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THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

CONTENTS.

WE call attention to the sale of the United States General Smelting and Mining Company's Works, at Spanish Bar, Clear Creek County, Col., advertised in another column. These Works are very favorably located, and are of an unusually substantial character. The chief difficulty under which they have heretofore labored, has been insufficient capital ; with that remedied, this property will doubtless yield large profits under judicious management. It is an investment well worthy the attention of capitalists.

THE Forty-fourth Exhibition of the American Institute, advertised in another column, will open in this city, September 9th. Machinery will be received after August 15th.

This Exhibition affords great advantages to Manufacturers, to make known their products ; in no other way can they bring them so well before a large and important class of purchasers. We shall be pleased to receive particulars of machinery intended for exhibition, and purpose devoting special attention to the description of whatever is worthy of note, and especially, where the exhibitors furnish us the necessary information in advance.

Boys vs. Jigs.

WE copied last week from the *Schuylkill Republican* a paragraph noting that the introduction of jigging-machines for separating slate from coal is depriving the little breaker-boys of their occupation. Our cotemporary says that over a hundred slate-pickers in Shenandoah alone found no work when the late resumption occurred, their places being filled by the new machines. No doubt this step of progress, like every other, causes some temporary distress to the working classes ; but we cannot consider these boys or their parents really injured. On the contrary, it would be far better for them and for the country to take them from their premature work, and send them to school. What the miners of the Anthracite region require most is education, and the rational ambition which springs from it. Putting children to daily labor, whether in mines, breakers or factories, is perpetuating ignorance, and planting trouble for the next generation. *

The Comstock Lode.

THE admirable account of operations upon the Comstock Lode, from the forthcoming report of the Commissioner of Mining Statistics (for which he acknowledges himself indebted to the intelligent and trustworthy observations of Mr. C. A. LUCKHARDT, of San Francisco) will doubtless attract considerable attention, though not more than it deserves. The instalment contained in our last number comprises a horizontal sketch of the ground between the Ophir and the Best and Belcher mines, as developed on a line about 1,500 feet below the surface. It is here that the nature and extent of the "big bonanza" may be best studied; though even on this level, its boundaries have been but imperfectly determined. It will be seen that Mr. LUCKHARDT inclines to believe that three distinct bodies have been combined by the popular theory into one ; and this view he supports with much acuteness and discrimination, though he frankly confesses that an argument based upon data so incomplete may be overthrown by the rapid progress of underground work.

But it is not our present purpose to discuss theories about the bonanza, or the future of the industry which has received from it so great an impetus. We wish merely to recall, for the benefit of such of our readers as are not acquainted with the subject, some of the peculiar conditions (often mentioned already) which surround this remarkable mining field.

Few persons who are not personally familiar with the workings of the Comstock mines, can appreciate the extraordinary difficulties attending the thorough exploration of this vein. In ordinary vein-mining, where the lode is comprised between walls a few feet apart, it is sufficient to sink a shaft and to run drifts at suitable intervals in depth. Each drift conclusively proves the character of the vein-material at the level upon which it is run ; and it is but rarely that outlying bodies in either wall are passed without discovery—particularly if the walls are watched with proper faithfulness and skill. But in a vein which ranges in width from 50 feet to 1,000 feet—for it is said that the Comstock, in early days and near the surface, showed at one point at least the latter extraordinary extent—each level must be cut up with drifts and cross-cuts indefinitely; and not until the whole area has been thus sub-divided can explorations be regarded as complete. Moreover, fissure vins have commonly some kind of ore-bearing zone or "pay-streak," parallel with the walls ; but the Comstock has presented a series of practically isolated bodies of ore, floating, as it were, in a medium of barren vein-material, of the volume of which they occupy not more than the fiftieth part. Add to these difficulties the trouble and cost of securing ventilation and drainage at great depths; and some notion may be gained of the extraordinary expense of exploration in this vein.

These considerations, together with the manner in which the Comstock has been subdivided into numerous claims, each requiring its separate administration and means of exploration, furnish at once the explanation and the excuse for two evils which have attended the history of its development. Much dead work has been done which was unnecessary, and much which was needed has been left undone. Ore-bodies have been discovered in ground already passed by after insufficient exploration; and it is not impossible that this experience may be again repeated—though, of course, the chances of it decrease from year to year; and there are now but a few spaces left in the levels above 1,000 feet, where further investigations in barren rock could be reasonably advised.

When ore-bodies have been discovered, their dimensions and position are such as to require an enormously expensive system of timbering in the stopes. One of the most interesting passages in Mr. LUCKHARDT's report briefly describes the system made necessary by the great diameter of the "big bonanza." It is still more expensive than the usual Comstock method (described and figured in HAGUE's volume of CLARENCE KING's reports); but it has the advantage of greater strength, nearly one-fourth of the ground being filled in solidly with waste rock; and a very important additional merit (to which Mr. LUCKHARDT does not allude, but which seems to us worthy of emphatic mention), is the increased protection which it offers against fire. The immense open spaces, cribbed with timber, through which the flames, once started, could rage for hundreds of feet with unchecked and frightfully increasing intensity, will no longer exist. Every fourth set of timbers furnishes a barrier at which the progress of destruction may be delayed or stopped.

The consolidation of a number of small claims into one large one, which has been effected in a number of instances on the Comstock, has proved highly beneficial, and might be carried still further with advantage. An ore deposit so peculiarly constituted, involving such alternations from "bonanza" to barrenness, needs especially to be wrought by strong companies controlling large sections of ground. We are glad to note the progress of this tendency.

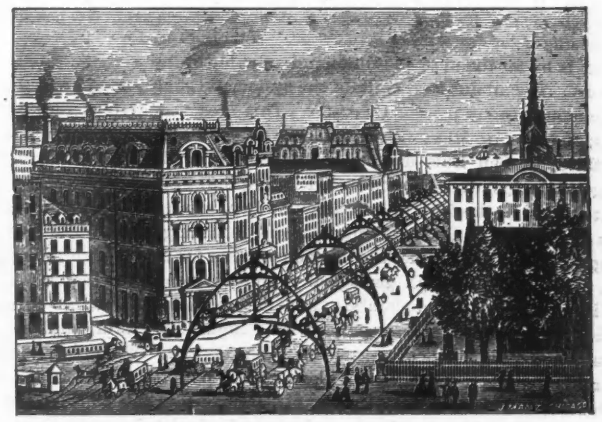
One result of some of the recent discoveries will, perhaps, be the revival of the ancient and (to anybody but the lawyers) unprofitable discussion concerning the mythical east wall of the vein. It would be sad to see the bitter controversy over the "one-ledge" and the "two-ledge" and the "many-ledge" theories revived again ; and we trust it will be in some way averted. Comstock mining is burdened with difficulties enough to be spared the extra load of a fierce and costly litigation. *

Morgan's Gothic Arch Elevated Railway.

THE rapid transit question is at present attracting universal attention, and all good citizens look with confidence to the Committee now examining plans for a prompt solution of the problem.

It is generally conceded that some form of elevated road offers the only prospect of financial success, but of elevated roads there are several designs, each of which has its advocates, and each, undoubtedly, presents some point of advantage over the others. Without desiring in any way to prejudge the case, it seems to us that a road directly over the middle of the street and supported from columns on the curb, offers special advantages in keeping the entire carriageway clear, and incommoding in the smallest degree the inhabitants on each side of the street.

It would seem almost inadmissible to have the carriageway obstructed by



one or two rows of posts, as is proposed by some of the plans; hence most persons desire to see the adoption of some design which spans the street without obstructing it, and which affords at the same time the utmost light and beauty.

An elevated road is in no sense "a thing of beauty," though it may be "a joy for ever," but we might almost make an exception of MORGAN's Gothic Arch Road, some idea of which may be gained from the accompanying cut. Though

certainly not the most economical distribution of the material in an engineering point of view, this is by far the most ornamental plan we have examined, and it offers many of the advantages sought for in such a road. Those plans which propose to use trussed girders running straight across the street or running in a zig-zag from one side to the other are doubtless cheaper forms, and include many substantial advantages; but while we repeat, we have no desire to prejudge the case, we hope the æsthetic conditions will not be altogether overlooked by the Committee now sitting in making its selection.

NEW PUBLICATIONS.

PROGRESS-REPORT *upon Geographical and Geological Explorations West of the One Hundredth Meridian, in 1872, under the Direction of* BRIG. GEN. A. A. HUMPHREYS, *Chief of Engineers, United States Army, by* FIRST LIEUT. GEORGE M. WHEELER, *Corps of Engineers,* in charge.

REPORT UPON ORNITHOLOGICAL SPECIMENS, *Collected in the Years* 1871, 1872 *and* 1873, *by* H. C. YARROW, *Surgeon and Naturalist to the Expedition of* LIEUTENANT WHEELER.

CATALOGUE OF PLANTS. *Collected in the Years* 1871, 1872 *and* 1873, *with Descriptions of New Species, by* SERENUS WATSON *and* Dr. J. T. ROTHROCK.

TOPOGRAPHICAL ATLAS *of Geographical and Geological Survey West of the* 100*th Meridian, under* LIEUT. GEORGE M. WHEELER.

THESE are but a part of the literature of exploration in the West which has accumulated on our table, awaiting, through months past, the leisure day which we had vowed to devote to a careful examination and criticism. That happy period has not arrived; nay, more, it is with infinite pertinacity not arriving; and we are forced, as the season for active occupation again returns, to give up, for the present, the plan of discussing at length the excellent work which has been done by Lieut. WHEELER and his parties. The publications he has issued are marked by the good taste in mechanical execution, the accuracy of detail, which characterize everything that emanates from the Corps of Engineers. Lieutenant WHEELER's parties are now again in the field, carrying forward the systematic plan of explorations which will ere long result in a thorough map and large amount of valuable scientific knowledge concerning extensive territories in the interior of the Continent, hitherto but little known. *

REPORT UPON THE RECONNAISSANCE OF NORTH-WESTERN WYOMING, *Including Yellowstone National Park, made in the Summer of* 1873, *by* WILLIAM A. JONES, *Captain of Engineers, U. S. A. With Appendix.* Washington, 1875.

THIS is a report of a reconnaisance made by Captain W. A. JONES, Corps of Engineers, U. S. Army, in the year 1873, for a wagon road from the Union Pacific Railroad, Wyoming Territory, to the Yellowstone National Park and Fort Ellis in Montana Territory. It contains, besides Captain JONES' descriptive journal and general report, an astronomical report by Lieut. BLUNT, and a geological report by Prof. THEODORE B. COMSTOCK, chiefly valuable for its discussion of what the Professor calls *thermodynamics*, meaning hot springs and geysers, their causes and phenomena. There is also an interesting archæological chapter on the manners and customs of the eastern Shoshones, and another containing philological notes on the Shoshone dialects, together with some minor chemical, botanical, and entomological notes. There are more than 40 maps, giving very thorough information as to the topography of the country lying between the Union Pacific Railroad and the Yellowstone Park. The route surveyed by Captain JONES passes through the Sweetwater range, and follows up the Wind River Valley to its head, and then, crossing the continental divide, enters the drainage basin of the Yellowstone Lake. The section of country traversed is interesting as containing the head waters of the Colorado system, the Columbia system, the Missouri system, and the Rio Grande system, draining respectively into the Gulf of California, the North Pacific Ocean, and the Gulf of Mexico. *

ANNUAL REPORT *of the United States Geological and Geographical Survey of the Territories, Embracing Colorado. Being a Report of Progress of the Exploration for the year* 1873. *By* F. V. HAYDEN, *United States Geologist. Conducted under the Authority of the Secretary of the Interior.* Washington, 1874.

THIS is by far the most thorough and valuable of the progress reports of Dr HAYDEN. It contains the results of the systematic survey of the eastern portion of the mountainous par. of Colorado. This area was divided into three districts; the first, or Middle Park division; the second, or South Park division; the third, or San Luis division. Mr. ARCHIBALD R. MARVINE, geologist in charge of the first division, conducted during the season a survey of about 5,600 square miles, in the form of a rectangular belt, extending westward across the main chains of the Rocky Mountains, and including the Middle Park. The topographical part includes a collection of data for a complete topographical map, as well as a thorough geological reconnaissance of the region. A detail-map is in progress of preparation; and meanwhile Mr. MARVINE furnishes a provisional geological map, together with a highly interesting and intelligent discussion of the geological phenomena of the district. We notice, also, in his admirable report, a discussion of the calorific powers of western lignites, in which reference is made to a paper by Mr. RAYMOND on this subject. Mr. MARVINE adds to the table of ultimate analyses and calculated powers given by Mr. RAYMOND, some suggestive criticisms, the justice of which we are inclined to acknowledge. As to general results and comparisons, the two writers are substantially in agreement.

The second district, comprising the South Park, is reported on by Dr. A. C. PEALE, geologist of this division, while Dr. F. M. ENDLICH, geologist of the San Luis division, furnishes not only a report upon the formation of that district, but also a preliminary report upon the mining districts of Colorado generally, with numerous sketches of vein-sections and a discussion of vein formations. Mr. ENDLICH's summary of the subject is, on the whole, sensible and clear, though we are tempted to indulge in some minor criticism of his tendency to the use of hard words; as, for instance, where he speaks of surface deposits as "superstratoid" deposits, or where he defines an ore vein as a "tabuloid" body. There is also an occasional remark, reminding one of HOLMES's Katy-did, who said "an undisputed thing in such a solemn way." The declaration that "in searching for lodes it is undoubtedly best to simply follow the teachings of sound judgment combined with empirical and other knowledge" is a case in point. If that is not true, then there is no answer to PILATE's conundrum! A more serious trouble with Mr. ENDLICH's essay is the not unfrequent appearance of unintelligible sentences; but we suspect that this is due to the misreading of interlineations, etc., by the printer, since there is abundant evidence that Mr. ENDLICH has a very good understanding of the subject, and can express himself clearly. These blemishes apart, he has furnished a very useful treatise. The volume contains also a series of important special reports on Paleontology, by LESQUEREUX; on Zoology, by Lieut. CARPENTER, Prof. PACKARD, Prof. VERRILL, and others; and on Geography and Topography, by Mr. JAMES T. GARDNER, the geographer of the expedition, who formerly occupied the same position under CLARENCE KING.

S. B. LADD, M. E., topographer of the Middle Park expedition, furnishes also a brief report, and HENRY GANNETT, M. E., a general geographical report, discussing the principal means of communication, wagon roads and trails, etc. The volume contains, including index, 718 pages, and is profusely illustrated. Dr. HAYDEN's own report occupies about 80 pages, and contains some stunning pictures of scenery and heavy geological generalizations. The perusal of a good deal of Dr. HAYDEN's writing has impressed us with the conviction that his *forte* is in field work, where he certainly manifests an untiring activity and a considerable degree of organizing and directing power. We are not disposed to undervalue his contributions to scientific literature; but certainly it would be better for his reputation as an author, if he could submit his manuscript, before publication, to some judicious friend, or else restrain himself from comments upon subjects outside of those to which he nas given special study, and with which he may reasonably consider himself well acquainted. Mining is certainly something which Dr. HAYDEN does not understand; and he rarely dips into it without saying something absurd. Thus, we have in the description of Mt. Lincoln and Mt. Bross, in Middle Park (p. 40), the following declaration: "Silver ore occurs to a considerable extent in pockets, some of which is very rich, yielding $500 to the ton. *Much of it is a decomposed carbonate, like the gulch ores.*" The italics are ours, but scarcely needed.

But we will not carp at the small imperfections of a volume so crammed with valuable information. Dr. HAYDEN's feud with the War Department, or rather the rivalry between him and the army engineers, represented by WHEELER, which breaks out every year before the Appropriation Committee, has hitherto resulted in voting money to both parties, and carrying on in different fields the work of both. Upon the merits of the argument for the employment of civilians rather than military officers, or *vice versa*, to conduct such explorations, we shall not enter at this time. As a purely theoretical question much can be said on both sides. The practical results have shown that the character of the work should go far to decide it; and after examining the maps and other publications of WHEELER and HAYDEN, particularly this last volume of the latter, we are inclined to believe that whoever wins, the country is well served. *

The Walking Locomotive.

AT a recent *séance* of the French Academy of Sciences some interesting particulars about the new invention of M. FORTIN-HERMANN were given, of which we make a *résumé*.

This locomotive is constructed on an entirely new principle, it is claimed, and does not resemble in any particular the ordinary machines in actual use. Its propulsion is produced by the rising and falling of six articulated feet, which strike the ground or rails something like the feet of a quadruped. These feet are arranged in two groups: three support the fore part of the machine, and the other three the after part. The two middle feet are connected together by a horizontal shaft; the four others are independent, and strike the ground successively in such a manner that while the middle feet move at a moderate pace the others have a highly accelerated motion (*battent le trot.*) Each of these groups of three feet are affixed to a single trunk. The force of the steam is applied in such a way as to drive these feet toward the ground.

The experiments made by the Eastern Railway Company at Paris with one of these machines have demonstrated that when the "feet" are shod with soles of india rubber weighing one kilogramme (2¼ lb.) each square centimeter (4-10th inch) an adherence to the rails or road is obtained equal to three-fourths of the weight of the machine itself. In the ordinary locomotive this adherence does not go beyond one-fifth of the weight of the machine; it may be added, that this adherence is, in point of fact, variable; on wet or damp rails it is not more than one-half; but in the newly invented locomotive of M. HERMANN, although the state of the rails or ground will always have an influence, as in the case of the machines in actual use, it will always be greatly superior. The experiments made thus far prove that this new machine will drag on ordinary roads or on rails a train four times as heavy as the ordinary trains; the cost of this augmented train will not, it is said, vary materially from that of the ordinary machines with the usual trains when used on equal grades, but the increased adhering power of the new locomotive will permit of the employment of a lighter built machine for the usual trains as well as the power to surmount steeper grades than are usual on the railways of the present construction.

This new system of M. FORTIN-HERMANN enlarges very greatly the capacities of all locomotives for ordinary roads, and will allow of passing through ground where roads have not been constructed, and up grades of one foot in ten which are by any of the actual inventions impossible to surmount.—*Ironmonger.*

The Comstock Lode in 1874.

From the forthcoming Report of the United States Commissioner of Mining Statistics.

CONTINUED FROM PAGE 53.

Gould and Curry.—This mine has reached to the 1700-foot level with its shaft, and a winze sunk near the north line, on joint account with Best and Belcher, has penetrated about 100 feet deeper. The waters coming from the North are so abundant, that this 1700-foot level has been only part of the time accessible. Work eastward and northward progresses slowly. The quartz of the 1300-foot level looks very well; but developments of importance are expected chiefly from the 1600 and 1700-foot levels, possibly the 1500. The old workings have yielded no ore this year. In fact, the *bonanza* has occupied all minds, and the principal work of the Gould and Curry has been to pump water for the others. But better things may be looked for.

Savage.—This mine has attained a vertical depth of 2200 feet. The shaft is vertical for 1300 feet, then inclined at 38° East for 160 feet, and was then changed to 45°, continuing to the present bottom. During the past year, the 2000-foot level was opened from the incline, which lies east of the vein. A cross-cut, 100 feet westward, met with the east clay, which is here from 6 to 12 inches thick. The vein was found to be about 100 feet wide here, and composed of quartz and porphyry. Near the center of it a few small ore-seams were found; the whole mass would assay from $1 to $20. The work was carried south on this level and connected with the Hale and Norcross workings. A cross-drift, 25 feet north of the south line, showed the vein 120 feet wide. Quartz predominated here over the porphyry. The ore-seams were also found here, but do not contain sufficient ore to pay for extraction. As the vein was wider south than north, or at the incline, a winze was sunk 100 feet north of the Hale and Norcross line, which penetrates down to the 2200-foot level. It was sunk east of the vein, to avoid the water. A drift south, for 120 feet, has been run from this winze, but all the work is east of the vein.

At the same level, the ground north was explored for 600 feet, with cross-drifts every 100 feet, showing about 100 feet of vein-matter. Towards the North, porphyry predominates over the quartz; towards the South the contrary is the case. The 2200-foot level has been opened, so far, with a cross-cut 175 feet west of the incline; but no east wall has as yet been found. The 1900-foot level has been more thoroughly explored. It shows less quartz than the 2000-foot level. It has a drift to the south line. About 300 feet north from Hale and Norcross, a cross-drift showed the vein to be 402 feet wide from the black dyke to the east wall, but composed mostly of porphyry. The 1900 has been connected with the 2200-foot level, east of the vein, and gives very fair ventilation.

The quartz in the 2000 north and south level, and its improvement towards the South, and the fact that it carries some ore, leads to the belief that the 2200 level, in the southern portion of the mine, may possibly develop a body of ore. From analogy furnished by the history of the Comstock, this certainly is to be expected. The company has under construction a splendid piece of machinery west of the present hoisting works. The engine has two cylinders giving 400 horse-power. The round steel wire-cable is to be used in preference to the flat, and it is claimed that the plant will be adequate to work to the depth of 4000 feet. The old 400, 500, and 1000-foot levels have been overhauled, and passages have been opened for air-connections. The mine produced no ore during the year.

Hale and Norcross has attained a depth of 2200 feet, but nothing new and noteworthy has been developed. The mine is very closely managed. During the year, 17,469 tons of ore were produced, which yielded $295,361.12. The larger part of this ore came from the 11th and 14th levels; but about three-sevenths came from the old 2nd, 3d, and 4th levels, and to all appearances the mine will continue to yield, from the old workings and the tributaries and "left ground" of the ore-body of the 6th and 7th levels, possibly 1200 to 1500 tons of $14 to $17 ore per month for some months to come.

