rich samples. The I. X. L., Occident, Florilla and Queen of the Hill, carry considerable lead, while the foot hill mines are nearly free from it. Third. The regularity of these veins in their course, following in direct line, one after the other, a distance of nearly two miles. Fourth. The similarity of the ores, along the whole line. The Kearsarge, Mono, Emporia, Utah Queen, Mineral Point, Plymouth Rock, Mount Savage, Florilla, I. X. L., Homestead, Swensea, Nabob, and generally all others, producing a like class and character of ore, differing only in value and percentage of lead. The Rip Van Winkle and Pizarro, alone, producing a fine millling ore. The I. X. L. and Mount Savage bear striking resemblance to the Sunny-side and other mines on Lion Hill, in their surroundings and development; the Homestead to the Mountain Tiger mine in all respects, and gives every assurance of opening up into a large body of ore of the same character as the Tiger. The assays of samples in all these mines run high, and the average is good. The ore on all this hill is what might properly be called an oxide, but generally classed by the miners as a chloride. No doubt there are chlorides mixed with the ore, as also black sulphurets of silver. There are also galena and carbonates, as well as arseniate and embolite; and to make a long story shorts, 'it is good truck.' There is no place that I know of, that now, or will as soon as the snow is off, afford so good chances for prospecting, as this hill, nor that offers such good opportunities to mining operators to work mines on the shares. I am of opinion that next year this hill will be the scene of much excitement over new strikes and valuable mines. The Mono and Kearsarge are not the only great mines on the north side of Dry Canyon; other mines will be uncovered during the present year, and many a now despondent man will be made happy and jubilant, he and his friends, by discoveries and strikes on Mahogany Hill.

NORTH STAR DISTRICT.

(From the same paper.)

BEAVER CITY, January 15, 1874.

This District lies some thirty or forty miles west of Beaver City and the mines are located in low hills and mountain ranges that rise out of the Beaver plain and not far from the sink of the Beaver River in the desert. These hills have been caused by the action of volcanic forces and subsequently changed by the action of water. This is evident from the geological character of the surface rock to be observed on every side. The mines so far examined (to be hereafter referred to separately) occur in a close and compact limestone remarkably destitute of fossils. The thickness of this limestone could not be ascertained either by any devolopment yet made in the mines nor could I ascertain the same from any wash either of the foot-hills or mountains. It is claimed for the district that some of the mines occur in granite, porphyry and shale as well as lime. The examination made by your correspondent was too hasty and superficial to say if this be so or not. The district is about three years old and, like all the valuable mineral deposits of Southern Utah, has so far attracted only to a small extent the attention of capitalists, while the poor but determined miner has, in many cases under adverse circumstances, persevered. The ores observed are carbonates and sulphurets, the latter prevailing. The richness of each class will be given in the descriptions of the mines.

IMPROVEMENTS.—The discovery of rich argentiferous and carbonate ores led to the laying out of what is called Shenandoah City, generally called Star. The camp has now some three hundred miners and business men and the village is the headquarters for supplies and the business generally of this camp and those surrounding Star. It is strictly a mining town, that is, made up of as noble, intelligent and hospitable a body of miners as can be found on this coast and, judging from appearances, the panic seems not to have reached this place. The location of the village is pleasant and commanding and contiguous to the most important mines. The only drawback is the scarcity of water; this necessary article is hauled about four miles and sold at about two cents per gallon.

The North Star Mill is situated on the Beaver River about seven miles from this village, and is one of the finest and most complete I have seen either in Nevada or Utah and is of sufficient capacity for the present. I will not occupy your space with a full and particular description of the mill, suffice is to state that it has been tested with satisfactory results to the owners and the public and will continue to give satisfaction as long as it is under the management of the gentlemen now in charge.

Nevada.

A REMARKABLY RICH DEPOSIT.—The Dayton Mining Company, whose mine is situated a short distance below Silver City, have opened upon a remarkably rich deposit of gold-bearing matter. The deposit in question, where cut on the 225-foot level, is fifteen feet in width, and has been followed northward a distance of from eighty to one hundred feet, where it becomes quite narrow. At the 100-foot level the deposit is about six feet in width. At the depth of three hundred and twenty-five feet a drift will soon cut the vein, it being now within from twenty-five to fifty feet of where the deposit should be found in case it extends to that depth. Car samples taken from the deposit on the 225-foot level assay at the rate of $600 per ton, nearly all gold. The deposit is composed of a black, decomposed matter which is perfectly "lousy" with free gold, much of it almost as fine as flour. Being fearful of losing much of this fine gold, if the ore be worked by common mill process, the company are now engaged in sacking it, and in a day or two will send a lot of fifty tons of it to the Auburn mill at Reno, the foreman of which guarantees that he will save all the precious metal contained in the ore. As an evidence of the astounding richness of the peculiar vein of matter developed we may state that we were yesterday shown a button of gold weighing half an ounce which was washed by pan from three pounds of the ore by SAMUEL DOAKE, of this place, and then there was so much gold left in the dirt he intends giving it a second panning. The gold was melted into the form of a button by CONRAD WEIGAND, who pronounces the gold worth $12 per ounce. Mr. DOAKE says that in digging out this sample he did not take it from one spot in the vein and had no idea he was getting dirt so immensely rich. The yield he obtained is at the rate of $4,000 per ton, a yield so great that it is next to impossible that there should be any very large amount of such ore in the mine. The Dayton folks appear to have struck a huge pocket and will no doubt take rich large amount of gold.—*Virginia Enterprise.*

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

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

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

III. The first volume of the Transactions of the Institute, containing proceedings, papers, rules, list of members, etc., is now ready, and has been sent to every member. Extra copies can be obtained of the Secretary, for $5 00 each. A few copies have been reserved by the Council for purposes of exchanges, etc., with libraries, scientific societies, or technical journals. The lists for these objects are now in course of preparation. Professor THOMAS EGLESTON, of the School of Mines, Columbia College, New York City, has charge of the list of foreign periodicals and professional societies, to which copies of the Transactions should be sent; Professor F. PRIME, Jr., Lafayette College, Easton, Pa., has the list of technical and public libraries in this country, and Mr. RAYMOND that of American periodicals and professional societies. Each of these gentlemen desires suggestions from members of the Institute; and from the names suggested the final lists will be made up, governing the distribution of free copies of the Transactions.

IV. 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.

V. According to the Fourth Rule of the Institute, the Vice Presidents and Managers have classified themselves by lot, with the following result:

Vice Presidents: Messrs. ROTHWELL, PECHIN and BLANDY retire May 1874; Messrs. COXE, EGLESTON and BLAKE retire May 1875.

Managers: Messrs. PETTEE, PRIME and FIRMSTONE retire May 1874; Messrs. MAYNARD, SYMONS and LESLEY retire May 1875; Messrs. CORYELL, HEWITT and HUNT retire May 1876.

VI. The next meeting of the Institute will be held in New York City, beginning on Tuesday evening, February 24th. Further announcements of the arrangements will be made hereafter.

THOMAS M. DROWN, Secretary, 1123 Girard street, Philadelphia. Pa.

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