Both east and westward of the described ground, numerous old claims and titles have been hunted up within the last year; surveys have been made for some of them, patents obtained by many, and work has been commenced on more than 40 of them, all represented by an incorporation issuing and dealing in the respective stocks. Probably, in the course of time, much litigation will arise, when these workings penetrate to a sufficient depth (if the companies do not die a natural death) to meet with ore. In the meantime, the old companies which are on the Comstock have been unmolested. Some of them have quartz and porphyry resembling that of the Comstock, and the "clay-wall" theory may one day be again tenaciously contested. That there are metal-bearing veins existing east of the Comstock is an established fact; and that the eastern boundary of the Comstock is a hard thing to determine is equally true. In the conflict of theories, probably nothing will be left for the contestants, but to *connect in ore with one another* or come to compromises.

The companies east of Hale and Norcross have erected large and expensive hoisting-works as, for instance, the Julia, Senator, etc., and have penetrated as deep as 1400 feet, but most of their underground work is done westward from their shafts towards the Comstock. In the Julia some ore-bearing quartz was encountered, but it is claimed to lie in the Chollar Company's ground.

Four miles north-east from the Utah some quartz has been found in a vein 4 to 6 feet wide, which assayed as high as $80 per ton. It does not at all resemble the Comstock quartz, being much more compact, and carrying very little gold. By next year it will be possible to give more information concerning this deposit. Thus far nothing noteworthy has been developed.

II. THE MIDDLE PORTION OF THE VEIN,

including Chollar, Bullion, Exchequer, Alpha, Imperial- Empire, and the small Gold Hill proper, an aggregate of 1800 lineal feet, gives much fairer hopes for ore this year than the past. Under the stimulus of the eastern developments in Virginia Consolidated, etc., on the North and Crownpoint, etc., on the South, the 1200 feet of ground, including Bullion and a portion of the Chollar, which had lain unnoticed and unprospected for a long period, have at length been explored to some extent, and with flattering results.

The Chollar is still at work on its apparently never-to-be-exhausted mass of low grade ore, at and near the surface, and is still producing about 60 tons of $20 mill-ore per day. The fact, that the Hale and Norcross workings showed ore, led to the former prosecution of explorations exclusively north of the Chollar shaft, the ground south and east being thought barren. Within the past year the shaft has been repaired, and the incline opened to 1300 feet in depth, and work was started in earnest on the 1050 and 1150-foot levels, south of the shaft. The vein is apparantly much wider than it proved to the North and above these levels; the labyrinth of clay and argillaceous and porphyritic matter which there filled the vein, ceases on the South and quartz takes the place of these minerals; here and there spots of ore are encountered, and the company now hopes to find ore in paying quantities—a hope which is strengthened by the finding of quartz in the Julia mine, and by the developments in the Bullion described below.

Bullion.—Much credit is due to the owners of this mine who, under adverse circumstances and almost unvarying ill-fortune, have, through many years, not abandoned the explorations for a single day. They have carried on their work, partly through their own shaft (down to the depth of 1400 feet, *i. e.* 800 feet vertical, and then inclined at 45° East, to the 1400 level) and partly through the Imperial-Empire shaft. In the Bullion shaft, at the 800-foot level, they are 150 feet west of the west clay of the Comstock; cross-cutting 400 feet east from the shaft, they passed through porphyries and clayey matter, carrying abundance of sulphate of lime. Drifting was done here for 100 feet in a S. E. direction (east of the west clay, and, therefore, within the vein) and the small quartz-seams near the shaft were found to unite into 15 feet width of solid quartz, resembling much the quartz-body which the Alpha 500-foot level showed, and also that of the Yellow Jacket 1100-foot level, but not to be supposed to belong to either. After 100 feet of drifting further south, near the west clay, the quartz became much wider, lay much flatter than it had done to the North, and assayed from $10 to $15 per ton, having very little porphyry intermixed. To this quartz reference will be again made, since it has been supposed to be identical with the quartz of the 1700-foot level of Imperial in Bullion ground.

The old workings have been overhauled. The quartz-body which came from the Chollar at the 400-foot level is from 50 to 110 feet wide, carries low grade ore ($10 to $12), ending barren at the east wall in the 1200-foot level, 300 feet south of the Chollar line. This body lay 500 feet N. E. from the quartz above, described in the 800-foot level. It really never yielded anything worth extracting below the 800-foot level. In the 500 and 600-foot levels this body still exists, bearing low grade ore; but none has been extracted in that portion, and only lately has work been commenced for its full exploration and exploitation.

The Imperial-Empire having finished exploration in its 1700-foot level, the Bullion Company worked 1050 feet north-eastward from the Imperial shaft in this level. This work lies 700 feet further east, and 430 feet lower than the 1400-foot level of Bullion proper. These 1050 feet from Imperial followed the "black dyke" through the Exchequer ground; and 10 feet north of the Bullion south line a cross-cut east was made, 64 feet in length, before the west clay-wall was struck. These 64 feet traversed a quartzose breccia, often found on the Comstock, lying between the west clay and the black dyke. It assayed here from $10 to $30 per ton. The same material was found 30 feet wide at the 1400-foot level of the old Bullion incline, 700 feet west of, and 430 feet above, this work of the 1700-foot level, where the quartz body east of this material (already referred to as found in the 800-foot level) was followed for 200 feet south and 200 feet north from the bottom of the incline, and found to be from 86 to 125 feet in width, and showed ore in seams and bunches assaying from $10 to $35 per ton—ending (in ore) 200 feet south of the incline, but apparently gathering strength in the northern portion of this 1400-foot level, where its northern terminus has not been exposed. Now, in this 1700-foot level of Imperial, continued into the Bullion ground, the first eastern cross-cut was made, as I have said, 10 feet north from the Bullion south line, cut through this brecciated belt, which in places showed ore-fragments assaying as high as $180. It lies between the "black dyke" and the west clay of the vein, and the cross-cut has not passed as yet into the quartz, east of it, a sufficient distance to permit any conclusion as to what may be expected from it. In the Bullion ground, 90 feet north from this first cross-cut, another cross-cut eastward is now in progress, and has run, so far, 30 feet in quartz east of the breccia. This quartz shows some very fair ore in seams, assaying as high as $45. It is the same as that developed in the 1400-foot and 800-foot levels, just east of the west clay. There is, therefore, a considerable piece of ground (700x430 feet in Bullion

alone) yet unexplored, while above and below the 430 feet of vertical height, ore has been exposed. Moreover, the west wall at the 1400-foot level runs N. 5° E., while at the 1700 it runs N. and S.; the west clay at the 1400-foot level runs nearly N. 6° E., while at the 1700-foot level it runs in Exchequer, N. 10° E., and the east clay, which bounds this quartz body in Imperial-Exchequer, runs N. 6° E., but in a distance of 150 feet northward, changes in Bullion to N. 20° E. If this course continues, it will widen in Bullion the distance (at 200 feet north) between the west and east clays to 125 feet instead of only 35 feet; and if this quartz maintains its character, which it has every appearance, so far, of doing, it will make a very formidable body in going north, and will, very probably, carry a compact ore-mass. I believe there has been no instance in the history of the development of the Comstock where a quartz body, 100 feet wide, did not carry a body of ore. As a rule, the wider the quartz the more extensive the ore-body. The ore from the quartz just described carries ⅔ silver to ⅓ gold, while the deepest body in Chollar carries 3-5 gold to 2-5 silver, and the upper body ⅔ gold to ⅓ silver. This quartz, therefore, cannot be taken for a continuation of either. Judging from analogy, it may be expected that explorations in this ground, from the 1100 to the 1700-foot level, will develop large masses of ore; certainly the indications are in the highest degree favorable.

Imperial.—This mine has attained a depth of 2100 feet, an increase of 200 feet in the past year. The 1850-foot level has been opened this year, and the vein found much wider. The 1700-foot level showed the vein to be narrow, especially in the northern portion of the mine. The 1700-foot level in Exchequer showed the east and west clay coming nearly together; for instance, 80 feet north of the Exchequer south line, the east and west clay came within 15 feet of one another, but the distance increased, 190 feet north of the Imperial north line, to 30 feet. The 1850-foot level was run 75 feet east from the incline, and a drift was pushed south nearly to the Yellow Jacket line. No cross-cuts were made to demonstrate the width of the quartz or of the vein itself; at 100 feet east of the west clay, opposite the incline, the quartz was not very porphyritic. It was followed south 70 feet, where ore of fair quality was encountered (width not known). A winze was sunk here 175 feet at an angle of 42° E., which went through ore in seams for 60 feet below the 1850-foot level. This ore was followed for 125 feet in a S. W. direction. It is $60 mill-ore—higher in grade, though not as heavy a body, as that found in Bullion. These developments, although much more favorable than any made in Imperial for five years past, do not promise permanent profit, unless the 2000-foot level should demonstrate the extension of this ore. The 2000-foot level was run S. 20° E and E., and entered the vein, which here carried quartz and porphyry in width not yet determined. Work here is progressing south as fast as possible, to connect with the winze coming down from the 1850-foot level, in order to ventilate both levels. The stifling air (at 126° F.) makes prospecting very expensive.

TO BE CONTINUED.

English Blast Furnace Practice.

From our Special Correspondent.

BARROW-IN-FURNESS, June 5, 1875.

IT has been a very fortunate circumstance for the pneumatic and open-hearth steel makers of England, that the hematite ores which exist in this and the neighboring districts of West Cumberland were held in such bad repute, until quite recently, by the pig iron manufacturers. The ore was known, and had been mined in a small way, for many years, but so poor a sale for it was there that it was seldom shipped, except as ballast by vessels going to South Wales for coal, where it was disposed of, for what it would bring, to such ironmasters as were courageous enough to use it. In 1840, a blast furnace was built at Cleator Moor, a place about twenty miles north of here, for the purpose of smelting these ores. For many years the furnace was more a source of anxiety to the managers than of profit to the owners.

Chemical analysis in connection with blast furnace management was then almost unknown in this country, and so, for lack of a little information which could easily have been obtained in this way, the purity of these ores proved an obstacle to their being smelted. With but few exceptions, the only ores which had been used were the clay band or black band, which only required a small amount of limestone for their proper fluxing. The ores the Cleator Moor people had to deal with, however, were quite different. Instead of containing lime and alumina in considerable quantity, most of them were composed of about 90 per cent. of sesqui-oxide of iron and 9 per cent. of silica, the remaining portion being made up of other constituents, among which sulphur and phosphorus were hardly to be found.

It took a long while to find out that some alumina was needed to make a fusible slag, and when this difficulty was overcome, there were other troubles from the iron sometimes being red-short and sometimes cold-short. When one looks back now and considers the impure fluxes and fuels which were then used, the reason for these results is quite apparent. When Mr. BESSEMER first erected his plant at Dowlais, and tried to make steel for practical use, it is well known that the experiment was a failure, and not until he had, at his own works in Sheffield, tried numerous kinds of iron, was he at last successful. He there found that when certain varieties of Swedish iron were acted upon by his process there was produced the metal he had long sought for. But the supply of iron from this source was so limited that in order to bring his steel into common use it became necessary for him to find either pig iron of a like character, or the proper materials to make such iron from in considerable quantity.

In the first case he was not successful, for although there was an immense amount of various qualities of iron made in England at that time, they all contained either too much sulphur or phosphorus for his purpose. At last his attention was drawn to the hematite ores of this district, and he found them to be just what was needed to make the proper kind of iron. Sufficiently pure fuel was found in several districts, notably in Durham, which, with an abundance of nearly pure limestone, supplied the material necessary to smelt the ore with. From this time the prosperity of the Cleator Moor furnaces and the West Cumberland and North Lancashire mines takes its date. There was at first some little difficulty in making fusible, yet highly basic, slags, which was soon overcome, however, by the use of local ores containing clay, or of aluminous Irish ores. These manufacturing difficulties once being removed, the demand for Bessemer iron soon caused furnace after furnace to be put up at different points convenient to the ore deposits, so that to-day there are nearly one hundred within a radius of thirty miles from here, which make little except this class of iron. These hematite ores, in masses of various size, are found filling cavities in what is locally known as the "mountain limestone." This is the lowest stratum belonging to the Carboniferous formation, and in some cases coal seams are but a few hundred feet distant from the ore deposits. Some of these masses of ore are of great extent, several mines having breasts of forty to fifty feet in height and from one to three hundred feet long; in one mine, near Millow, it has been found in solid mass to over one hundred feet in depth.

These large bodies of ore are, however, the exception and not the rule, for in many mines it occurs in much smaller quantities. In the latter case it is often necessary, after exhausting one pocket of ore, to drive many yards through limestone before another is met with. In the Whitehaven or Cleator Moor district, a roof rock and floor of quartz, which the miners term "whirlstone," serves as a guide to some extent in searching for the ore. Quite frequently, however, this peculiar stone is not met with. The first mines in the district were worked by open cuts, but now nearly all the ore is obtained by sinking shafts from 150 to 300 feet in depth.

Many of the mines are troubled with water and require large pumping engines to keep them clear. Some which are favored in position drain all their water through the fissured limestone into the pits of their less fortunate neighbors.

There are two general varieties of ore, the hard and the soft. The first kind is known in mineralogy as "kidney ore," the resemblance in form to a beef kidney often being very striking; mixed with this, and binding it together, is massive ore wanting in this characteristic.

Fine specimens of quartz crystals are often to be seen intermingled with the ore, constituting its only practical impurity. To mine this ore the use of powder or other explosives is, of course, necessary.

The soft variety of ore contains frequently a considerable proportion of clay which gives it, when freshly mined, an unctuous feeling and appearance. This kind of ore is found in the same neighborhoods as the hard variety, but not in such abundant quantities. At Ulverstone, in North Lancashire, the reverse, however, is true, nearly all the ore being soft. It works well in the furnace, and much of it is sent from that place to various ironworks in the Kingdom.

The irregular nature of these deposits of ore makes it necessary to search for them in the same way that our oil prospectors make their discoveries—by boring. By putting down holes at various points over the ore-bearing districts the presence or absence of the ore can, of course, be detected.

The result, however, is nearly a negative one, for a large mass of ore may be within six inches of the test-hole, and yet remain undiscovered. All sorts of contrivances for boring the holes are used, from the old-fashioned process of "jumping down" by hand-power to the more scientific diamond drill.

The total area of surface over which these deposits have been found to exist in this Furness district and the neighboring districts of West Cumberland and North Lancashire, is about 40 square miles. Although sometimes occurring in large masses, as has been stated, when the large barren districts are taken into consideration, in connection with the fact that nearly 40,000 tons of ore are raised every week, it would seem that unless new territory is discovered the supply will, in a few years, be exhausted. Some minor deposits of the same kind of ore have been discovered in the Silurian strata, not far from Cockermouth, in West Cumberland, but as yet they do not give promise of amounting to much.

The deposits just described are the only ones in England which are suitable for making Bessemer iron, so the steel makers, with wise forethought, are securing fine mines of pure ore in Spain and Northern Africa, in anticipation of future scarcity at home. Even now large quantities of these foreign ores are used in some parts of England.

The locations chosen for nearly all of the furnaces in this neighborhood are well suited, both for their convenience to the ore and for the shipment of the iron and the disposal of the slag. Commencing at the seaport town of Whitehaven, where there are nine furnaces belonging to two companies, the remainder are scattered along the coast at various towns, particularly at Workington and Barrow, until the last ones are reached at Carnforth, in North Lancashire.

The Cleator Moor furnaces being the first to make Bessemer iron naturally served as a model for those put up by others for the same purpose.

As they had open tops, so all the rest were made with open tops, too, until some constructor more bold than the rest put a closed top on one of his furnaces to see whether it was impossible to make the same kind of iron as without it. Very naturally, he found that he could make as good iron as before, with, at the same time, the advantage of saving considerable fuel. His example has been followed in a number at cases, but there are still some managers who contend that the iron is not so good when made in that way.

Nearly all the furnaces which have been built ten years or over are about 50 feet high, 18 feet in the boshes, and from 6 to 7 in the crucible. They are all built with cupola casings, supported on brick arches. From four to six tuyeres are generally used, the blast having a pressure of from 3 to 4 pounds, and a temperature of 800° to 900° F.

The same cause which started the improvement of furnaces in Scotland, two years ago, had a similar effect here, where the expense of the Durham coke is a very important item.

As a result, new furnaces from 60 to 70 feet in height, with closed tops, and, in a number of cases, with fire-brick hot-blast stoves, have been put up, and the result has been so satisfactory that nearly all the old furnaces are being made like them as fast as they are blown out.

In general construction these new furnaces are built after the best Cleveland models.

TO BE CONTINUED.

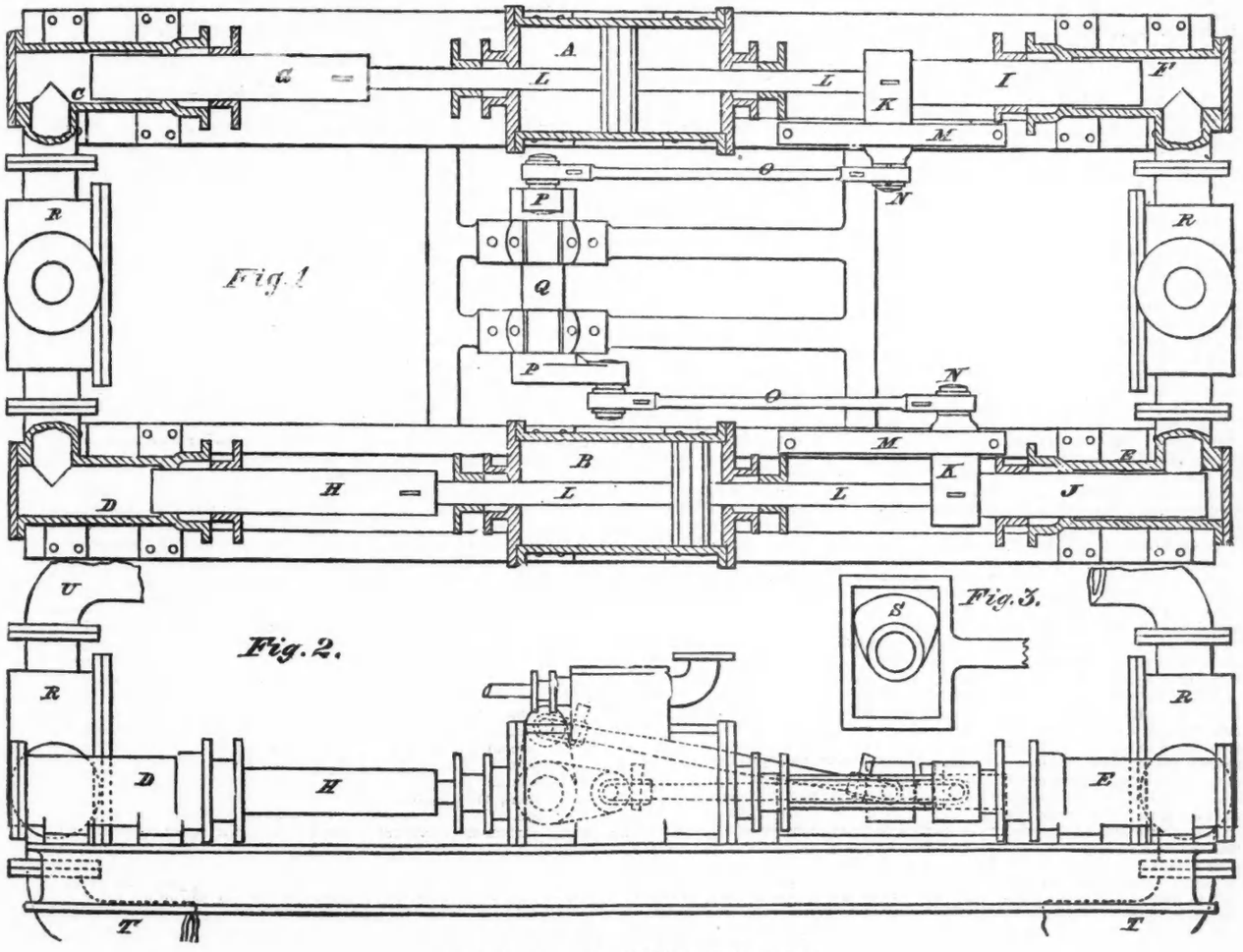
New Railroad into the Lehigh Region.—The Mauch Chunk *Democrat* says: The Central Railroad Company of New Jersey concluded a contract recently with Mr. A. F. BEECH, to build a line of road up Sandy Run from the L. & S. R. R to carry the coal to market from the Buck Mountain, Eckley and Drifton collieries, whose aggregate annual shipments at present are 500,000 tons The road is to be completed by December 1st, and the work to be done by Mr. BEECH will aggregate a large amount. This will be an important feeder to the Central Railroad, the coal at present going via L. V. R. R. The length of the new branch will be about 12 miles, and the grade 85 feet to the mile.

Messrs. Carter & Allen's Machine Shops, at Tamaqua, Pa.

THE progress that has been made in the construction of heavy machinery in the anthracite regions of Pennsylvania has been very satisfactory within the past six or ten years. Our large mines are now provided with direct-acting hoisting engines of the largest class, and direct-acting and Cornish steam pumps have almost everywhere taken the place of the old style of geared pumps and water tubs. Many of the machine shops in Scranton, Wilkes-Barre, Tamaqua, Pottsville, and in other parts of the coal regions, are admirably equipped, and can turn out machinery of the best class. Among the best of these works we may mention those of Messrs. CARTER & ALLEN, in Tamaqua. These have a frontage on the railroad of over 900 feet, and can employ, when working full, 400 men. The shops are provided with a number of 20-ton cranes, so that all handling of heavy iron work is done by machinery.

Among the heavy machinery which we saw in course of construction, during a recent visit, we may mention a large hoisting engine for the Franklin Coal Company, near Wilkes-Barre, Pa. This engine has two steam cylinders. 30 in. diam. x 72 in. stroke, and a cast iron grooved drum, which, complete, weighs 40 tons. The length of its shaft is 15 feet; diameter of drum, 12 feet. Three of BRADFORD'S coal jigs and many other machines were also building, and some large 5-ton iron chasers for DU PONT'S powder mills were then ready to ship.

MR. L. H. ALLEN, the Superintendent of the works, has patented a direct-acting steam pump which is giving great satisfaction in the mines where it has been used; as it presents several features of novelty and is no mere experiment but has stood successfully the test of use in Coles Colliery, Mahanoy, and in other mines, we devote a large space to-day to its illustration.



ALLEN'S DIRECT-ACTING STEAM PUMP.

A B represent two steam-cylinders, arranged in a horizontal or other position, as desired. C D E F are four pump working barrels, arranged at each end of steam-cylinders and in line with cylinders. G H I J are four pump-plungers, connected with steam piston-rods L L L L, thereby imparting a direct motion from steam-piston rods to pump-plungers. K K are two cross-heads, connected to pump-plungers I J and working through guides M M, with wrist-pin N N on end to connect connecting-rods O O, they connecting on opposite ends with cranks P P, the cranks set at right angles and fastened to crank-shaft Q, whereby the steam-cylinders assist each other over the dead-point, and also keep the column of water in constant motion. One pump-plunger being at the end of stroke, the other in the middle of the stroke, the column, consequently, will be kept continually in motion. The advantage of keeping the column of water in constant motion is here obtained in a very convenient and successful manner.

MESSRS. CARTER and ALLEN have a very high reputation for excellence of their work, and, as they are thoroughly familiar with the actual requirements of mine machinery, their engines, pumps, etc., can be counted on without fail to do the work for which they are intended.

Analysis of Rocks.*

BY PROFESSOR T. EGLESTON.

How to interpret the composition of rocks has been a question which has caused a great deal of discussion and investigation among geologists and chemists. It is evident that that analysis will give the clearest results, which will give the relative proportion of the different minerals composing the rock as well as the weight of their different constituents. This, however, is a very difficult matter, and in those rocks which seem to the naked eye entirely compact, like obsidian and other rocks of that class, appears to be impossible.

CORDIER, in the early part of the century, invented a process which is known as the "mechanical analysis of rocks," which is really a method of mechanical preparation, and consists in crushing the rock to a certain fineness, and then, by virtue of their density, washing out the different minerals, so as to make a mineralogical analysis, separating completely the different constituents of the rocks. In the hands of so skillful a man, this was a comparatively easy matter. CORDIER found no difficulty in ascertaining the mineralogical composition of a rock. The ultimate chemical composition was ascertained from the sum of the elements contained in the different minerals. In the light of to-day, it is very easy to see that the complete chemical analysis of the rock does not necessarily lead to the explanation of its character. It has been so difficult, however, to have any other kind of analysis made that most chemical examinations have been made as ultimate, and not as mineralogical analyses. The panning out of the different minerals composing the rock, which are often very nearly of the same specific gravity, is so difficult that a person of ordinary mechanical skill is scarcely able to do it; consequently the mechanical analysis which CORDIER proposed, and was able himself so skillfully to effect, has never been practised to any extent. A school was formed in France consisting of a very small number of CORDIER'S followers, which, in face of the difficulty of acquiring the method, very soon died out as a school, though some of his most skillful followers are still living. The next important step in ascertaining their composition was to cut the rock into transparent sections and examine the mineral with the microscope, which gave results more or less certain.†

* A Paper read before the St. Louis meeting of the American Institute of Mining Engineers, May, 1874.

† Some observer has proposed to make a drawing of the enlarged section on a thin sheet of paper, and then to cut the outlines of the different minerals apart and weigh them, and thus ascertain the relative proportion of the different minerals. It is said that quite accurate results are obtained in this way. The adaptation of polarized light to the study of these thin sections was almost of necessity the next step in order, and was for a very long time supposed to be almost the *ultima thule* of lithological investigation. Notwithstanding, however, the great hopes which were entertained, and the thousands of sections which have been cut and investigated, less has been derived from their investigations than was at first hoped. The lithologists are still looking for some method of investigation which shall be as certain and less difficult of accomplishment. The installation which is required for cutting and grinding

In 1873, while studying micro-lithology, I had the good fortune to make the acquaintance of Mr. FOUQUÉ, of the College of France, who had been studying for some years the volcanic rocks of Santorin, and who, finding all the known methods for examining these rocks unsatisfactory, had invented one of his own, which is within the reach of every chemist or lithologist, and with a few additions taken from other methods, is of general application. After making a careful microscopic analysis of the rocks of that country and ascertaining that although nearly compact, they were composed of a large number of minerals,* and that these microscopic minerals, like most of those which are larger, are rarely ever pure, but are filled with inclusions, both solid, liquid and gaseous, Mr. FOUQUÉ invented a process which is partly mechanical and partly chemical. It consists, (1) In reducing the rock to powder and separating, by means of graduated sieves, the coarse parts from the fine powder. (2) In order then to separate those parts which contain iron from those which do not, the powder is submitted to the action of an electro-magnet, worked by eight or nine ordinary Bunsen cells. The mineralogical elements of the rock are thus divided into two parts: those which contain iron, even in very small proportions, whether combined with silica or not, and those which contain no iron. The white powder, in ordinary cases, is composed almost entirely of feldspathic minerals, which, when there are several varieties, may be separated either by differences in their size, for they are rarely ever crystallized in the same way, or by the fact of their being unequally acted upon by acids. In order to ascertain the composition of the other part of the rock, Mr. FOUQUÉ uses concentrated fluohydric acid, which, when the temperature is not raised, and the action not too prolonged, attacks the feldspars only, and leaves behind such minerals as magnetite, pyroxene and chrysolite. Magnetic iron is easily removed by the magnet, and pyroxene and chrysolite may be separated by their color with a magnifying glass or attacked by a weak solution of sulphuric acid, which acts upon the chrysolite and does not act upon the pyroxene. By the application of this exceedingly simple method, Mr. FOUQUÉ was able to determine eight different minerals in a rock which is either black and compact or else granular, in which last case it is possible to distinguish the minerals with the eye and to separate them, so that it was possible to make a complete analysis of each of them. The use of a low-power microscope is indispensable in these operations, both to see that the crystals with small inclusions have been removed and, also, to watch the effect of the different acids.

The first operation consists in reducing to powder two or more kilograms of the rock and sifting them so that all the grains shall be of a uniform size and about a quarter of a millimetre in diameter. This powder is divided into two parts which are to be treated differently. The first of these is submitted to the electro-magnet, which, for convenience, is suspended by a wire to within three or four centimetres of a table. The material to be acted upon is placed upon a sheet of paper which is raised in the two hands and moved close under the magnet. One of the ends of the wire is so arranged as to fit the clamp screw without the necessity of being clamped. After the paper has been moved several times underneath the magnet it is withdrawn from it and placed to one side of the table. Another paper is now brought under the magnet and the wire, which is not clamped, removed All the material containing iron, of whatever form it may be, that has been attached to the magnet, falls to the paper. The wire is then replaced and this process is repeated a number of times until the microscope shows that all the powder that remains on the first paper is free from any coloring matter and entirely white. This operation requires a great deal of patience and care, because there are, in different feldspars, very small inclusions, which are not easily taken up, but which must be removed. All the material containing any considerable percentage of iron, whether a silicate or not, is removed in the first two or three passes, and then it requires a careful observation with the glass to ascertain, after fifteen or twenty passes, whether there is anything which should still be eliminated from the mass. It required thirty to forty passes under the magnet to remove all the material containing iron from a somewhat decomposed basalt rock of New Hampshire. The white residue, which is left, is composed almost entirely of feldspar and generally the grains of either species will be of different sizes and often will be either crystals or crystalline in form. On submitting these feldopathic grains to the action of moderately strong muriatic acid they are either attacked or not attacked. Those which are not attacked will be orthoclase, albite and labradorite, and those which are will be generally anorthite. The second part of the powder is acted upon by fluohydric acid, which, when its action is not too long, nor the temperature too high, dissolves at once the feldspars and amorphous matter of the rock and leaves behind a crystalline residue composed of such minerals as pyroxene, chrysolite and magnetite. The magnet takes out the magnetite, and the chrysolite and pyroxene may be separated with a glass by their difference in color or by their different solubility in acids.

In this way sufficient material was collected to make analyses of all the different minerals of a rock apparently compact, namely, two kinds of pyroxene and chrysolite, magnetite, albite, anorthite and labradorite. Mr. FOUQUÉ communicated these results to the Academy of Sciences in May and June, 1873. To complete this work, the rock was cut into sections and photographed, and for this particular work Mr. FOUQUÉ had become so skillful that he was able in the photograph to point out each variety of the different minerals and to control his determination by the analysis that had been previously made. He found in his observations, that all the different feldspars in the rocks in Santorin were in crystals of different dimensions, and that they could be easily recognized by their structure alone, after studying the rock.

On examining these slides made from the rocks by polarized light, by the methods proposed by TSCHERMACK, ROSENBUCH and others, the crystals were determined in the rock. After working for some time upon the rocks of New Hampshire, and using them both as sections and with the method of Mr. FOUQUÉ, it occurred to me that it was not always necessary to cut slides, but that a simple examination of the powder before passing under the magnet would be quite sufficient. I found it quite difficult to prepare these slides, but, finally, adopted the plan of using a few drops of a very thin solution of Canada Balsam in chloroform, placed upon a microscope cover-glass, upon which a sufficient quantity of powder was afterwards placed. With a glass magnifying 5 or 6 diameters, it was easy with a needle point to separate all the different grains, and then by evaporation to have them all kept in their place by the small quantity of Canada Balsam contained. This cover-glass was afterwards turned down upon a drop of Canada Balsam, and in this way I succeeded in mounting a large number of slides which answered all the purposes of sections.

the surfaces necessary for examination for micro-analysis by polarized light is expensive, and the skill required, and the time necessarily consumed, are such that few feel warranted in undertaking the method, though the difficulty is more in imagination than reality.

* The rock resembles obsidian with small whitish crystals scattered through it.

Mr. FOUQUÉ's method must be considered as an important step in the progress of lithology. One of its greatest advantages is, that it furnishes for analysis very small crystals, which are always purer than large ones, and are much less likely to contain inclusions. It is, besides, a method which any person possessed with a moderate amount of patience, can readily learn, and with a few variations it is applicable to all varieties of crystalline rocks.

Influence of Silicon, Sulphur, Phosphorus and Manganese on the Qualities of Iron.

BY RICHARD AKERMAN, OF THE STOCKHOLM SCHOOL OF MINES.

CONTINUED FROM PAGE 29.

THE MUTUAL BEHAVIOR OF SULPHIDE AND PHOSPHIDE OF IRON DURING FUSION.

WE not unfrequently hear the opinion expressed that a charge composed of ores containing both sulphur and phosphorus, yields a better iron than those charges which contain but one of those substances to any considerable amount; and it is, therefore, of interest to see if any compound of sulphur and phosphorus is separated when sulphide and phosphide of iron are fused together. According to PERCY (1) this is not the case, for when an intimate mixture of these substances was fused in a well-closed clay crucible, they separated completely from each other, inasmuch as the sulphide of iron, without taking up any phosphorus, floated upon the phosphide of iron, which, again, combined with 2 per cent. of sulphur from the sulphide of iron. In full agreement with this are several experiments made by CARON (2) which shall be referred to at greater length further on, when the action of manganese is treated of; and accordingly it is considered very certain, that sulphur and phosphorus do not conduce to each other's removal; but it is not therefore asserted that they cannot, when present at the same time in iron, in some proportion counteract or nullify each others' hurtful influence. It appears, however, to be most probable that the advantage of mixing ores containing sulphur and phosphorus with each other in a charge, is limited to this, that neither substance can pass into the iron in so great a quantity as would be the case if either sort of ore were exclusively used. If the one kind of ore is rendered impure only by phosphorus, and the other only by sulphur, and these ores are mixed in such proportions that either of them yields the same quantity of iron, the quantity of either of these substances contained in the iron produced cannot be more than half so great as it would have been, if the iron had been produced exclusively from one of the varieties of ore, and an iron which, with a certain content of sulphur and phosphorus is unserviceable, may be useful if it contains half of the amount of any or both of these substances. Yet better, however, would the iron have been if one of these varieties of ore were, instead, mixed with a corresponding quantity of a pure iron ore, provided that sulphur and phosphorus present at the same time in iron do not counteract the action of each other, which has not yet been sufficiently inquired into.

THE WAY IN WHICH PHOSPHORUS OCCURS IN IRON.

We can, as has been already stated, produce different compounds of phosphorus and iron with fixed proportions of both substances, and these substances are in general dissolved with great difficulty in hydrochloric and sulphuric acids. As we can further, by fusing pure iron and phosphide of iron together, produce iron with any less content of phosphorus whatever, it appears to be a fact that iron has an unlimited power of dissolving phosphide of iron; but it does not therefore follow that all iron containing phosphorus consists of quite homogeneous mixtures of these substances; and that phosphorus is not always equally and homogeneously distributed in the hearth-manufactured iron is thought to be shown by the fact, that such iron containing phosphorus, after being polished and treated with dilute hydrochloric acid, commonly shows dark spots in it (3), which probably consist of undissolved phosphide of iron, which, in a finely distributed state, still adheres to the surface of the iron. Yet, in the experiments made by SNELUS with borings of pig iron, which were divided into two varieties, according to their specific gravity and fineness, there was obtained a less amount of phosphorus in the finer and lighter than in the rougher and heavier borings, whence it seems to follow that phosphorus occurred in the varieties of iron then examined in homogeneous union with the iron.

THE ACTION OF PHOSPHORUS ON THE QUALITIES OF IRON.

The compounds of phosphorus and iron are described by the older inquirers as hard, brittle and easily fusible; but FREESE (4) has shown that these fusible compounds could not have been pure, but mixed with carbon iron, for the compounds of iron and phosphorus, unmixed with other substances, are, according to his statement, so difficult to fuse, that he has not once succeeded in getting them to soften. On the other hand, mixtures of phosphide of iron with iron containing carbon are more easily fusible than the latter by itself, and the smaller amounts of phosphorus occuring in common iron, therefore, increase its fusibility, the phosphorus at the same time making the iron harder and more brittle. But while iron is hardened by carbon, phosphor iron, on the contrary, is not susceptible of hardening; but, on the other hand, circumstances seem to show that iron containing phosphorus, but poor in carbon, sometimes, at least, through hasty cooling, becomes more malleable (5).

The same TORBERN BERGMAN, who discovered that the content of carbon was the chief reason of the dissimilarities between pig iron, steel and malleable iron, also found that the brittleness, "cold-shortness," distinguishing some iron was caused by the phosphorus which it contained; and it has thus been long known that phosphorus imparts to iron the tendency to be cold-short. Of two pieces of iron, containing like quantities of phosphorus, it is, however, possible for one to be very soft, while the other is very brittle and short, and the action of phosphorus upon iron is therefore in fact more complicated than we would readily expect beforehand.

Carbon and silicon increase the brittleness of iron; but though this undoubtedly is the case in a yet higher degree with phosphorus, the content of phosphorus by itself does not make the iron so brittle as we would have reason to suppose from the cold-shortness of some iron; but the chief action of phosphorus upon the iron is thought to be to increase its tendency to crystallize, when heated, to a yet higher degree than carbon does.

Cold-short may be compared with burned Iron.—Even the iron that is freest from phosphorus may, both by excessive and more moderate, but long-continued, heating, acquire a crystalline texture, when it is called burned, and shows itself brittle in consequence, on account of the weak cohesion between the crystals formed during the heating. If, afterwards, the burned iron, after renewed car-

(1) "Metallurgy; Iron and Steel" p. 66. Percy-Wedding, p. 85.
(2) "Comtes Rendus," T. 56, p. 1017.
(3) "JERNKONTORET's Annaler," 1825, I., p. 156; and 1846, p. 275.
(4) POGGENDORFF's "Annalen der Physik und Chemie," Bd. 132, p. 265.
(5) "JERNKONTORET's Annaler," 1871, p. 236.

ful heating, is properly drawn, it is possible thus to take away the crystalline texture, and the iron again becomes soft. Iron containing phosphorus behaves quite in the same way except that it shows itself cold-short, or burned, after a gentler and shorter heating. The iron which contains a greater quantity than usual of phosphorus, readily becomes crystalline when manufactured, and if it is not afterwards sufficiently drawn it continues to behave in the same way, and it is, in consequence, brittle or cold-short. If it is, on the other hand, after new moderate heating, again considerably drawn, the crystalline texture—if the content of phosphorus is not all the greater—may often be removed, and though the amount of phosphorus continues to be the same, the iron is thus thereafter soft until it is strongly heated, without the accompanying drawing, for it then recovers its crystalline texture, and shows itself in consequence thereof anew cold-short.

An iron produced by hearth-refining was, for instance, even after drawing to 1¼ inches square, so cold-short that it could be broken off bit by bit, without a chisel being used, and continually showed a coarsely crystalline fracture; but nails made from this iron by further drawing showed themselves quite good, and so soft that they could not only be doubled up without cracking, but also allowed the doubled parts to be hammered close together. The content of phosphorus, in the meantime, was the same in the nail as in the cold-short bar from which it was drawn, or 0.245 per cent.

As a striking example of the action of phosphorus upon iron, the following circumstances, described by EGGERTZ may be stated in his own words: "While an old house at the Fahlun School of Mines was being repaired, the wall was to be provided with a girder, and this was fastened with an iron screw (1 inch square, 18 inches long). When this was being driven in it broke off close below the head, with a fracture like that of cold-short iron. It was thereupon submitted to a new trial, by hammering it upon an anvil, but it then showed itself perfectly strong, and could, when cold, be completely bent together by striking it with a sledge-hammer, without showing the least sign of brittleness, even where the bend was sharpest. It was cut through at this place, and filings taken from it, to determine the amount of phosphorus there contained, as well as the cold-short fracture above-mentioned. Both trials gave 0·17 per cent. phosphorus. The reason of this behavior appears to have been that the iron rod when the head had been put upon it, had been too much heated without receiving afterwards the necessary hammering; and to confirm the accuracy of this opinion, a piece of the strong portion of the screw was heated nearly to white heat, and was then left to cool without hammering. This was found to be as brittle as at the first-mentioned place, and broke asunder, with a shining crystalline fracture, with a gentle stroke of the sledge-hammer.

The fusion of iron is preceded by a graining or separation into crystals, and this tendency of the iron to crystallize increases with its fusibility and content of carbon. The fusibility of iron, however, is more increased by the mutual action of the phosphorus and carbon, than by a quantity of the latter substance alone corresponding to the total amount of both, and it is therefore to be expected that the iron containing more phosphorus will, when heated, be more difficult to handle than that which only contains carbon, with the same quantity of carbon as the other contained carbon and phosphorus together. This is also the case with slag-free iron, or Bessemer metal and the like; but, on the other hand, it can scarcely be said to be the case with the puddled iron, poor in carbon but rich in slag, for its graining at a high temperature is thought not to be noticeably more promoted by phosphorus than by carbon.

The iron occuring in commerce always contains some carbon and phosphorus, and as the fusibility of such iron is more increased by the latter than by the former substance, it naturally follows that an iron containing more phosphorus cannot be heated without fusing to the high temperature that a purer iron, containing as little carbon, will bear. But if we now keep to iron containing always the same quantity of carbon, but an increasing quantity of phosphorus—and when over-heating the varieties of iron now in question, do not employ one and the same degree of heat, but temperatures near the point of fusion—it will be found that the same complete correspondence which is observable between the so-called burned and cold-short iron in an unheated state, is also to be remarked when they are over-heated. The worst degree of burning consists in the iron through excessive heating, arranging itself loosely in crystals, so that in its over-heated state it will not keep together at all, but will fall asunder under the hammer. If an iron, cold-short from containing phosphorus, is heated to the highest temperature which an iron in other respects of the same kind, but as good as free from phosphorus, can bear without being burnt in the least degree, the cold-short iron behaves in the way just described, inasmuch as it then completely falls in pieces under the hammer or rolling mill. If the content of carbon is small, however, an iron poor in phosphorus, over-heated in this way, after a little cooling may be hammered together, and in quite the same way also an iron richer in phosphorus when overheated may, after a short time's cooling, be hammered together whole; but if the drawing is not very considerable, the former, after cooling, shows itself burnt, and the latter cold-short. The newly-mentioned circumstance is also the reason why at the works where pig iron, containing more phosphorus than usual, is refined in the hearth, the blooms must be allowed to cool for a little while before they are struck together, for if they are taken from the hearth and at once put under the hammer, they would be immediately grained, and scattered in small pieces over the floor of the works.

From the behavior now described, together with the circumstance that the fracture of cold-short iron has quite the same appearance as that of burnt iron, it seems to follow that cold-short iron is quite comparable to burnt, and that the principal difference between the behavior of iron containing more or less phosphorus consists in this, that phosphorus so essentially increases the tendency of iron to crystallize, that while an iron, poor in phosphorus, with a small content of carbon, is only exceptionally burned, it is, on the other hand, the rule that iron rich in phosphorus is burnt.—*Iron*

TO BE CONTINUED.

British Colliers and Colliery Owners Buying American Mineral Estates.

A project, in whose favor it is being attempted to enlist the practical sympathy of the colliers in this country, having for its object the development of a mineral estate in Kentucky, has been for some time before the public, and it is espoused by the leaders of the two organizations into which the unionist colliers of Great Britain are divided. The scheme is brought forward again and again at meetings of working miners in different parts of the Kingdom, and it is announced that Mr. ALEX. MACDONALD, M. P., the President of the National Union, and Mr. W. PICKARD, the Treasurer of the Amalgated Association, with a unionist from the North, will go out, to prospect the property, on August 8th. Meanwhile, much expectation is being excited by the Unionist leaders as to the prospects of this Transatlantic property. Many thousand acres are offered to the British miner almost for the asking. Immediately he is a shareholder he is entitled to have two acres of land, and he may become a shareholder for £4. We shall be interested in learning whether these spies, when they return from this promised land, will be agreed in their report as to its wonders. It is very clear what is the object of the Unionist leaders in this matter, but even if their report should equal their hopes, we must question if their object will be successful. The British collier who has made enough money to buy soil in America, to pay his passage out, and to enable him to wait until his investment brings him income, whether as wages or as dividend, has not a migratory inclination. The Cornish miner may be willing to leave the West for the North, or his own country for a distant land, but the Northumberland pitman, the Staffordshire collier, and the South Wales miner are not, as a rule, prone to wander. More men have gone out to the States from Wales than from either of these districts. Still, the Welchman is now resisting all enticements by emigration agents to remove either to other parts of the kingdom or to distant climes. Judging from the information which reaches us, in common with the general public, we do not think that he is altogether unwise in remaining where he is. Even in the much-lauded region of Pennsylvania the colliers, after a prolonged fruitless struggle, have been compelled to go back to work upon the terms which the wretched condition of the iron trade of that part of the world will alone permit. Nevertheless, it has come to our knowledge that this Kentucky colliery scheme is receiving in the several colliery districts of England an amount of support with which the promoters of it here profess themselves satisfied.

It is not a little interesting that at the same time that Unionist leaders are promoting what is virtually an emigration scheme, presumably because wages are low, British iron and coal masters, getting hardly any profit by their current trading in this country, should be purchasing iron and coal property in the New World. It is no secret that there are ironmasters of position in England who are shareholders in mineral properties and blast-furnaces in the States. But it is a new thing for a syndicate to be formed exclusively of British iron manufacturers and colliery proprietors to work a Transatlantic estate. Yet this is being done. A syndicate has actually been created of leading North of England iron and coal masters for the purpose of developing large properties in the State of Tennessee. These gentlemen have purchased, at the extraordinary low price of 6s. per acre, estates which contain lead ore and sulphate of baryta, together with manganese ore, which contains 82·43 of oxide of manganese, and is found in an immense deposit, intersected by river and by rail. On the same estates there are brown hematite and specular iron ores, which are free from sulphur, are low in phosphorus, and are discovered in masses varying from 80 to 240 feet in thickness, extending over several miles of country already opened by railway communication. Close by there is a tract of country in every way fitted for the erection of blast-furnaces, for it possesses excellent mountain limestone 200 feet thick, and has no fewer than 52,000 acres of coal land outcropping into water-worn ravines, in seams 12 feet thick. This presents a practically inexhaustible field of coking and steam coal, which can be mined by drift ways, without shafts or pumping, and where there is no appearance of fault in the stratification. For the accuracy of all this a man of position connected with the North of England iron trade is responsible. He has personally examined the estates, the titles to which have been verified, and some of them have been registered in the Tennessee State Court. The iron ores have been tested in Newcastle, and Dr. PERCY certifies that the coking coal contains 68 to 69 per cent. of coke, and the steam coal 75 to 82 per cent. of carbon. Not only are there all these valuable acquisitions below ground, but upon the surface some industrious Swiss have settled, and are cultivating vineyards, which are surrounded by numerous flourishing peach and apple orchards. Further, much of the land is wooded with fine trees of hickory, oak, magnolia, maple, and walnut; building stone and brick clay are plentiful, and a navigable river connects the deep water frontages of the estate with the Mississippi. We have not yet seen any prospectus, but we can state that the company is incorporated under the Companies Acts, 1862-67, in this country, and also under charter from the State of Tennessee.

The simultaneous attention by colliers and colliery owners in this country directed to the United States as a place for the employment of money and of industry is singular, particularly as both are influenced by different motives. But it is extremely suggestive, and is characteristic of the changes through which these industries are now passing. Though it may come about as we anticipate, that comparatively few colliers will go out under the Kentucky scheme, yet should the North of England masters begin in good earnest to develop the mineral resources of the States, the miners will have enough opportunities to gratify any desire they may have to become American citizens without becoming investors in the Kentucky scheme.—*London Mining Journal.*

Practical Notes on the Management of Gas Works.*

CONTINUED FROM PAGE 55.

USE OF TAR AS FUEL.

In places where the tar commands no sale for other purposes, from the quantity produced being too small, or from local reasons, it may be used, in conjunction with the coke, as fuel—100 lb. of tar being equal in heating power to 150 lb. of coke from Newcastle coal. The tar should be introduced into the furnace at a point immediately over the furnace door frame, by means of a square cast iron box, constructed on the principle of an ordinary water tuyere—in order to withstand the heat, which would otherwise destroy it in a short time—and provided with pipes connected to a convenient water supply for proper circulation. The tar should be placed in a suitable vessel on the top of the retort stack, and, by means of a cock at the bottom, allowed to run into a funnel and syphon, communicating with, or attached to, the tuyere box; if the tar is heated by any suitable means, say to 100°, it will run with much greater fluidity and with less attention. An arrangement which ensures a more regular and constant flow of the tar, and in such quantity as is required, is to provide *two* vessels, which may be distinguished as the reservoir and the feed cistern; the reservoir should be raised above the feed cistern so as to command it, and should be provided with a stop-cock, inserted at the bottom of its sides, and fitted with a lever and copper float; the float will regulate the flow from the reservoir to the feed cistern, and maintain the liquid in the latter vessel at a uniform level or head; the head being thus constant, the cock in the feed cistern (which should have cleaning caps easily removable) may be adjusted to

* From notes compiled by W. C. HOLMES & Co., Engineers and Contractors of Gas Works, Huddersfield, England. We shall be pleased to hear from our managers of gas works as to the way they do these things, and wherein our ways are improvements on the English.

the proper or desired extent, which will be, of course, maintained so long as the reservoir contains any tar. With one vessel, the head is continually varying, and consequently the flow into the syphon requires frequent adjustment; by the use of the two vessels, this inconvenience is obviated to a considerable extent. Another method of using tar is as follows: A quantity of exhausted tan bark is obtained, and mixed with coke, bulk for bulk; a pailful or two of tar is then thrown over the heap—not quite so much as it will absorb—and it is then turned over; the mixture burns with a fine clear flame, attended with little smoke; the furnace bars, by remaining unclinkered, admit the oxygen freely for the combustion of the fuel. When tan bark cannot be had, peat moss, loose and dry, makes a good substitute.

SETTING OF RETORTS.

The setting of the retorts is a matter of the utmost importance; if not carefully and properly done, the result will be a great waste of fuel, or rapid destruction of the retorts, or both effects combined; there are hundreds of instances where the retorts have not lasted more than one or two months, and others where it has been found utterly impossible to heat them at all. These are extreme cases, but the instances of injudicious and improper settings between those two extremes are very common, and cause much inconvenience and unnecessary expense. The retorts should, in the first place, be set on the best and most thoroughly tried principles, which, at the same time, should be as simple as possible, so that an ordinary village bricklayer may be competent to set any new retorts required in the ordinary course of the usual process of "burning out," etc.; and no deviation from the mode of setting first instituted should be allowed to be made on any account. Many men, with an opportunity of this kind, are very apt to indulge in any crotches they may have on the subject, to the frequent vexation and loss of their employers—the cause of failure being generally ascribed to anything but the right one.

PARTIAL CHARGING OF RETORTS.

Another method of both wasting fuel and destroying retorts, and which is very commonly practiced, especially in summer, is to keep a greater number of retorts and furnaces in action than are necessary to produce the quantity of gas required; that is, supposing that a bed of three retorts is sufficient, by being charged four times in the twenty-four hours, in charges of six hours each—two beds of retorts are kept heated the whole of that time, but only charged twice; both sets are therefore inactive for half the day, though they require frequent stoking during that time, in order that they may be in proper working condition when charged. Cases have been known where three or four beds have been kept heated, even when required to be charged only once in the twenty-four hours. It is unnecessary to say that, under such a course of management, no dividends can be expected by the shareholders.

WEIGHING COAL, ETC.

In order to keep a proper check on the gas-making operations, the coal to be carbonized, the coke produced from it, and the fuel used, should be regularly weighed and taken account of, and a scoop machine provided for that purpose.

COKE AND TAR VS. GAS.

It sometimes happens, owing to local circumstances, that the demand for coke and tar is such as to warrant the Gas Company in so modifying the gas-making operations, as to enable them to produce the best quality and the greatest quantity of these materials, even at the sacrifice of part of the gas. By keeping the heat of the retorts at a lower point than is necessary when the production of the greatest possible amount of gas is the principal object, the quantity of coke and tar will be increased, with a corresponding diminution in the quantity of gas, though it should not be carried to such an extent as to materially affect its illuminating power. In some manufacturing establishments, where coke is used to a considerable extent, coals containing only a small amount of volatile matter are used, the quantity and quality of the gas being a secondary consideration.

MODE OF CHARGING RETORTS.

In charging, the coals, after being broken, by means of a hammer, to lumps not larger than an egg, must be thrown in until the bottom of the retorts are covered to a depth of four or five inches, as evenly spread as possible; a larger quantity will require too long a time to carbonize, and, as a general rule, the thinner the layers, and the quicker the coal is carbonized, the greater will be the quantity of gas generated, and the better the quality; besides, if too large a quantity is thrown in, the expansion consequent on the conversion of the coal into coke, and amounting to one-fifth more in bulk, will, in all probability, be injurious to them, owing to their being in a comparatively weak state at that temperature. When the end of the retort is flat, a shovelful or two of coal should be heaped up against it; this plan is found to prevent the ends from burning out too rapidly, and the heat is usually the most intense at this point; with rounded ends, this precaution is unnecessary.

PROPER CHARGE OF COAL.

When the proper quantity of coal with which to charge the retorts has been ascertained, it should be afterwards uniformly adhered to. Heavier charges can be used with cannel coal than with common coal; the coke from cannel does not swell so much, and does not present the same resistance to the penetration of the heat into the interior of the charge.

COMPLETING THE CHARGING.

After the coals have been thrown in, the doors must be put on, and firmly compressed against the mouth-pieces by means of the crossbars and screws, so as to make a gas-tight joint. The doors must be previously coated with a luting of putty, composed of spent lime from the purifiers and water, on the edges which come in contact with the mouth-pieces, and the faces or edges of the mouth-pieces must be cleared of the previous luting.

LUTING MATERIALS.

The luting material must be of the consistence of ordinary mortar. When the luting is required to resist a considerable pressure, the lime should be mixed with common moulding sand, in the proportion of one part of lime to two parts of sand.

OPERATION OF CHARGING

In works where one or two men only are employed, the retorts are charged with an ordinary shovel; with two men, one will stand on each side, in order to reduce the time occupied in throwing in the coal as much as possible, as, during this time there is, necessarily, a considerable loss of gas; towards the conclusion of the operation, one of the men should be left to complete it, whilst the other brings forward the lid, which has been previously luted in the interval between the charges, and which, after the front-edge of the mouth-piece has been cleared of the previous luting, by means of a trowel, is adjusted in its place.

DISPOSAL OF THE COKE.

In drawing the charges, the coke should be allowed to fall into sheet iron barrows or wagons and extinguished with water.

CHARGING BY MEANS OF SCOOPS.

In many gas works, it is usual to charge the retorts by means of scoops, which are constructed of sheet iron, and of a semi-cylindrical form, and are provided with a cross handle at the end; these scoops being filled with coal to the amount of the charge required, in the interval previous to withdrawing the coke, are introduced into the retorts by the assistance of three men, two of whom lift up the end of the scoop by means of a bent bar on to the bottom of the mouth-piece, whilst the third man pushes it forward into the retort as far as it will go, and, by means of the cross hand e, turns it over and withdraws it, leaving the coal, which is then spread uniformly over the bottom of the retort by means of a rake; the use of scoops, however, involves the necessity of employing three men for that purpose.

LABOR REQUIRED FOR CHARGING.

In small establishments, two men are sufficient for working two beds of five retorts each; in larger works, and where the scoop is used, the proportion of labor is considerably less, being usually at the rate of one stoker to every 13 retorts.

DURATION OF CHARGES, ETC.

The duration of the charges should not exceed from five to six hours; where more than one retort, or one bed of retorts, are being used, they should not all be charged at the same time, but at intervals; for instance, supposing that three retorts are being used, and that the duration of the charge is six hours, it is better to charge a retort every two hours, in order to maintain a more equable working of the apparatus, the greatest amount of gas from a charge of coal being generated in the first two hours. Similarly in cases where there is a bed of five or more retorts in operation, a saving of fuel is also effected by following the same method of charging part of them only at once, and the remainder in two or three hours afterwards, by which arrangement the bed is not so much or so suddenly cooled down, and can be kept up at its proper heat with greater ease and more regularity than when the retorts are all charged at once.

REGISTERING TIME OF DRAWING AND CHARGING.

A black board should be fixed up in the retort-house, divided into as many parts as there are retorts, each retort being distinguished by a number or letter; when a retort is charged or drawn, the hour of the day or night should be marked on the board by a piece of chalk, opposite to its own number or letter, so that the manager or attendants can see at all times how long the charge of any individual retort has been in.

EFFECTS OF CHARGE REMAINING TOO LONG.

The charges should not be left in too long, as the last portions consist chiefly of hydrogen, nitrogen, and carbonic oxide, which have an injurious, enfeebling effect on the quality of the gas.

APPLYING A LIGHT ON LOOSENING THE DOOR.

Previous to drawing a charge, and after the screw has been slackened, the door must be loosened by a tap with a hammer, and a light applied; this precaution is necessary to prevent explosion.

DRAWING OF RETORTS.

The coke must be drawn out of the retorts immediately after the doors have been slackened, and then extinguished, taking care to remove it to a sufficient distance from the open retorts, to prevent injury to them from the sudden cooling inducdd by the steam thus generated.

CLEARING THE UPRIGHT PIPES.

Immediately after the charge has been drawn, the lower end of the upright pipe, where it opens into the mouth-piece, must be cleared out of any pitchy matter or deposit which may have there accumulated, and which would, in a short time, stop the passage of the gas; a short iron bar bent to a right angle at one end, should be in readiness for this purpose.

PREVENTING THE STOPPAGE OF THE UPRIGHT PIPES.

In some instances a plan has been adopted for preventing the stopping up o the upright pipes, which appears to fully answer the purpose; it consists of a water lute formed around the outside of the lower end of the upright pipe and open at the top; to the lower part of this lute is attached a pipe provided with a stop-cock, and connected to any convenient water supply; another pipe is attached to the upper part for carrying off the water; the water, by contact with the upright pipe, keeps it cool, and prevents the formation of pitch. A pipe of ⅜-inch bore is sufficient, and the supply of water may be reduced, as found necessary, by means of the stop-cock.

HYDRAULIC MAIN.

Care should be taken to keep the hydraulic main perfectly level from end to end, as, should it be thrown out of level by the settling or disturbance of the brickwork on which it is placed, the seal of the dip pipes leading from the retorts will be affected to a corresponding extent—in some cases the ends of the dip pipes will be laid bare, and in others, the seal will be injuriously increased. In small works, and where no exhauster is used, the seal of the dip pipes in the fluid contained in the hydraulic main should not exceed 1¼ inches; and this should be examined and adjusted as occasion requires The usual mode of adjustment is by altering the level of the fluid in the hydraulic main by means of the tar outlet pipe, which is altered or placed in a lower or higher position for that purpose. The hydraulic main should also be thoroughly cleaned out once a year, or oftener if necessary, and the dip pipes, bridge and upright pipes, should be also cleaned out and put in order.

TO BE CONTINUED.

Sub-Wealden Exploration.—The Rev. HENRY WILLETT, Hon. Sec. and Treasurer, writes to us under date Netherfield Parsonage, near Battle, June 19:—Three days after my last report to you, and when we had attained a depth of 1134 ft., the rods snapped about 20 ft. from the bottom. The augur was grasped the same day and brought to the surface with 10 ft. of calcareous grit within it, on Friday, June 4. On attempting to resume operations it was found that the sides had fallen in, and 140 ft. of loose debris obstructed us. We had but two alternatives—to give up altogether or tube the whole distance. This latter course was decided upon, owing to the very liberal terms offered by the Diamond Rock Boring Company. The decision arrived at on Tuesday was acted upon without delay; 900 ft., of 4 in. continuous tubing were screwed together and lowered in 24 hours, and I am pleased to inform you that the whole length of 1138 ft. was affixed in its proper position at two o'clock this day. On Monday we shall be occupied in washing out a new lining with a stream of water at 200 lb. pressure directed to the bottom of the new lining, and on Tuesday we hope to commence boring."—*London Mining Journal.*

Notes.

The Cape Gold Fields.—We have little news from the Gold Fields, but that little is in the form of a very exciting statement that a nugget weighing 48 lb. has been found, and is now on its way down for shipment to England. The population is increasing, and digging operations are being carried on with varying success. One party washed 1,200 ounces in one week.

The Bethlehem Iron Company, in spite of the dull times, made a net profit of upwards of $30,000 in the past year, while there are orders on hand to run the steel mills for the greater part of this year. The following Board of Directors were re-elected for the coming year: ALFRED HUNT JACOB RIEGEL, JOSEPH WHARTON, R. H. SAYRE, E. P. WILBUR, JOHN KNECHT, and ARIO PARDEE.

Transhipment of Petroleum by the B. & O. R. R. Co.—The tank wagons of the Columbia Conduit Company hold twenty-five barrels each, and it requires a little over a minute to load and less than two to unload. These wagons are used for transporting oil across the track of the West Penn Railroad at Montrose, Penn., near the famous Powers Run, some nine miles up the Allegheny River, the railroad company having refused to allow the pipes of the former company to be laid under their track, because the oil was intended for transportation to Baltimore by the B. & O. R. R.

Iron Works for Japan.—The London *Colliery Guardian* says: "Messrs. HEAD, WRIGHTSON & Co., Stockton-on-Tees, have entered into a contract with the Japanese Government, to supply them with the whole of the necessary plant for two blast furnaces. The Japanese Government intend to have two furnaces put up at the Heygori mines in the North of Japan, for the purpose of smelting a rich ore containing 50 per cent. of metallic iron. Those will be the first blast furnaces erected in that part of the country. Mr. DAVID FORBES, F. R. S., London, the professional adviser of the Government, and Messrs. HEAD, WRIGHTSON & Co., are now making the complete drawings for the whole work. The furnaces will be 57 ft. high, and 10 ft. bosh, for charcoal and will be fitted with WHITWELL'S hot-blast stoves, WRIGHTSON'S patent charging apparatus, and all the modern appliances known to this branch of engineering."

European Demands for American Engineering Instruments.—Messrs. HELLER & BRIGHTLY, the Mathematical Instrument Makers of Philadelphia, have recently received, and are now filling, heavy orders for Engineering Instruments (Transits and Levels) from Vienna, Austria, and from Bristol, England. When it is recalled to mind that up to within a comparatively recent date all the most accurate instruments of this class have been imported from Europe, and that this is the first instance known where instruments of this class have been imported into Austria from this country, this fact is deemed worthy of notice. Messrs. HELLER & BRIGHTLY are also now filling orders for Engineers' Transits and Levels, etc., for the Imperial College (Kaga Yashiki), Tokio, Japan, from Yokohama and Kokaido, Japan, and Hong Kong, China. They have also recently shipped a number of their instruments to MEIGS, of South America, and have present orders for their instruments from Conception, Chili, Havana, Cuba, Nacupai, Venezuela, and the Chimbote R.R., Peru.

The New East River Bridge Project.—The bridge is to extend from Third avenue and Seventy-seventh street, across Blackwell's Island, to Astoria Heights, and is to be built, Mr. STEINWAY states, entirely by the Company, without asking any aid either from New York or Brooklyn. By the act incorporating the Company the capital stock is fixed at $2,000,000, and after the bridge is completed, New York and Brooklyn have the privilege of purchasing it at one-third more than the actual cost of construction. Numerous plans of construction were submitted to the directors at the meeting yesterday, but it was decided to take no action upon any of them until the next regular meeting of the Board. The appointment of a chief engineer is under consideration, and it is expected will be decided at the next meeting. Mr. STEINWAY stated yesterday that it was the intention of the present Board of Directors to push the work forward as rapidly as possible to completion. Among the officers we note the names of WILLIAM STEINWAY, HERMAN POPPENHUSEN, and other well-known citizens.

Fire-proof Composition.—A French journal says that of the score of fire-proof compositions that have been brought forward within as many years past, there is scarcely one that possesses superior or even equal adaptation to the purpose, to the following: Dissolve, in cold water, as much perlasa as it is capable of holding in solution, and wash or daub with it all the boards, wainscoting, timber, etc., then, diluting the same liquid with a little water, add to it such a portion of fine yellow clay as will make the mixture of the consistence of common paint, and then stir in a small quantity of paper hanger's flour paste to combine both the other substances. Give three coats of this mixture, and, when dry, apply the following composition: Put into a pot equal quantities of finely puiverized iron filings, brickdust and ashes, pour over them size or glue water, set the whole near a fire and, when warm, stir them well together. With this liquid composit on, or size, give one coat, and on its getting dry, give a second coat. It resists fire for five hours, and prevents the wood from ever bursting into flames; that is, it so resists the ravages of fire as, at most, only to be reduced to coals or embers, without spreading the conflagration by additional flames. It is found that a quantity equal to twenty pounds of finely sifted yellow clay, a pound and a half of flour for making paste, and one pound of pearlash is sufficient to prepare a square rood of deal boards.

Copper Smelting in St. Louis.—The St. Louis Smelting and Refining Company has just closed the shipment of seventy tons of copper matte to an Eastern concern. It is not probable that such shipments will be often repeated. The company have it in contemplation to include copper smelting and refining in their purpose, and add to the present establishment the additional plant requisite. The recently constructed Flintshire furnace is working splendidly. In the few weeks of its run, over 7,000 pigs of lead have been produced from the by-products which this type of furnace was intended to treat. So popular is the company's refined lead among corroders, that more than half of the orders have to remain unfilled.—*Mines, Metals and Arts.*

Purifying Coal Gas. A process for purifying coal gas of its ammonia (and compounds), and which saves incidentally the necessity of the washing or scrubbing of the gas, has been lately devised and patented. The process consists in utilizing the observation that when coal gas containing ammonia, or its compounds, is passed over or through a layer or mass of "salt cake"—a by-product in the manufacture of acids and of soda - it parts completely and at once with all its ammonia, which readily combines with the free acid invariably contained in the salt cake, until complete saturation has taken place. From its combination in the salt cake, the ammonia can be readily separated by the usual methods and may be utilized. By this plan, which the inventor affirms removes only the ammoniacal compounds from the gas, the further process of purification is greatly simplified and improved, inasmuch as there exists then no necessity for washing or scrubbing the gas with water and ammoniacal liquor—a process which, though of necessity universally employed, is well understood by all well-informed gas engineers to be attended with a loss of valuable illuminating constituents, while it likewise involves the use of costly apparatus and a large outlay for water, and effects only the partial removal of the ammonia. The following is a brief description of the application of the new purifying process in the language of the patent: "In carrying out my invention, I take the by-product of acid and alkali works, known as 'salt cake,' and place it in layers of convenient thickness in boxes, or other form of purifying apparatus familiarly known to gas engineers, and such as are now in use for what is known as 'dry lime purification' or 'oxide of iron purification,' causing the gas as it comes from the hydraulic main to pass through the apparatus, properly charged with salt cake, reduced to a suitable degree of fineness. This agent completely and immediately removes from the gas all ammoniacal compounds, retaining them in chemical combination in a dry state, gaining thereby an increased value in proportion to the ammonia absorbed and combined."—*Am. Exchange and Review.*

The Coinage of England in 1874.—The annual report of the Master of the Mint, which has just been issued, is again (the *Economist* remarks) a most interesting document, a leading point being that the coinage of gold, which had fallen very low in 1873, had fallen still lower in 1874. In 1873 it was £3,300,000 as against £15,000,000 in 1872, and £10,000,000 in 1871; but in 1874 it is only £1,462,000. The average of late years has been about £5,000,000. This diminution, it is explained, "is, in a great measure, to be accounted for by the magnitude of the coinages just referred to; but it should also be mentioned that the importations into the Bank of England, during the year, of Australian sovereigns and half-sovereigns, which are now of the same design as those issued from the Mint in London, and are equally legal tender in the United Kingdom, have again been considerable, having amounted to £1,972,000 and have contributed in a sensible degree towards maintaining the supply of gold coin required for circulation in this country. Since the conclusion of the gold coinage in the month of September, no information has been received from the Bank of England that the coinage of that metal will be resumed." The total number of pieces struck in 1874 was 27,467 142, as against 41,846,269 in 1873, including a small coinage of the value of £8,000 for Newfoundland. The total value of the British coins struck during the year at the Mint, and by contract, was:

Gold—Sovereigns	£520,713	0	0
Half-sovereigns	942,216	0	0
			£1,462,929 0 0
Silver—Half-crowns	£273,574	17	6
Florins	164,263	0	0
Shillings	275,187	7	0
Sixpences	105,643	3	0
Fourpences (maundy)	98	19	0
Threepences	55 393	19	9
Twopences (maundy)	46	9	8
Pence (maundy)	36	8	5
			£874,244 4 4
Bronze—Pence	£51,200	8	9
Half-pence	13,260	8	11⅓
Farthings	3,733	6	8
			£68,194 14 4½
Making a total of			£2,495,367 18 8½

STATISTICS OF COAL PRODUCTION

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending July 17:

	1875.		1874.	
	Week.	Year.*	Week.	Year.
Wyoming Region.				
D. and H. Canal Co.	61,730	1,712,249	31,832	1,328,616
D. L. and W. RR. Co.	79,906	1,832,947	25,598	1,370,321
Penn. Coal Co	29,269	698,079	28,557	670,811
L. V. RR. Co	25,658	453,341	24,938	552,028
P. and N. Y. RR. Co.	3,018	64,069	459	34,767
C. RR. of N. J.	49,346	379,787	821	737 933
Penn. Canal	16,653	35,993	11 672	151,195
Lack. and B. RR.	..	63,596	.	97 019
	265,580	5,238,664	123,877	4,942,630
Lehigh Region.				
L. V. RR. Co	65,295	313 464	57,486	1,691,570
C. RR. of N. J.	31,282	63,488	18,763	552,677
D. H. and W. B. RR.	1,557	36,023	498	14,680
	98,134	412,975	76,747	2,258,927
Schuylkill Region.				
P. and R. R. RR. Co.	170,611	1,171,823	10,484	2,437,220
Shamokin and Lykens Val.	33.556	608,010	23,190	443,201
	204,167	1,779,833	33,674	2,880,421
Sullivan Region.				
Sul. and Erie RR. Co.	..	5 557	1,601	18.981
Total	567,831	7,437,025	235,899	10,100,959
Increase	331,982	..	..	..
Decrease	..	2,653,930	..	..

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

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

The Production of Bituminous Coal for the week ending July 17, was as follows:

Tons of 2,000 lb., except where otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2,240 lb.	58,916	1,181,459
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb.	7,124	160,382
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	3,432	116,873
*East Broad Top	718	25,081
Clearfield Region, Pa.		
Snow Shoe	845	38 214
*Tyrone and Clearfield	17 347	443,131
Allegheny Region, Pa.		
*Pennsylvania RR.	2,817	129,842
Pittsburgh Region, Pa.		
*West Penn. RR	4,239	114,367
*Southwest Penn. RR	75	4,052
*Penn. & Westmoreland gas coal, Pa. RR.	20,163	289,689
*Pennsylvania RR.	9,224	207,121
Kanawha Region, W. Va.		
Chesapeake and Ohio RR	3,546	88,569

* To July 14.

The Production of Coke for the week ending July 14.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	273
Alleghany Region	..	53
West Penn. RR.	564	27,319
Southwest Penn. RR.	11 316	279,839
Penn. & Westmoreland Region, Penn. RR.	1,034	15,242
Pittsburgh, Penn. RR.	2,040	53,856

Bituminous Coal Production to July 1st, 1875.

The following does not include the total production, but such quantities as have been reported to this office:

Pennsylvania	4.536,719
Ohio	313,579
Maryland	1 198,010
Illinois	370,856
Indiana	25,201
Iowa	46,406
Wyoming	61,369
West Virginia	80,325
Tennessee	43,087
Alabama	28,269
Colorado	12,096
	6,715.917

The receipts at Port Richmond for the week were 75,000 tons, shipments 65,000 tons, and balance on hand 50,000 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads amounts to 32,063 tons.

Receipts at Greenwich, Philadelphia:

	Bituminous.	Gas Coals.
Receipts	6,382	4,300
Shipments	6,629	6,077
On hand	4,229	1,890

Shipments from Pictou, N. S., for the week ending July 10:

	Tons. Week.	Year.
To United States	1115	7485
" West Indies	1107	1107
" South America	—	1002
" Canada	9569	38627
" Other Provinces	2630	16290
	14,121	64525

Shipments from the Block House, Cow Bay, C. B., to the following destinations, for the week ending July 1:

	Week.	Year.
Provinces	505	3115
West Indies	..	806
United Stated	1054	1054
	1559	4975

COAL TRADE REVIEW.

Duties.

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

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

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

NEW YORK, Friday Evening, July 23, 1875.

Anthracite.

The great activity in the grain market; the encouraging reports of our crops, and the probability of short crops in Europe, have given a little more confidence in all branches of business, and even some of our coalmen share in these feelings. However, even if our expectations of a large export business in grain should be realized, it will take considerable time to move other industries, and many classes of manufacturers would not feel the improvement before next Spring. Nevertheless, we will be only too happy to welcome any improvement of the general trade of the country, be it ever so small. A very good demand continues for the hard anthracite coals, and most firms and companies are largely booked ahead. The Wilkes-Barre Company is very busy filling contracts made early in the season, as is the Philadelphia and Reading Company; but contractors of other companies, mining the softer coals, find business very dull, with a great many cargoes on the market under demurrage. We are informed that concessions have been made on the latter coals ranging from 10c.@20c. per ton. The Philadelphia and Reading Railroad Company reported, on the 17th inst., an accumulation of 50,000 tons at Port Richmond, as compared with 105,000 tons at the corresponding time last year. The Delaware, Lackawanna and Western R.R. Co., have quite an accumulation of loaded cars at Hoboken, and the Delaware and Hudson Canal Company are again increasing their stocks.

The production is constantly increasing; the output last week being more than 150,000 tons larger than the previous week, and 331,982 tons more than the corresponding week of last year. The total production from January 1st, this year, is 7,437,029 tons, as compared with 10,100,959 tons last year; showing a falling off for 1875 of 2,663,930 tons. The mines are not fairly at work in all the districts, but at the rate at which the production picked up last week, it will not take long to make up the deficiency, if the trade will take the coal. During July of 1874, the production was very much curtailed, and did not average over 300,000 tons per week. During August of last year the curtailment continued, the weekly production being less than 400,000 tons. During last week the production was 567,881 tons.

The following price circulars for August have been issued, showing an advance of 10 cents per ton on Stove, Egg and Chestnut and on Shamokin; 15 cents on Egg and Chestnut, and 25 cents on Stove.

	Lackawanna Scranton & Wilkes-Barre.	Pittston.	Lehigh.
Lump	$5 00	$5 00	$5 55
Steamer	5 10	5 10	....
Broken	5 20	5 20	5 45
Egg	5 45	5 45	5 55
Stove	5 90	5 90	5 90
Chestnut	4 90	4 90	5 10

The above prices are at the different New York shipping ports. The Pennsylvania Coal Company issues circulars for its contractors, but as prices are set and no commissions allowed, the contractors are compelled to establish their own prices, which are nominally as above.

The Philadelphia Coal and Iron Company has issued a circular containing the following prices:

	Lump.	Steamboat.	Broken.
Hard white ash coal	$4 50	$4 60	$4 70
Free-burning white ash	4 50	4 60	4 70
Schuylkill red ash	....	....	5 00
Shamokin	....	....	....
Lorberry	....	....	5 70
Lykens Valley Vein	....	....	6 30

	Egg.	Stove.	Chestnut.
Hard White Ash Coal	$4 95	$5 40	$4 40
Free burning White Ash	4 95	5 40	4 40
Schuylkill Red Ash	5 05	5 45	4 40
Shamokin	5 15	5 55	4 45
Lorberry	5 70	5 70	4 60
Lykens Valley Vein	6 30	6 30	5 45

The above coals are sold by the wholesale dealers advertised in our columns upon as good terms as are obtainable.

Bituminous.

The demand for all descriptions of bituminous coals continues exceedingly light, although shipments last week are considerably in excess of the previous week, Cumberland alone showing an increase of 6,026 tons. Cumberland continues very irregular in prices—$3 85@$4 10 at Georgetown being the range given us. A cargo was sold yesterday at $5 50 per ton, discharged in this city, equal to less than $3 90 at Georgetown. Although some companies are selling at our lower quotation, yet, others possessing a superior quality of coal, and using care in preparing and shipping the same, are receiving, in some cases, as much as our higher figure. Some of the companies in the Clearfield and Allegheny Mountain Regions are receiving fair orders which, with orders booked earlier in the season, are keeping them fairly employed, although the best qualities of these coals have been sold as low as $5@$5 10 at South Amboy, while some Broad Top coal was sold as low as $4 70, and $4 85@$4 90 appear to be the figures most commonly realized for these and the inferior grades of Clearfield. One notable feature of the business of this year is the quantity of Clearfield coal sold in Baltimore. We are reported one sale of importance—to that market—during the week under review.

Foreign and Gas Coals.—There is nothing new to chronicle in these. There have been some further arrivals of Provincial coal, but all on orders. Prices remain as reported for some time by us. The shipments from the Westmoreland (Pa.,) district continue quite active on contracts.

Freights.—Coastwise freights are without change. The rate from this city to Boston is $1 25; to New Haven 80c.@90c.; and to Providence 90c. From Philadelphia to Boston $1 60, and to Providence $1 35; from Georgetown to Boston $1 75, and to this city $1 40. Vessels are in fair supply at Georgetown and Philadelphia, but in only moderate supply here.

We are in receipt of the following:

LEHIGH VALLEY RAILROAD.—No. 21.

MAUCH CHUNK, Pa., Aug. 1st, 1875.

NOTICE TO SHIPPERS.

On and after this date, until further notice, the rates of transportation on through coal, consigned as noted below, and passing over this company's road from mines through, will be as follows:

	From Penn Haven.	From Mauch Chunk.
To Mauch Chunk	14	....
" Phillipsburg	97	83
" Newark	2 56	2 42
" Perth Amboy	2 20	2 06
Via Morris Canal.		
To Newark	....	2 32
" Jersey City	....	2 36
" " " for re-shipment	....	2 16
" New York	....	2 36
Via North Penn R. R.		
To Philadelphia	....	1 75

On canal coal at Jersey City an additional charge of twenty cents per ton will be made for transferring coal from boat to boat, and thirty cents per ton for placing the same on the wharves and re-shipping.

ASA PACKER, President.

Philadelphia Coal Trade.

July 22, 1875.

The receipts of coal here are very large, and great anxiety is shown amongst buyers to secure good receipts before the advance which is to take place on 1st of August. The advance on coal on board at Port Richmond is 10c. per ton on Egg, Stove and Chestnut White Ash; and on Shamokin, 15c. on Egg and Chestnut, and 25c. on Stove. There is no advance on Lump, Steamboat and Broken. For the line and city trade the advance is 10c. on Broken, 15c. on Egg, Stove and Chestnut No 2, and 5c. on Pea coal. Lump, Steamboat and Chestnut No. 1 remain the same. This early advance seems premature, and if kept on as the season progresses will make the rates in the fall higher than they have been for years. It is idle to expect that when the producers have the power to fix the rates of an article of such necessity as coal, that they will act wisely, and confine themselves within reasonable limits.

Vessels are abundant, and freights maintained eastwards at $1.60 to Boston and $1.35 to $1.40 to Rhode Island, with an occasional coaster a shade lower.

Orders for Broken, Egg and Stove hard white Ash are plenty, but the other sizes of White Ash are very dull, and free burning coals which have been plenty during the strike are also dull of sale. July, in ordinary years, is a poor month, except for contracts made early in the season, and would be very much so this year, if the long strike had not taken place. In the absence of season contracts buyers of large sizes are anxious to secure a supply now to save the advances; and it is expected that Broken will be very dull in the Fall while there is nothing to indicate a better demand for Lump and Steamboat for the balance of the year.

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

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
*Lackawanna and Scranton at Rondout and Hoboken	5 00	5 10	5 20	5 45	5 90	4 90
‡Pittston at Newburgh	5 05	5 05	5 15	5 30	5 80	4 85
Wilkesbarre at Port Johnston	5 00	5 10	5 20	5 45	5 90	4 90
Plymouth, R. A., *Net*	....	....	....	5 45	5 90	4 90
Susque. Coal Co. at Amboy W.A.	....	....	....	..	....	....
Kingston at Hoboken	....	....	..	....	....	....
Lehigh Coals.						
Old Company at Port Johnston	5 55	....	5 45	5 55	5 90	5 10
Old Company's Room Run "	....	....	....	....	....	....
§Sugar Loaf, Hobok. & Amb."	5 55	....	5 45	5 55	5 90	5 10
Lehigh Coal Exchange "	5 55	....	5 45	5 55	5 90	5 10
Honey Brook Lehigh	5 55	....	5 45	5 55	5 90	5 10
Spring Mt. C. Co. at Hoboken	....	....	....	....	....	....
Beaver Meadow at South Amboy	5 55	....	5 45	5 55	5 90	5 10
†Schuylkill Coals at Port Richmond.						
Schuylkill white ash	4 50	4 60	4 70	4 95	5 40	4 40
Schuylkill red ash	....	....	5 00	5 05	5 45	4 40
Shamokin white and red ash	....	....	....	5 15	5 55	4 45
Lorberry	....	....	5 70	5 70	5 70	4 60
Lykens Valley	....	....	6 30	6 30	6 30	5 45

Per ton.

Freight from Hoboken and Weehawken to New York.... 40c.
" " Elizabethport & Port Johnston to N. York. 45c.
" " South Amboy to New York..... 50c.

*Freight on Lackawanna coal from Rondout to New York, by boats or barges of the D. and H. Canal Co. 50c. per ton. The expense of towing vessels from New York harbor to Rondout and back will be borne by this Company.

†Freight from Port Richmond to New York (free of discharging) 85c. per ton.

‡Prices to the Trade.

§By Canal at New York, Jersey City and Brooklyn, 30c. additional alongside.

Schuylkill coal is delivered f.o.b. of boats in New York harbor at 50c. per ton additional to these rates.

Pittston coal is delivered to carts in New York or Brooklyn at 65 cents per ton in addition to the above rates.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$5 20	$6 50
" " at S. Amboy	6 00	6 50
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" " South Amboy	8 50	...
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt	5 00	6 50
Despard, West Va.,	——	6 50
Murphy Run, West Va., at Baltimore	4 75	6 30
Fairmount, West Va., " "	4 75	6 50
Newburgh Orrel, Md. " "	4 75	6 50
Cannelton Cannel, W. Va., at Richmond.	9 50	11 00
" Splint, " "	5 00	6 50
Peytona Cannel, " "	9 50	11 50
Straitsville " at Sandusky, O	3 25	10 00

Foreign Gas Coals.

	Sterling.	Am. cur'cy
Newcastle, at Newcastle-on-Tyne	10/6@12/9	6 50@7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	47/	18 00@20 00
" Gas Cannel "	30/	12 00
Scotch Gas Cannel, at Glasgow, nominal,	25/ Gold.	7 50
Block House, at Cow Bay, N. S.	2 00	5 50
Caledonia, at Port Caledonia	1 75	5 25
Glace Bay, at Glace Bay	1 80	5 50
Lingan, at Lingan Bay	75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Steam and House Coals.

Broad Top, at the mine, $1 25; at Amboy	4 75@5 00	5 25@5 50
Cumberland, at Georgetown and Alexandria, Va	4 00@4 25	....@....
Cumberland, at Baltimore	4 15@4 50	5 75@6 25
Clearfield and Allegheny, "Derby," "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, $1 25; at Greenwich, Phil	4 60	5 65

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$6 20	$6 40	$5 60
*Lackawanna coal, delivered	6 75	7 00	6 25
Wilkes-Barre, "	6 50	6 75	6 00
Lehigh & Locust Mountain, del'd	....	....	....
Schuylkill Red Ash, del'd	....	....	....

The Cost of delivering Pittston coal ranges from 40 cts. to $1 per ton, according to distance from the yard.

* Lackawanna grate is quoted 25c. per ton less than egg.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$23 00
Liverpool House Cannel " " "	.... 25 00
American Sterling " " "	.... 13 50
American Orrel " " "	15 00@16 00
Red Bank Cannel " " "	..... 14 00
Cumberland " " "	..... 9 00

Baltimore, Md. July 19, 1875.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$4 86	$4 65
Broken	5 36	5 21
Egg	5 62	5 47
Stove	5 87	5 72
Nut	5 02	4 87

Shamokin, (red or white ash), and "Boston," freeburning white ash,		
Egg	5 65	5 50
Stove	5 85	5 70
Lykens Valley, red ash,		
All sizes	6 05	5 72

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. $6 75@7 75.

BITUMINOUS.

George's Creek and Cumberland f. o. b. at Locust Point	4 35 4 50
West Virginia f. o. b. at Locust Point	5 50
Youghiogheny Gas, f. o. b. at Locust Point	5 50
Swanton Coal, George's Creek	4 40

Boston. July 21, 1875.

Reported by our Special Correspondent.

CARGO PRICES TO TRADE.

Lingan coal	$ 5 20	Westmoreland and Penn.	6 85
Caledonia	5 00	Waverly Co. Youghiogh'y.	6 80
Pictou	5 60	Cannelton Cannel	11 60
Block House	5 20	Cumberland	5 80@ 6 00
Red Bank Cannel	10 00	Anthracite	6 50@ 7 25
Glace Bay	5 00	" retail	7 50@ 8 00
Sydney	6 25		

The sales of English Cannel continue to be confined to small lots, with a very reduced stock here and none on the way. Scotch and American Cannel are quiet and prices remain unchanged. In Nova Scotia Coal no transactions. The few cargoes received were previously contracted for. Cumberland Coal is quiet and Gas Coals continue to arrive quite freely on previous contracts. Anthracite is very dull and in limited demand. Cargo sales are difficult to make, and some cargoes afloat are offered at some concession. We quote retail sales at $7 75@8 25, and cargo prices are nominally $6 50@7 per ton.—*Shipping List.*

July 17, 1875.

Coal is in fair demand, and prices are steady. The receipts have been large, and a stock is at last beginning to be formed. Nobody appears now to be willing to wait for lower prices. Freights are easier. We quote $1 50@1 60 from Philadelphia, $1 70@1 75 from Baltimore, and $1 20@1 30 from New York. There is nothing doing in English Cannel, and none is on the way. There is a good stock of Scotch and American Cannel, and these grades are fast taking the place of English. But little Provincial coal has come to hand, and that on contract.

Total receipts for the week—36,886 tons domestic and 671 foreign. Total receipts since Jan. 1, 382,711 tons domestic and 8,457 tons foreign.

We quote Anthracite $7 75@8 25 at retail; English Cannel $22@24 at retail; Library Cannel $14@16 at retail; American do $10@12 by the cargo and $14@16 at retail; Cannelton Cannel $11 at wholesale; Sydney, $14@15 at retail. Cumberland $8 at retail.—*Commercial Bulletin.*

Buffalo, N. Y. July 19, 1875.

Reported by our Special Correspondent.

Prices free on board vessels here are as follows:

ANTHRACITE.

	Afloat.	F. O. B. Vessel.	Retail, Deliv'd.
Grate	....	$6 30	$7 00
Egg	....	6 30	7 00
Stove	....	6 75	7 45
Nut	...	6 50	7 20

	Lump.	Run of Mine.	Nut.	Slack.	Nut & Slack.
Connellsville Coke	$5 50	....	....	....	....
Brookfield Coal	....	....	....	....	....
Briar Hill	4 50	....	....	....	3 00
Youghiogheny	4 75	....	....	....	....
Monterey	3 75	3 50	3 25	2 50	....
Catfish	3 75	3 50	3 25	2 50	....
Stoneboro	....	....	3 25	2 50	....
Sterling Cannel	5 50	....	....	....	....
Buffalo Coal Co.	3 50	3 25	....	2 30	....

Chicago, Ill. July 19, 1875.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants.
Retail prices per ton of 2000 lb. delivered to buyer.

No change in prices.

		BITUMINOUS.	
Lehigh Lump	$10 00	Briar Hill and Erie	@ 7 00
Lehigh grate and egg	10 00	Walnut Hill, Pa.	@ 6 00
Lehigh stove and chest.	10 50	Midway, Pa.	@ 6 00
Lackawanna, Wilkes-Barre and Pittston*		Cannel	@ 9 00
		Blossburg	8 00
Grate and egg	9 00	Indiana Block	5 50
Stove and chestnut	9 50	Hocking "Brooks"	6 00
		Wilmington and Illinois.	4 50

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

Cincinnati, O. July 19, 1875.

Reported by our Special Correspondent.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	10c.	—
Pomeroy coal	6½c.	—
Cannel coal	16c.	—
Semi Cannel	9½c.	—
The following are the retail prices delivered:		
Youghiogheny	— c.	$3 35
Pomeroy	— c.	2 75
Cannel	— c.	5 50
Kanawha Semi Cannel	— c.	3 35
Anthracite	9 50@10	—
Foundry coke	—	—
Coke, hard and soft	10 c.	—

Cleveland, O. July 19, 1875.

Reported by our Special Correspondent.

Per ton of 2000 lb. f. o. b. vessels.

Youghiogheny, lump	$4 40	Columbiana	$3 00
Youghiogheny, nut	3 50	StripVein & Steubenville	3 30
Briar Hill, according to quality	$3 05 to 4 00	Mountain Blossburgh (blacksmith)	5 40
Massillon	3 25	American Cannel Coal Co.'s Cannel	4 40
Hocking Valley	3 35		
Straitsville	3 35		

The coal market remains firm without change in prices or movement. The quantity of coal coming forward is equal to every want, and the demands are only sufficient to give easy motion to business all around. Shipments by lake continue steady, but the rates of freights are not at all enticing. Freights to Toronto are taken for 90 cts. per ton, since a fleet, a short time since, cut the higher rates. To Chicago and other upper lake points the rate continues at 70 cts. per ton.—*Manufacturer and Trade Review.*

Connellsville, Pa. July 21, 1875.

There is little change in the shipments or price obtained during the last week. Coke is beginning to accumulate on the yards; prices obtained are not satisfactory to operators. There is little change to note in prices, as coke is selling at 2½ to 2¾ on the cars. Shipments for week ending July 17th, by the P.W. & B.R.R., were 1,183 cars or 8 in excess of last week.—*Tribune.*

Detroit, Mich. July 19, 1875.

Specially reported by Messrs. ROBINSON & KEYS, Dealers in all kinds of coal.

Per ton of 2000 lb.

Lehigh Lump, per ton	$10 50	Blossburg	8 50
Lehigh " prep.sizes.	10 00	Briar Hill	7 50
Wilkes-Barre, Grate and Egg	9 00	Willow Bank	7 00
		Erie	7 50
Wilkes-Barre, Stove and Nut	9 50	Massillon	7 00

Erie, Pa. July 19, 1875.

Reported by our Special Correspondent.

Wholesale, per ton of 2000 lb. Bituminous f. o. b.

Briar Hill lump	$3 75	Beaver lump	$3 50
Midway	3 25	Cat Fish	3 00

Indianapolis, Ind. July 19, 1875.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.
Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

Sand Creek, per ton	$3 25	Peytona cannel, per ton.	7 25
White River, "	3 00	Indiana Cannel	6 50
Brazil Block, "	2 65	Hocking Valley	4 25
Highland, grate, "	2 25	Youghiogheny	4 75
Block coal, nut, per car	18 00	Blossburg (smithing)	6 50
Highland " "	18 00	Piedmont "	6 50
Block Slack "	17 00	Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Grate	$8 60	Chestnut	8 50
Egg	8 60	Stove	8 75

Owing to the Miner's strike there is no Lehigh coal in this market.

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8
White River	14	" Slack, "	7
Brazil Block	14	Peytona Cannel	28
Highland grate	14	Indiana "	24
Block Nut, domestic use.	12	Youghiogheny	20
Highland Nut, " "	12	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE,

All sizes (Wilkes-Barre and Lackawanna), $10 per ton.

Louisville, Ky. July 19, 1875.

Specially reported by Messrs. BYRNE & SPEED.

The coal market here has been extremely dull for a month past, manufacturers are doing but little, and very few residences are filling up coal houses; preferring to wait till later.

Pittsburgh, in river, per bushel	11c.	Kentucky (E. and P. RR)	9c.
Screened Raymond City.	9c.	Kentucky nut, per load	
Pine Hill	9c.	" Slack, "	
Buckeye Cannel	20c.	City-made Coke, per bus.	10c.
Peytona "	22c.	Pittsburgh, retail, "	14c.
Nut and Slack		Kentucky on cars, at wholesale per bushel	
Pine Hill nut		Anth., per ton, $10 00 to 10 50	

Milwaukee, Wis. July 19, 1875.

Specially reported by Messrs. R. P. ELMORE & Co.
Retail price per ton of 2000 lb.

Lehigh Lump	$10 00	Scranton	$9 50
Lehigh Prepared	10 50	Briar Hill, select	8 00
Lackawanna	9 50	Blossburgh	8 00
Pittston	9 50	Pittsburgh	7 00

New Orleans, La. July 17, 1875.

We have no change to report and would ask you to repeat quotations of 3d inst. Our largest consumers being well supplied there is no activity in the market, some still clinging to the hope of a rise in the river, which our telegraphic despatches report this day 4 ft. 9 in. and rising at Pittsburgh, and loth to buy at the present rates.

Pittsburgh coal, retail, per bbl	65c.
" wholesale	—@45c.
" steamboats, per box	50c.
" to manufacturers, per bbl	60c.
" shipments, per hhd	$6 00
Anthracite, wholesale, per ton	none.
" retail, "	$12 50
Virginia Cannel, per bbl	90c.
Scotch " "	
St. Bernard, wholesale, per bbl	37½c.
" retail, "	60c.

Pittsburgh, Pa. July 19, 1875.

Per ton of 2000 lb. and Bushel of 76 lb.

Youghiogheny coal, ton,	$2 00	Pittsburgh retail deliv'd. per bushel	9@10c.
" coke, "	2 50	Anth'cite on cars Lehigh	$7 75
Connellsville coal, "	2 50	" " Wilkes-Barre	6 75
" coke	$2 25@2 75		
Pittsburgh coal	1 85		

Twenty-five to fifty cents per ton additional for delivery.

COAL.—Strong hopes have been entertained during the past few days that there would be a rise sufficient to let out the coal, but the prospects at this writing are not very encouraging, although all hope has not yet been abandoned. It is strange, in view of the recent heavy rains west and south, that there has not been sufficient rain at the head waters of the Monongahela and Allegheny to cause a rise, but such is the fact. The stock of coal here ready to move is very large, estimated at 12,000,000 to 15,000,000 bushels, and, as might be expected, those operators who have the most of their capital locked up in these black diamonds, are anxious to get them to market so that they can realize.

COKE.—There is nothing new or important to report in regard to this article that we are aware of; while business is not as active as it was during the coal strike, it is about all that can reasonably be expected, and the indications are that it will continue so during the balance of the Summer. It is true the consumption is light as compared with what it usually is, in consequence of the suspension of so many pig iron furnaces, but the production is also light, and with only moderate stocks, prices are maintained; we continue to quote at $2 25@2 75 per ton, delivered free on cars in Pittsburgh. We understand that some of the Ohio river furnaces, not accessible by rail, are badly in need of coke, and there will be a large quantity shipped away by river as soon as there is water.—*American Manufacturer.*

San Francisco.

From the *Commercial Herald* of July 8, 1875.

Imports from January 1st to June 29:

Anthracite tons	6,348	English, tons	22,688
Australian, tons	46,879	Vancouver Island, tons	29,137
Coos Bay, tons	17,938	Rocky Mountain, tons	32
Cumberland, tons	6,539	Seattle, tons	23,275
Mt. Diablo, tons (5 mos)	65,515	Bellingham Bay, tons	6,170

"With ample supplies of Australia nhere and to arrive, prices favor the buyer. The receipts since the beginning of the current month embrace the following: per *Baron Blantyre*, Newcastle, N. S. W., 2,300 tons; *Duchess of Argyle*, 2,425 tons, same; *Sarah Bell*, 1,224 tons, same; *Alaska*, from Seattle, 2,021 tons; *America*, Nanaimo, 2,010 tons; *Empire*, 430 tons, Coos Bay. The very low prices ruling here are no doubt the cause of lessened supplies from Bellingham Bay, yet, at the same time, imports from the several mines of British Columbia seem to be steadily augmenting. Anthracite is scarce and wanted: Lehigh and Pittston ruling at high figures in a jobbing way. Cumberland continues very plentiful. We quote Bellingham Bay at $8 50; Coos Bay, $10; California Mt. Diablo Steam, $6 25@8 25 for fine and coarse respectively. Cargoes of Scotch and English Steam to arrive may be quoted at $9; Cumberland, $18@20; Nanaimo, $9 50@10; Seattle, $9 25@10; Sydney, $9@9 25 by the cargo."

Toledo, Ohio. July 19, 1875.

Specially reported by Messrs. GOSLINE & BARBOUR.
Per ton of 2000 lb. on cars.

Hocking Valley	$3 40	Massillon	4 20
Straitsville	3 40	Youghiogheny	5 00
Shawnee	3 40	Blossburg	7 00@7 50
" nut	2 90	Cumberland	7 00@7.50
Briar Hill	5 50	Connellsville coke	7 00

ANTHRACITE.

Grate, screened	$7 75	Stove, screened	$8 25
Egg, "	7 75	Chestnut "	7 75
Lehigh Lump	9 50		

40 cents to $1 per ton additional for delivery at retail.

Halifax, N. S. July 19, 1875.

Prices per ton of 2240 lb. in gold.

Sydney (old mines)	$4 00	Little Glace Bay	3 50
Gowrie	3 50	Blockhouse	3 75
Victoria	3 50	Albion (at Railroad)	4 00

Montreal. July 19, 1875.

Specially reported by Messrs. ROBERT C. ADAMS & Co.
Wholesale per ton of 2240 lb.

Scotch Steam	$5 50	Cape Breton Steam	$4 50
Pictou "	5 00	Newcastle Smiths	7 00

Anthracite at retail, per 2000 lb., delivered.

Egg	$7 50	Chestnut	7 00
Stove	7 75		

Toronto, Ont. July 19, 1875.

ANTHRACITE.

	per ton.		per ton.
Broken	$7 65	Chestnut	$7 65
Egg	7 65	Lehigh	9 00
Stove	8 15		

BITUMINOUS.

Blossburgh	7 50	Screenings	5 00
Briar Hill	7 00	Soft Nut	5 50

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb,	From Penn Haven.	From Mauch Chunk.	From Hazleton*	From Upper Lehigh.	From Ashley and Sugar Notch.†
To ‡ Newark, N. J., via Central Railroad of New Jersey	2 54	2 40	2 86	3 18	3 39
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	..	56	51	72
‡ Philipsburg, N. J.	96	82	1 34	1 44	1 65
‡ Elizabethp't, Port Johnston, Hoboken and South Amboy, N. J., shipping and wharfage 35c. add.	2 18	2 04	2 80	2 82	3 03
High Bridge, N. J.	2 40	2 20	2 80	2 79	3 09
Somerville and Raritan, N. J	2 80	2 60	3 20	3 19	3 49
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 95	2 75	3 35	3 34	3 64
¶ Jersey City, N. J., and New York, via Morris Canal	2 85	2 35	3 17	3 24	3 54
Andover, via Delaware, Lackawanna and Western RR.	3 30	3 10	3 70	3 69	3 99
§ Trenton, Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76
From Mauch Chunk to New York (towing limits) and Jersey City† via Lehigh Valley RR. and Morris Canal					$2 34

From Phillipsburg, N. J., to Hoboken (for consumption) via Delaware, Lackawanna and Western RR..... 1 80
From *Lackawanna Junction* to **Auburn, N. Y.*, for shipment, via Southern Central R R. in connection with Pa. and N. Y. R.R..... 2 59
From *La kawanna Junction* to †*Weedsport* for *Rochester and Charlotte*..... 2 41
From *Lackawanna Junction* to *Sterling* for *Oswego, N.Y.*.. 2 58
* To this point for Syracuse the rate is 2 06
† To this point for all places between Rochester and Buffalo the rate is 2 59
* The rate to this point for Syracuse is..... 2 22

*Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $11 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

¶ 20 cents per ton additional for transferring coal from boat to boat, and 30 cents per ton for reshipment of same from wharves.

† Transportation on Coal destined for re shipment from this point is 20c. less than above rate.

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove.	From Tamaqua.	From Port Carbon.	From Mount Carbon.	From Schuylkill Haven.
To *Port Richmond*, for shipment, via P. & R. R. R., Main Line	2 12	2 07	2 00	1 99	1 92
Philadelphia, Retail yards	2 22	2 17	2 10	2 09	2 02
Harrisburg, via Lebanon Valley Branch	1 35	2 02	1 95	1 94	1 87
Allentown, via East Pennsylvania Branch	1 70	1 65	1 58	1 57	1 50
Lancas'er, and Points on Lancaster Branch, via R. & C. R.R	1 82	1 77	1 70	1 69	1 62
Dauphin, via Schuylkill and Susquehanna Branch	85	....	1 43	1 42	1 35
Slatedale Junction via Berks and Lehigh Branch	1 88	1 83	1 76	1 75	1 68
Lebanon, via Lebanon and Tremont Branch	96	....	....	....	....

From *Tamanend* to *Catawissa*, via Catawissa and Williamsport Branch Railroad 94
From *Tamanend* to *Williamsport*, via Catawissa and Williamsport Branch Railroad..... 1 39
* From *Port Clinton* to *Philadelphia* via Schuylkill Canal, including freight and charges for the use of cars and barges, and for tolls (exclusive of cost of unloading)... 1 69
* From *Port Clinton* to *New York*, within towing limits, " 53d street..... 2 71

For shipment via Main Road or Schuylkill Canal, one and one-half cents per ton per mile, and two cents per ton additional, to Port Carbon, Mount Carbon, Schuylkill Haven, Pine Grove, Tamaqua, or Port Clinton, for Canal, as the case may be.

Coal sent to points on the Catawissa and Williamsport Branch will be charged one and one-half cent per ton per mile, and two cents per ton additional to Tamanend.

The rates of freight and tolls on lump and steamboat coal will be twenty per cent., and on broken coal will be ten per cent. less than the above rates.

* The charge from Schuylkill Haven to Philadelphia or New York is 11c. additional to these rates.

On and after July 4th, the Drawback of ten cents per ton now paid on shipments of Anthracite Coal from Schuylkill Haven and Port Clinton, that have passed Fairmount Locks to Philadelphia and vicinity, will be discontinued.

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

From the Mines to Cumberland and State Line (say an average of 20 miles) the charge is 3 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $3 75 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 50 cents per net ton,

From Cumberland to Baltimore (178 miles) $2 31 per ton of 2240 lb., or $2 02 per net ton, and 4 cents per gross ton for use of cars.

From Cumberland to Georgetown, (152 miles) by canal, $1 25. Tolls, 51 cents.

From the Mines to Piedmont, (from 4 to 10 miles) 5 cents per ton of of 2240 lb. per mile on distances less than 5 miles, and 4 cents per ton per mile on distances not over 10 miles.

From Piedmont to Baltimore, (206 miles) $2 69 per ton of 2240 lb., or $2 40 per net ton.

From any point in the Kanawha Valley to the James River wharves below Richmond, (say 350 miles) by C. and O. R.R., including terminal charges, per ton of 2240 lb. For Cannel coal, $4 50.

Do do., for Semi-Cannel or Splint, per ton of 2240 lb., subject to rebate on shipments of 5000 tons or more, $3 65.

From Irwin to W. Phila (say 332 miles) per P. R R. Penn. Westmoreland gas coal, per ton 2000 lb..... $4 75
From Osceola to W. Phila (say 248 miles) per T. & C. R. R., per ton bituminous coal of 2000 lb., 6c. extra for cross roads. Drawbacks, according to destination of coal 3 55
From Fairmount and Clarksburg to Baltimore (say 300 miles) via B. & O. R. R. including loading, per 2000 lb 4 75
On through coal after deducting drawback..... ....
From Richmond, Va., to New York, via vessel, 392 miles per 2240 lb.. 1 60
" " " *Boston*, about 650 " " " 2 00
" " " *Philadelphia*, 292 " " " 1 25
From the Mines to Richmond, via James River and Kanawha Canal, 15 miles..... 15

Erie Canal.

	per 2240 lb.
Hoboken to Buffalo	75c.
" Rochester	70c.
" Oswego	65c.

The above rates are exclusive of harbor towing, trimming, unloading and tolls.

Delaware and Raritan Canal.

Tolls and Steam Towage.

Per 2240 lb. Cargoes to exceed 110 tons.

From Fairmount to New York, towing limits within 53d st.			69c.
" Greenwich "	Bituminous		64c.
" Lambertville "	Anthracite		57c.
" Port Richmond "			63c.
" " " "	Semi-bituminous coal,		63c.
" Philadelphia "	Cumberland	"	58c.
" Trenton "	Anthracite	"	37c.

CANAL TOLLS, exclusive of towage, Bordentown to New Brunswick, when towed by the Company's Steam Tugs:
For Anthracite Coal ....35c.
Bituminous and Semi-bituminous Coal...35c.

Freights.

Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore and Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	2 00	....
Albany	*85	1 70	....
Amesbury, Mass	....	....	....
Bangor, Me.	†1 35	2 00	1 20
Bath, Me	1 60	1 80	1 30
Baltimore	....	....	....
Boston, Mass	1 60 & 3c.	1 60@1 75	§110–125
Bridgeport, Ct	....	1 50	90
Bristol, R. I	....	....	90
Cambridgeport, Mass	1 60&3c.	....	1 25
Derby	....	1 60	....
Dighton	....	....	110@125
East Cambridge	1 60&3c.	....	....
Fall River	1 35	1 50	90
Hackensack	....	....	....
Hallowell, Me	....	....	....
Hartford	....	....	1 20
Hoboken	†85	1 30	....
Hudson	....	1 60	....
Jersey City	....	1 30	40
Lynn, Mass	1 70	....	‡110–225
Middletown	....	....	1 10
Mystic	....	....	....
Newark	....	....	....
New Bedford	....	1 50	90
Newburyport	....	1 90	1 35
New Haven	....	1 50	90
New London	....	1 50	85
Newport	1 35	1 50	90
New York	85†	‖1 40	40
Norfolk, Va	75	60	....
Norwalk	....	....	90
Norwich	....	1 65	90
Pawtucket	1 45‡	....	‡100
Philadelphia	....	1 00	....
Portland	1 55	1 75	1 20
Portsmouth, N. H.	1 60	1 85	1 40
Providence	....	1 50	90
Petersburg, Va	....	90	....
Portsmouth, Va	....	....	....
Poughkeepsie, N. Y.	....	1 50	....
Richmond, Va	....	80	....
Rockport	....	....	....
Saco	....	....	....
Sag Harbor	....	....	1 00
Salem	1 00	1 75	110@125
Salisbury Pt., Mass	....	....	1 50
Savannah, Ga	....	1 50	....
Stamford	*85	....	85
Stonington	....	....	....
Taunton	..	..	80@90
Trenton, N. J.	....	....	....
Troy	....	....	....
Warren, R. I.	....	....	....
Washington, D. C.	80	....	....
Wareham	....	1 65	....
Weymouth	....	1 80	....
Wilmington, Del	....	85	....
Wilmington, N. C.	....	1 50	....

* And discharging and towing.
† And discharging. ‡ And towing.
§ 5c. per bridge extra.
‖ The rate to this point by barge is $1 60.

Towing.

From foot of 23d Street, East River, and *return*, *per ton*

	cts.		cts.
Bridgeport, Conn	33⅓	New Haven and Norwalk, Conn	33⅓
Hartford and Stonington, Conn	75	New London, Conn	60
Norwich, Conn	68	*Derby, "	3 ⅓
Stamford, Conn., per boat	$75	Harlem, N. Y., per boat.	$18
Whitestone, L. I.	$30	Glen Cove, L. I.	50

	cts.
Manhattanville, via Hudson River, per ton	8
Harverstraw and Peekskill, via Hudson River	16
West Point and Cold Spring " "	17
Rondout " "	23
Yonkers, boats of 100 tons capacity " " per boat.	$15
Sing Sing and Peekskill " " " "	20

* $50 per boat extra is charged for towage to this point.
Boats having less than 200 tons will be charged the same to Eastern points as if carrying that quantity.

ROBERT CROOKS & CO.'S METAL CIRCULAR.

LIVERPOOL, July 8th, 1875.

PIG IRON.—Contrary to expectation, the market for Glasgow warrants is higher now than price quoted in our last circular A good demand for shipping iron has sprung up, which has reduced stocks considerably, the exports being high. This week there has been a steady market, closing yesterday with buyers at 60/ 7½d, and sellers 60/ 9d. The furnaces in blast are 118, against 123 last month. Makers' iron is steady, with only slight alterations in prices: No. 1 Gartsherrie, 67/ 6d.; Coltness, 69/; Summerlee, 66/ 6d; Monkland, 62/, f. o. b. Glasgow; Glengarnock, 68/ 6d.; Eglinton, 62/, f. o. b. Ardrossan. Shipments for week ending 3d July, 14,101 tons Stock against warrants on 2d July, 33,744 tons.

FINISHED IRON.—Masters and men have not come any nearer a settlement yet, and as the former have not resorted to strong measures, and are not very likely to do so, if a reduction of any account does take place it will be by the men voluntarily giving way. During the past month, business with most makers has been excessively dull, and they would willingly see lower prices to encourage a revival. Staffordshire bars have been a little easier, and 50 to 100-ton lots are procurable of Crown quality, at our minimum price of £8 12/ 6d. Lancashire Crown bars are obtainable at £8 7/ 6d. At the Quarterly Meeting to-day list houses reduced their prices £1 per ton.

CANADA PLATES.—Many of the brands have given way a little in price, and, as a consequence, some round orders have been given out. We anticipate still further concessions before the bulk of the orders are placed. It is estimated about one-third to one-half of last year's purchases have been placed, so buyers are still evidently holding off till prices are at their lowest.

TIN PLATES.—Prices have given way during the last month from 1/ to 2/ per box, and some good buying has been done at the reduction. Whether the bottom has been reached it is hard to say, but prices are sufficiently low now to make purchasing for ordinary wants tolerably safe. The following are the lowest prices touched: Bradley, 32/; R. G., 28/; Gwendreath, 28/ to 28/ 6d.; Cwmfelin, 29/; Ynis, 28/ 6d; Iwen, 27/ 6d.; Monnow, 27/. Coke: Pen, 25/; Dunvant, 23/; Gelly 22/ 6d.; Yspitty, 22/ 6d.; Diamond Y., 21/ 6d.; Charcoal Ternes: Dean, O. F. P. P., and S. T. P. L., 24/ 6d.; Coke Ternes: L F., 21/, and C F., 21/ 6d.; Budd's Patent, 19/ 6d.

TIN has been rather fluctuating during the past month, and we have now a dull market with Straits quoted at £81 10/ to £82 per ton. English is much too high in comparison with other sorts, and a further decline is almost inevitable.

COPPER.—The dull market reported in our last has continued throughout the month, and prices for English are easy at £83 for Tough Ingots. Yesterday the advice from Chili of charters to this country for upwards of 3,000 tons, caused a depression in Chili bars, and this may lead to lower prices for English manufacture

LEAD continues very quite, there being but few enquiries on the market. For the month we can quote English Pig at a reduction of 10/ per ton, and Spanish is obtainable at £21 5/ to £21 10/.

FREIGHT.—The Canadian Steamship Companies, following the example of the New York lines, have formed an agreement as to rates To Quebec and Montreal nothing less than 14/6d. to 15/ is taken. New York 12/6d.; Boston, 12/6d.; Western Canadian Towns, 25/.

EXPORTS FROM LIVERPOOL TO

Description.	New York. June, 1875.	New York. June, 1874.	Boston. June, 1875.	Boston. June, 1 74.
Sheets, Bars, Plates, &c ,ts.	360	400	580	213
Railway Iron	"	4538	8	67
Pig Iron	"	1451	..	..
Chain	" 36	44	..	2
Wire	" 152	256	40	47
Copper	" ..	..	13	..
Tin and Terne Plates boxes	93,259	81,943	17,921	10,215

Description.	Philadelphia June, 1875.	Philadelphia June, 1874.	Baltimore. June, 1875.	Baltimore. June, 1874.
Sheets Bars, Plates, &c...	134	10	25	.. Tons.
Railway Iron.	"	..	..	1,057 "
Pig Iron	187	120	..	.. "
Chain	15	22	6	5 "
Wire	7	..	..	.. "
Copper	..	..	..	.. "
Tin and Terne Plates	20,301	14,150	25,658	266 boxes.

Import Duties.

The following are the duties in Gold:

Flat Iron, not less than 1, nor more than 6 inches wide, nor less than ⅜, 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 ½, nor more than 2 inches square per pound 1 c.

Flat, Round or Square Iron, of larger or smaller sizes than the above mentioned, per lb .....1½c.

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 in bars.

Provided, that none of the above iron shall pay less than 35 per cent.

Railroad Bars—Iron .....70c. per 100 lb.
Railroad Bars—Steel .....$1.25 per 100 lb.
Boiler plates, or other plate iron not less than 3-16 of an inch thick, per lb..... 1½c.
Scrap Castings per ton..... $6 00
" *wrought* " " 8 00
Pig Iron per ton 7 00
Iron ore 20 per cent. *ad valorem*
Antimony crude or regulus, 10 per cent.
Copper Ore—On all fine contained therein, 3c. per lb.
Old Copper, fit for manufacture only, 4c. per lb.
Copper, pigs, bars, ingots or plates, 5c. per lb.
" sheets, bolts, nails, spikes, rods, pipes, &c., 45 per cent in, in bars, blocks or pigs, and grain tin, free.
Tin Plates, or sheet, and terne or taggers tin, 1 1-10c. per lb.
Lead—Bars or pigs, 2c. per lb. Old lead, for manufacture only, 1½c. per lb. Pipes, shot and sheets, 2¾c. per lb.
Zinc, in blocks or pigs, 1½c. per lb.; in sheets, 2¼c. per lb.; manufactures of, 35 per cent.
Quicksilver, free.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, July 23, 1875.

American Pig.—We are unable to learn of any transactions worthy of note. There are constantly small sales being made, but they do not aggregate much. Although the majority of the trade have all along thought that there were no encouraging indications of a marked improvement likely to take place in the iron business this year, yet, three weeks ago, there were those who thought that a reaction was about to set in, but even they do not speak so confidently now. This business is without doubt as dull as it has been at any time this year. As good irons as the market affords have been offered as low as $27 for No. 1 foundry, in ordinary lots. Good irons, but of not such high reputation, can be bought at a less price. We quote No. 1 foundry, $26 @$27; No. 2, $24@$25; and gray forge, $22@$25.

Scotch Pig.—We only hear of small parcels moving. Prices in Glasgow continue unchanged with a falling off of business. Stocks are only moderate, and holders are rather firm, and not forcing sales. We quote nominally at $31 50@32 for Glengarnock; $31@32 for Coltness; $29 50@31 for Eglinton; and $31@32 for Gartsherrie.

Rails.—There have been no further transactions since our last. A number of inquiries continue in the market and look as though they would eventually result in business, although slow of consummation. We continue to quote American at mills at $48@50; and steel at $70@75.

Old Rails.—In the absence of business we quote nominally at $26@26 50.

Scrap.—There have been no transactions during the week under review. The lot of 1500 tons reported in our last is said to have been mostly or entirely shipped to Providence. Those knowing positively at what figures it was sold, refuse to give information, while the outside reports are so conflicting that we omit them. We quote nominally at $30@31.

Boston. July 21, 1875

IRON.—There is no movement of importance to report in Scotch Pig, and the small stock in the hands of importers is held at previous quotations There has been very little doing in American Pig, and though we still quote dealers' prices at $28@32 per ton for No. 2 and 1 brands, it would be difficult to place large lots of No. 1 at $1@2 per ton less than the outside figure. Refined Bar is very quiet, with sales at $58@59 per ton. The sales of Common Bar have been at $53@54 per ton. American Rails are held nominally at $48@52 per ton, with very few sales. Sheet Iron is selling in lots as wanted at unchanged prices.

Imports of Pig Iron from January 1 to July 17:

	1874.	1875.
From Great Britain, tons ...	2,375	1,350
Coastwise	6,783	7,792

LEAD.—There is no movement to report in the market for Pig Lead, except the usual small sales, and prices are nominally unchanged. Lead Pipe and Sheet Lead are selling at 9½c per lb., and other lead manufactures are steady at previous quotations.

Imports from January 1 to July 17.

	1874.	1875.
Pigs	61,318	21,254

COPPER.—We quote Copper Sheathing at 30c; Copper Bolts and Braziers at 31c.; Yellow Metal Sheathing at 22c; and Metal Bolts at 28c. per lb., with a very moderate demand. Ingot has been a shade firmer, with sales of about 300,000 lb. in New York at 22⅞c. @ 23c. per lb. The sales here have been in small lots at the outside figure.

TIN.—Market dull and prices nominally unchanged. We quote Staits at 18½@18¾c., per lb., gold.

TIN PLATES. The demand continues light and prices weak. We quote currency rates as follows: Charcoal IC at $10@$10 25; Coke at $7 75@$8 50; and Terne, including all kinds at $7 75@$10 75 per box.—*Shipping List.*

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July 17, 1875.

Pig Iron had a ripple of business towards the last of the week, when three or four prominent foundry-men came in, asking bottom prices on 50-ton lots They each found they could buy here cheaper than order from primary points, and quote purchases No. 1 X, f. o. b, at $28 50, one party naming one of the most prominent brands. The "slumps" to the prices of cast scrap of nearly twenty per cent., this week, noticed in the junk market, would suggest that foundrymen generally were buying at lower prices, although our quotations are nominally unchanged.

On wharf here No. 1 $29@31; No 2, $24@27, and gray forge, $21@24. New York advices quote a trifle lower, being $26@29, No. 1; $22@27, No. 2; and $21 50@26, gray forge.

Bar has been very quiet all the week, seeming to have struck the usual summer dullness. The receipts have not been so large, the supplies for this market having about all reached us. There is no change in quotations, nor any anxiety amongst holders as to values, the range $58 to $60 covering the run of lots and sizes the buyers are likely to call for. Common iron is listless and easy, quoting at $52@56 as to size.—*Commercial Bulletin.*

Baltimore. July 21, 1872.

Specially reported by R. C. HOFFMAN & Co.

We have nothing of interest to report in the Iron market for the week; the same inaction prevails as heretofore, consumers only purchase for immediate needs, and seem determined to adhere to this policy, at least for the near future. We quote.

Baltimore Charcoal	$30@35	Anthracite No. 2	$25@26
Virginia Charcoal	30@35	" No. 3	23@24
Anthracite No. 1	27@28	Mottled and White	20@22

Cincinnati. July 20, 1875.

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

Below please find closing quotations of our Pig Iron Market, viz:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$27 00@28 00	—4 mos
" No 2, "	25 00@26 00	—4 mos
" Mill	24 00@25 00	—4 mos
Tennessee No. 1, Foundry	26 00@27 00	—4 mos
Tennessee, No. 2, "	25 00@26 00	—4 mos
" Mill	24 00@25 00	—4 mos
Missouri, No. 1, Foundry	@	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	25 00@26 00	—4 mos
" No. 2, "	24 00@25 00	—4 mos
Ohio Mill	24 00@25 00	—4 mos
Missiouri, No. 1 Foundry	28 00@29 00	—4 mos
" No. 2, "	26 00@27 00	—4 mos
" Mill	26 00@27 00	—4 mos

CAR-WHEELS.

Hanging Rock, C. B	40 00@30 00	—4 mos
Tennessee "	33 00@35 00	—4 mos
Missouri "	35 00@40 00	—4 mos
Alabama "	33 00@38 00	—4 mos

BLOOMS.

Charcoal	70 00@ 80 00	—cash

SCRAP IRON.

Cast	65c.@ 90	—cash
Wrought	1 00@1 40	—cash

Chicago. July 19, 1875.

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

Our pig iron market remains quiet, the demand being confined to small lots. We quote:

No. 1 Coltness	$41 00@ ...
No. 1 Gartsherrie	40 00@ ...
No. 1 Summerlee	39 00@ ...
No. 1 Glengarnock	38 00@ ...
No. 1 Eglinton	37 00@ .
Wareer's "American Scotch"	34 00@ ...
Massilon No. 1 Foundry	33 00@ ...
No. 1 Grand Tower Mo. ores (Bituminous)	30 00@ ...
No. 2, " " "	28 00@ ...
No. 1 Mill	26 00@ ...
Union "A" 1 (Anthracite)	28 00@ ...
Union "B" 1 (Anthracite)	27 00@ ...
No. 1 Lake Superior (charcoal)	30 00@ ...
No. 2 Lake Superior "	29 00@ ...
No. 3 Lake Superior "	30 00@ ...
No. 4 Lake Superior "	32 00@ ...
Bessemer Steel Rails	73 00@ ...
New Iron Rails	50 00@ ..
Old Rails	28 00@ ...

Cleveland, Ohio, July 19, 1875.

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

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	32 50@ ..
No. 2, " "	31 50@ ....
No. 1 Anthracite	29 50@ ....
No 2, "	27 50@ ...
No. 1, Bituminous foundry	29 00@ ..
No 2, " "	27 00@ ...
American Scotch, No. 1, Cherry Valley	31 00@ ...
" " B—1, " "	28 50@ ...
" " No. 2, " "	27 50@ ....
No. 1, Massilon	30 50@ ....
B—1, "	27 50@ ..
No. 2, "	25 50@ .

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	31 50@ ....
No. 4 " " "	32 50@ ....
Nos. 5 and 6 " "	33 00@ ....

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	32 00@ ...

FORGE IRON.

No. 1, Gray	25 00@ ...
White and Mottled	23 50@ ..

The pig iron market is decidedly dull, more so than it has been before, this season, and sales are confined to lots barely heavy enough to meet absolute daily wants Yet prices remain firm, and essentially without change. Strong hopes are entertained, from the nature of the inquiries being made, that a more brisk demand will soon set in—that with the passage of the summer months a far better state of affairs can be relied upon.

The bar iron market continues firm, with considerable inquiry from distant points and light sales at home. Nails are in fair demand. The hardware trade is moderately good.

The iron ore trade is now nearly complete for this season. Ore has all along been accumulating more than one-half more rapidly than it has been shipped to furnaces, and although it is understood that little more will be brought down than has been contracted for, there does no seem to be a desire to receive all of that, at least not while the iron trade remains so dull. The chartered vessels have nearly finished the trips contracted for and another month will take them out of the trade when the receipts of ore will immediately slacken to comparatively nothing —*Manufacturing and Trade Review.*

Indianapolis, Ind. July 19, 1875.

Specially reported by NELSON KINGMAN, broker and dealer in pig iron, etc.

Trade very dull at prices named below.

New Rails at mill	$48 00@50 00
Old Rails "	24 00@26 00
Hanging Rock Charcoal Pig No. 1 foundry	28 00@29 00—4 mos
" " " " " 2 "	26 00@28 00—4 mos
" " " " Mill	24 00@26 00—4 mos
Car Wheel C. B	40 00, nominal.

STONE COAL.

Indiana No. 1 Foundry pig Red Short	24 00@26 00—4 mos
" 2 " " "	22 00@24 00—4 mos
" 1 Forge " "	....@ ....—4 mos
" 2 " " "	...@ ....—4 mos
Ohio No. 1 Foundry pig Cold Short	25 00@26 00—4 mos
" 2 "	24 00@25 00—4 mos
" Mill	23 00@24 00—4 mos
" No. 1 Foundry, Neutral	26 00@28 00—4 mos
" No. 2 " "	25 00@27 00—4 mos
Merchant Bar	2¼c.—3 mos
1st quality C. H. No. 1 Boiler Plates, per lb	5 c.—3 mos
1st " Com. Sheet for No. 24, W.G. "	4 c.—3 mos
1st " Charcoal Sheet " " "	5¼c.—3 mos
Best Bloom Galvanized Shoet, discount 20 per cent	—cash.
2d quality " " " 30 "	—cash.

f. o. b. in Indianapolis.

Louisville. July 13, 1875.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market for all grades of metal is dull, with a strong tendency to inside figures.

The usual time, 4 mos., is allowed on the quotations below.

HOT BLAST—CHARCOAL.

No 1 foundry, from Hanging Rock Ores	$27 00@28 00
No 2 " " "	25 00@26 00
No 1, Mill, from " "	23 00@
No. 1 foundry, from Alabama, Georgia and Tennessee ores	25 00@
No. 2 foundry, from Ala., Geor'a and Tenn. ores	24 00@25 00
No 1, Mill, from " " " " "	23 00@24 00

HOT BLAST—STONE COAL AND COKE

No 1, foundry, from Hanging Rock ores	25 00@26 00
No 2, " " " "	24 00@25 00
No 1, Mill, " " " "	23 00@24 00
No. 1, foundry, from Ala. Ga. and Tenn ores	25 00@26 00
No. 2, " " " "	24 00@25 00
No 1, Mill, " " " "	23 00@24 00
No. 1 foundry, from Missouri ores	27 00@28 00
No. 2 foundry, from Missouri ores	26 00@27 00
No. 1 Mill, from Missouri ores	26 00@27 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock ores	35 00@40 00
" " Tennessee "	30 00@33 00
" " Alabama and Georgia ores	30 00@35 00
" " Kentucky ores	28 00@35 00

Milwaukee. July 12, 1875.

The following are the present prices, per ton of 2,240 lb.:—

Frankfort L. S. Charcoal, No 1.	$30 00
" " " No. 2 & 3	28 00
" " " No. 4 & 5	31 00
" " " No. 6	35 00
Mil. Anthracite L. S., No. 1	30 00
" " " No. 2	28 00
Wisconsin Iron, No. 1	26 00
Mahoning Valley Bit's No. 1	32 00
" " " No. 2	30 00

Pittsburgh. July 21, 1875.

Specially reported by A. H. CHILDS, Esq., Commission Merchant for the sale of pig iron, blooms, ore, etc.

QUOTATIONS.

No 1. foundry	$27 00@28 00—4 mos
" 2. "	25 00@26 00—4 mos
Gray Forge	24 00@25 00—4 mos
White and mottled	22 00@23 00—4 mos
Hot blast charcoal	28 00@30 00—4 mos
Cold blast charcoal	35 00@40 00—4 mos

PITTSBURGH, July 21, 1875.

PIG IRON.—The general position of the market remains substantially as noted in our last review; business continues very quiet, as it generally is in mid-summer, especially during July, when it is customary with many of the mills to take stock and make repairs; it is evident, however, that there is a feeling—and the impression generally prevails—that hard pan has been reached, the lowest notch, and that a reaction is only a question of a little time. The consumption will continue comparatively light during this month and next, as it always is during the heated term, when nearly all the mills change from double to single turn in consequence, but this will not prevent the mills from anticipating future wants. It is generally conceded by consumers that raw iron is not likely to go any lower, and we are cognizant of some of our mill owners who are inclined to buy and who will take considerable at current rates, provided they can get it; the stock, not only here, but at those points tributary to this market, have been very much reduced during the past few months, as the consumption was considerably in excess of the production, and, furthermore, it is worthy of notice that the prevailing rates, even taking reduced cost of ore, labor, etc. into consideration, do not more than cover actual cost of manufacture. It is also worthy of notice that if there is no improvement in prices soon, it is probable that a number of those furnaces in, will blow out, and even if there should be an advance of a dollar or two per ton, it is not likely that many, if any, of those out will blow in before Fall. This may be considered a "bullish" view of the situation, but we believe it is correct; but the general position of this market, at the present time, for mill irons, is favorable to the producing interest, in consequence of the very decided reduction in stock, and while there is no idea entertained of anything like fancy prices, it is very generally expected that an advance of one or two dollars will be established within the next few weeks. Foundry irons continue very dull, as the consumption here has been light ever since the panic, and there does not appear to be much prospect of an early improvement.

MANUFACTURED IRON.—While there is still a very general complaining in regard to prices, which have been very unsatisfactory to makers all season, business continues fairly active; it is holding out as well as usual at this season of the year. The most of the bar mills appear to have sufficient orders to absorb about all the iron they can turn out working single turn, and then nearly all have specialties, on which they have a fair margin for profit, as the production of the latter as yet is not excessive, and the competition in consequence is nothing like what it is in the ordinary sizes of the regular list.

Prices for bars are lower now than they have been at any time since the war, and the impression very generally prevails that the lowest notch has been reached, and that in sympathy with the raw article an early advance is not improbable. While manufacturers are still willing to supply the immediate wants of buyers, they are unwilling to contract for future delivery at current rates. It is believed, in view of the fact that money is easy, and the crops promise well, that there will be a good, healthy Fall trade, although it is probable that the margin for profit will continue small. We continue to quote at $2 25@2 30, Western classification

SALES REPORTED FOR THE AMERICAN MANUFACTURER FOR THE WEEK ENDING JULY 14, 1875.

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

30 tons No. 1 foundry.....$25 00—4 mos.
270 tons gray forge ..... 24 00—4 mos.

ANTHRACITE.

20 tons No. 1 foundry..... $28 00—4 mos.

COKE.

10 tons No. 2 foundry..... $24 00—cash.
400 tons gray forge, neutral..... 24 00—time.

CHARCOAL.

55 tons No. 1.....$29@30—4 mos.
78 tons No. 2 and 3, H. B..... $28 00—time.
American Manufacturer.

Richmond, Va. JULY 14, 1875.

Reported by ASA SNYDER, Esq.

Virginia	Cold Blast	Charcoal	Pig Iron.....	$30	to $35
"	Warm "	"	"	28	to 32
"	" "	Coke	" " 1 X.....	26	to 27
"	" "	"	" 2 X.....	25	to 26
"	" "	"	" 3.....	24	to 25
"	Anthracite 1 X.....			27	to 28
"	" 2 X.....			26	to 27

San Francisco, Cal.

From the *Commercial Herald* of July 8th, 1875.

"The ship *Black Hawk*, for New York, carried upward of a million pounds "Selby" Pig Lead. The consumptive demand for Pig Iron continues to be quite brisk for Scotch. We quote Eglinton No. 1 at $40; Glengarnock No. 1, $42 50@44 for spot parcels, while the same to arrive next fall and winter can be purchased at $32@33 per ton. Australian Block Tin is plentiful and cheap, so also is Tin Plate."

St. Louis. July 20, 1875.

Specially reported by MESSRS. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market is very dull, with few, if any, sales worthy of mention. Prices remain steady, though cash buyers could probably buy round lots considerably under prices we quote. Our Missouri furnaces are inclined to hold their iron fully up to quotations, with few exceptions, while Ohio, Alabama and Pennsylvania irons have been offered very low, to induce sales. Though trade is very light now, we anticipate a change for the better next month, both in demand and prices.

We quote as follows :

BITUMINOUS.

Missouri, No. 1	$28@29	Massillon A No. 1	$36@37
" " 2	$26@27	" B " 1	$34@36
" " 1 Mill	$25@26	" " 2	$33@34

CHARCOAL—HOT BLAST.

Missouri, No. 1	$28@29	Hanging Rock, No. 3	$26@00
" " 2	$26@27	Tennessee, No. 1	$28@29
" Mill	$25@26	" " 2	$26@27
Hanging Rock, No. 1	$29@00	" Mill	$25@
" " 2	$27@00		

CHARCOAL—COLD BLAST.

Missouri Car Wheel	$37@40	Tennessee " "	$35@40
Alabama " "	$35@40	Hanging Rock "	$53@55

MISSOURI BLOOMS AND BILLETS.

Charcoal Blooms	$75@85	Hammered Billets	$90@100
Scrap "	$70@75		

JULY 5, 1875.

The condition of trade is shocking. There is positively little or no demand for iron. The prospects for improvement are very remote. It is expected that when a change takes place it will be brought about by the railroad interests reviving. We can say nothing as to that view. Furnaces and mills have been run without profit; some with positive loss. Mills in this city decline orders of magnitude for railroad work; either the prices bad or the railroad company. Iron Mountain Furnace No. 2 has been running cold blast for some time past up to this week. It is now back on hot blast. There is no certainty as to when No. 3 will be started up. Irondale is repaired, but will not blow in before October. The Laclede Puddling mill and furnace have not blown out over ten days. The bar, sheet mills and forges will run a litte longer, when a general haul-off will ensue, hot weather, repairs and stock-taking being sufficient reasons. Helmbacher mill will stop for awhile after Saturday, for a general repairing and stock-taking.

The St. Louis Iron and Bolt Co. presents one refreshing picture in the gloomy shadows of the surrounding situation. The mill is running on large, fair orders, and will go on double-turn after this week.

LEAD.—Very steady at $6,50, with larger exports than receipts.

ZINC.—Steady at combination prices. There is great interest felt on the question of additional furnaces to the south of the city.—*Mines, Metals and Arts.*

METALS.

NEW YORK, Friday Evening, July 23, 1875.

Gold Coin.—During the week past gold has ranged from 11⅞ to 115, and closed to-day at 112⅜.

Bullion.—Fine silver bar is quoted at $1 21@ 22, gold, per ounce, and fine gold bar, par ($20 67 gold per ounce) to ¼ per cent. premium.

Copper.—The sales during the week have amounted to about 300,000 lb. of Lake, mostly at 23c., although transantions as low as 22½c. are reported. 23c. is asked to-day and has been paid. The inquiries are much more numerous than a few weeks back, although manufacturers are only buying for their most pressing immediate necessities. The great bulk of the copper in this market it is held by strong hands; and under a very easy money market, which makes the cost of carrying very small, it is being held for an improved demand, which is looked for soon. Very little copper is offering at current rates. The latest information by cable quoted Chili Bars, in London, at £80, and Best Selected £88. The metal trade looks for good results from the active foreign demand for future gain, but realizing the conservative spirit existing in business circles, it does not expect to reap immediate results, although an improvement is looked for next month.

Tin.—The business doing in pig is entirely in a jobbing way. Straits is quoted at 18½c; L. and F., 18¾c; and Bancs, 23c. A fair jobbing demand exists for tin plates, which are quoted at $8 12½@$8 25 gold, per box for I. C. Charcoal, and $7 37½@$7 50 for ternes; cone tins, $6 50@$7, and ternes $6 75. The latest quotations by cable were: Straits in London, £78@£78 10/, and Malacca tin at Singapore, $21 25 per picul.

Lead.—The transactions of the week have been in lots of 10 to 25 tons, at 5.95c @6c. gold, and aggregate but little. Most of the larger manufactories were filled up some time ago, and the business now doing is for the immediate necessities of the smaller works. Foreign is very quiet, in small stock and firmly held at 6¾c gold.

Spelter and Zinc.—There is but little doing in spelter, which is somewhat unsettled. The Combination still asks, as a rule, 7.35c@7.50c. currency, cash and 30 days, although some combination lots are reported to have been sold at 7¼c., and even less is hinted. The latter would most probably be the figure at which ordinary lots could be bought. Sheet zinc is rather firm at 8 5/8@8⅞c. gold.

Antimony. We note a sale yesterday in a large way at 12¾c. In a jobbing way 13c.@13¾c. is being asked.

Quicksilver.—This market is quiet at 75c. per lb., and San Francisco, quotes 67½c@70c. In London the price is unchanged, being nominally £11 per flask—75 lb

The San Francisco *Commercial Herald* of July 8, says :

Since the departure of the steamship *City of Tokio*, on the 1st inst., to China and Japan with 1,395 flasks, of an average cash value of $50 per flask, we have had a very quiet market—the nominal price with us per lb. is 70c; in New York, 75c; London £11 per "bottle." Parties desiring to purchase invoice parcels are liberally dealt with by many receivers, for prompt pay, to be delivered from the wharf.

FINANCIAL.

New York Stocks.

July 23, 1875.

The operations of the New York Stock Board during the week under review have been characterized by a moderately active market, the list for railroad stocks closing decidedly firm at a general advance.

Mariposa Land and Mining Company's stock exhibits quite a decline from our last quotations. Recent information from the mines states that the heading of the tunnel is again in hard rock, and work goes ahead very slowly; one lode has been cut.

The United N. J. R.R. & Canal Co. was quoted at the close at 129½ bid.

QUOTATIONS AND SALES OF STOCKS :

	Highest	Lowest	Closing	Shares
Pennsylvania Coal Co.....	—	—	270	—
Consolidation Coal Co.....	48	46½	48	405
Spring Mt. Coal Co.....	—	—	64½	—
American Coal Co.....	—	—	60	—
Maryland Coal Co.....	—	—	19	—
Cumberland Coal and Iron Co.....	—	—	116	—
Del., Lack., and West. RR. Co.....	121	118¾	121	2216
Morris and Essex RR.....	102¼	102	102¼	678
New Jersey Central RR. Co.....	110¾	110	110½	404
Delaware and Hudson Canal Co...	119½	119	*119½	351
Quicksilver Mining Co. pref'd.....	—	—	20	100
" " " Common..	14	13⅞	14	400
Mariposa Land & Min. Co. various.	11¾	10⅜	10⅜	2900
St. Louis & Iron Mountain RR....	—	—	18	—
Lehigh & Wilkes-Barre Coal Co....	—	—	—	—
Total Shares sold				7454
Sales for the week previous.....				11870
Decrease.....				4416

*Ex. Dividend.

The following are the sales of bonds for the same period :

	Sales.	Price
Ches. & O. R. R. 6s, 1st Mtg.....	$500	— @ 38
" " " ex coupon	500	— @ 33
Central RR. of N. J. 1st Mtg. N..	2,000	—@112¾
" " " 1st Cons.....	26,000	104¼@104⅜
" " " Cons. Convt.	5,000	—@110
Am. Dock Imp. Bonds.....	7,000	— @ 99⅝
Del. and H. C., 1st Mtg. Reg. 1891,	—	—@110
Del. and Hudson Canal, 7s, 1894,	—	—@107⅜
Del., Lack. & W. R. R., 7s, cou...	—	—@118
" " " " 2d Mtg..	—	—@111¼
Morris and Essex, 1st Mtge.....	1,000	—@112
" " 2d "	—	—@109
" " Construction ..	38,000	103¾@103⅞
St. Louis & Iron Mount'n 1st Mtg.	5,000	— @ 91¼
St. Louis & Iron M'tn, 2d Mtg.	—	— @ 49
Total Sales.....	$85,000	

Quotations in the last column, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, July 23, 1875.

The Philadelphia Stock Market has been generally steady during the week, with quite a decrease in transactions as compared with the week previous, the market closing firm at a slight advance.

A semi-annual dividend of 3 per cent. has been declared by the North Penn. R.R., payable Aug. 2d. We note recent quotations of the Susquehanna Coal Co's. bonds at 90, bid.

Bonds closed firm with about the average volume of transactions.

QUOTATIONS AND SALES OF STOCKS :

	Highest	Lowest	Closing	Shr's
Catawissa RR.....	—	—	19¼	—
" " Preferred.....	43	42⅛	42½	18
" " New Preferred.....	—	—	39½	1
Huntingdon and B. T. RR.....	—	—	7	—
" " " Pref'd.	—	—	13	—
Lehigh Valley RR. Co.....	61⅞	61½	61½	505
Little Schuylkill RR.....	—	—	50	9
Minehill R'R.....	—	—	53¼	6
Nesquehoning Valley RR.....	—	—	56½	10
Northern Central RR.	—	—	29	—
North Pennsylvania RR.....	—	—	52	—
Pennsylvania RR.	51⅜	50⅞	51⅜	32400
Reading RR.	55⅛	54⅞	55⅛	2201
Delaware Division Canal.....	—	—	—	—
Lehigh Coal and Nav. Canal.....	50⅝	50¼	50⅝	5602
Morris Canal.....	—	—	51	—
" Preferred.....	—	—	128½	—
Pennsylvania Canal.....	—	—	—	—
Schuylkill Navigation Canal.....	—	—	7¼	—
" " Preferred..	—	—	14¾	71
Susquehanna Canal.....	—	—	—	—
Buck Mountain Coal Co.....	—	—	—	—
Fulton Coal Co....	—		—	—
Locust Mountain Coal Co....			—	—
Westmoreland Coal Co.....	—	—	80	—
Cambria Iron Co.....	—	—	—	—
Crane Iron Co.....	—	—	—	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co...	—	—	72	—
Total shares sold.....				40,923
Sales for the week previous.....				63,033
Decrease.....				22,110

Quotations in the last column, in the absence of sales, represent the latest prices bid.

Sales of the various bonds for the period under review have been as follows :

	Sales.	Price
Catawissa RR., 1st m'tge. conv. '82.....	$——	—— @——
" " chat. " '88.....	——	—— @——
" " new 7s. 1900.....	——	—— @106
H. and B. T. RR. 1st mortgage, 7s.....	——	—— @106
" " " 2d "	——	—— @103
" " " 3d " cons	——	—— @ 51
Lehigh Valley RR. 6s, '98.....	2,000	—— @103¼
" " " 6s reg. '98	——	—— @103¼
" " " 7s, 1910	10,000	—— @110
" " " con. mtge. 6s reg...	20,000	—— @ 99
North Penna. RR. 2d mtge. 7s, '96.....	——	—— @107
" " "	6,000	—— @102
Pennsylvania RR., 1st mtge. 6s, '85.....	2,000	—— @104
" " gen. " reg. 1910...	5,000	103 @103⅛
" " 6s coup.....	3,000	101 @101¼
Phil. & Reading RR. 6s, '80.....	1,000	—— @ 80
" " " 7s, '93.....	——	—— @108
" " " deb. bonds.....	500	—— @ 80
" " " G. M. 7s, cou. 1911,	——	—— @106
" " " " reg. 1911,	1,000	—— @107¼
" " " 6s q 1911.....	——	—— @106¾
" " new convertible 7s, '93....	7,700	—— @105¼
Phil. & Reading C. & I. Co. 7s deb. '92....	——	—— @ 80
" " " " 7s '92-3.....	——	—— @——
Lehigh Coal & Nav. Canal, 6s '84.....	1,500	—— @102¼
" " " RR., '97.....	2,000	—— @102¾
" " " '77.....	——	—— @ 96
" " " conv. '82.....	1,000	—— @102½
" " " " g. '94.....	500	—— @106
" " " gold, '97.....	2,500	—— @102½
Morris Canal, 1st mtge. 6s, '76.....	——	—— @100
" " 2d " '76.....	——	—— @100
" " boat, '85.....	——	—— @100
Penn. and N. Y. Canal, 7s.....	10,000	105½@106
Schuyl. Nav. Canal, 1st mtge. 6s, '97.....	968	—— @ 96
" " " 2d " 1907.....	——	—— @ 81
" " " mtge. 6s C. '95	——	—— @ 78½
" " " 6s Imp. '80.....	——	—— @ 94
" " " 6s boat and car, 1913,	——	—— @ 77
" " " 7s " " 1815,	——	—— @ 91
" " " scrip.....	660	94 @ 95
Susquehanna Canal, 6s '94.....	——	—— @ 77
Total amount of sales.....		$77,328

Gold and Silver Stocks.

SAN FRANCISCO, July 21st, 1875.

The San Francisco Stock Market still continues its upward movement; a slight decline in Eureka Consolidated and Union Consolidated being the only exceptions to a decided advance of the whole list.

The Hale & Norcross and the Chollar-Potosi companies have united in the sinking of a joint shaft on the Comstock lode, which is designed to be six thousand feet deep—deeper than any existing or projected shaft in the world. Plans have been submitted and approved, machinery has been erected, and the preliminary work finished. The shaft is now down seventy-five feet.

Some interest is manifested, in San Francisco, in the Gold Hill Mines, in consequence of the developments in the deep workings of the Imperial Mine. On the 2,000-foot level pay ore is coming in, traces of mineral having been recently exposed in what is known as the up-raise.

Specimens from the south end of the Leopard Silver Mine, Nevada, assay $8,000 per ton. This company have announced a dividend of 50c. per share, amounting to $25,000, payable July 15. Specimen assays from the Queen of the West silver mine, Colorado, return $12,290 per ton.

The operations of the Eureka Consolidated Silver Mine

during the past fiscal month show a heavy increase. They were as follows :

	Lb.
Ore received from the mine	11,214,230
Bullion produced	1,803,108
Bullion shipped	1,607,438

Four furnaces are now employed, which on the 14th produced 910 bars of bullion, weighing over 50 tons.

A new Mining Stock Exchange has been organized at Denver, Colorado, but owing to the scarcity of speculative capital, its transactions are very limited.

The June product of the Ophir Mining Co. amounts to $43,000. The product of the Manhattan Silver Mining Co. for the month of June amounted to $130,100.

The exact bullion production of the Consolidated Virginia silver mine for the past fiscal month was $1,501,000, out of which a ten per cent. dividend amounting to $1,080,000 was paid, and a balance carried to the surplus fund. This product is slightly in excess of the programme of the company, which is to take out $50,000 per day, or $1 500,000 per month. This is a splendid showing, and would have been increased were it not for the fact that the mills stopped several days for repairs. The ore from the Belcher and Crown Point mines is said to show increasing richness. The product of the Belcher for the last month was $290,481.

The financial report of the Chollar-Potosi Silver Mining Company for the fiscal year just closed is as follows:

Receipts from ores, etc	$625,396 48
Disbursements for mining, milling, etc.	557,359 63
Balance on hand	$68,036 85

Quotations July 21, 1875.

Gould & Curry	19	Overman	63
Savage	118	Raymond & Ely	49
Chollar Potosi	79	Eureka G. V.	5
Ophir	53	Best & Belcher	49
Hale and Norcross	41	Kentuck	16
Crown Point	33	Meadow Valley	7
Yellow Jacket	90	Alpha	22
Eureka Consolidated	58	Sierra Nevada	15
Belcher	31	Union Consolidated	5
Imperial	10	Mexican	21
Consolidated Virginia	319	Caledonia	24
California	61	Silver Hill	—

Copper Stocks.

BOSTON, July 22, 1875.

Copper stocks are dull and unchanged. A dividend of $5 per share is announced by the Calumet and Hecla Mining Co.

The report of the Engineer of the Duncan Silver Mining Co. is very favorable, and expresses full confidence in the future of the mine under proper management, and increased facilities for its development. Sales of this stock have been made during the week at 60c. per share.

100 shares of the Silver Islet Mining Co. sold at auction recently at $251 per share.

Quotations are as follows :

Allouez	16	National	..
Calumet and Hecla Co.	159	Petherick	..
Copper Falls	8	Quincy	40½
Central	25	Ridge	6
Franklin	..	Rockland	50c

Gas Stocks.

NEW YORK, July 23, 1875.

The following quotations of Gas Stocks represent prices which have been bid during the week :

Manhattan Gas Light Co.	New York,	par 50	300
Metropolitan "	"	" 100	157
New York "	"	" 100	157½
Mutual "	"	" 100	100½
Harlem "	"	" 50	130
Baltimore "	Baltimore,	Md.	190
People's "	"	"	25⅝
Boston, Mass. "	"		770
Cambridge, "	"		132¾
Portland, Me. "	"		72
*Hartford, Conn "	"		45†
San Francisco, Cal. "	"		99
Williamsburgh "	"		140
Northern Liberties Gas Light Co.	Philadelphia		29½
Brooklyn "	"	par 25	245
Citizens' Gas Co.,	Brooklyn	" 20	150
Nassau "	"	" 25	123½
People's "	"	" 10	96
Metropolitan "	"		100
Westchester Co Gas Co.,	N. Y.		100
Louisville, Ky			127
Cincinnati, Ohio, Gas Light and Coke Co			205

* Ex dividend. † Asked.

The East Boston Gas Light Co. announces a dividend on demand. We note recent quotations of the Baltimore Gas Co.'s 6 per cent. gold certificates at 107. The Capital Gas Light Co. of Sacramento announces a dividend of 30c. per share. The San Francisco Gas Light Co. has paid $350,000 in dividends for the first six months of the present year. At an auction sale in Boston, recently, a few shares of the Chelsea, Mass., Gas Light Co. brought $130 per share.

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. THE ENGINEERING AND MINING JOURNAL, containing the official reports of proceedings, transactions and notices of meetings, will be sent to each Member and Associate on the payment of his annual dues. Back numbers cannot, as a rule, be sent.

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

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

IV. The second volume of Transactions has been mailed to all home members and associates not in arrears. Any member who failed to receive his copy will please notify the Secretary promptly. The Institute is not responsible for the loss of the volume in those cases where members have changed their residences and have omitted to inform the Secretary. Volumes I. and II. will be sent, post-paid, to non-members, at five dollars each.

THOMAS M. DROWN, Secretary, Lafayette College, Easton, Pa.