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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. Articles written by Mr. Raymond will be signed thus * Those written by Mr. Van Wagenen will be signed ‡.

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WESTERN OFFICE OF THE ENGINEERING AND MINING JOURNAL—DENVER, COLO.

The Western office of the ENGINEERING AND MINING JOURNAL, at Denver, Colorado, is under the charge of T. F. VAN WAGENEN, Esq., as Staff Correspondent, and W. W. ROSE, Jr., Esq., as Manager. These gentlemen are the fully accredited agents of this JOURNAL for the Western Department, extending from the Mississippi to the Pacific, and are authorized to make contracts for advertising, take subscriptions, and collect and receipt for the same.

All business communications from the Western Department should be addressed to the Western Office at Denver.

AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

The Sixth Annual Meeting of the Institute will be held in Wilkes-Barre, Pa., beginning Tuesday evening, May 22, at 8 o'clock.

In addition to the regular sessions for the reading and discussion of papers, the Local Committee has arranged for visits to the mines and works in the vicinity of Wilkes-Barre, including the wire rope works of the Hazard Manufacturing Company, General OLIVER'S powder mill, the Lehigh and Susquehanna planes, etc. It is also proposed to visit the steel and iron works at Scranton.

Trains leave New York for Wilkes-Barre via Central Railroad of New Jersey, at 6:30 and 8:45 A. M. and 1 P. M., and via Lehigh Valley Railroad at 6:30 P. M., arriving at 1:55, 4, and 8:30 P. M. and 1:15 A. M. Trains leave Philadelphia at 8:15 and 9:45 A. M., and 2:15 and 8 P. M., and arrive as above.

There will be a meeting of the Council of the Institute at 5 o'clock on Tuesday afternoon.

EASTON, PA., May 17, 1877. THOMAS M. DROWN, Secretary.

THE INSTITUTE ELECTION.

We have received (in common, we suppose, with other members of the Institute of Mining Engineers) a printed ballot, containing the names of certain candidates for the approaching election. We presume the intention of the sender or senders was to recommend these candidates. The anonymous nature of the circular has, however, misled a number of members, if we may judge from their communications, alluding to it as the "official ticket," and assuming that either the Council or the editors of this paper, or some caucus of leading members, has adopted this method of suggesting to their colleagues the most suitable ticket. We feel obliged to correct this misapprehension. The Council of the Institute has nothing to do with any nominations, and has taken no action in the matter. The ENGINEERING AND MINING JOURNAL has said nothing on the subject this year, and its editors are not concerned in the preparation or distribution of the printed tickets referred to. It is the right of any member to nominate candidates, and the duty of the Secretary to send out the nominations he receives. Beyond that no official or semi-official measures can be taken. If any member or set of members wish to elect certain parties and defeat others, they may undoubtedly make speeches, write letters, or print circulars for th purpose. Their letters and circulars may even be anonymous, if they so prefer; though in that case we should think they would have little weight.

These remarks are in no way directed against the candidates upon the ticket above referred to. Some of them have assured us that they were ignorant of its origin and existence. Many of them we have personally voted for—just as we should have done without this mysterious suggestion. Others we have voted against, because there were among the names omitted from this list candidates whom we preferred. So far as we are concerned, therefore, the circular has had no greater effect than any other advice volunteered by people whom we do not know, and who do not give their names. Its evident object is to defeat certain candidates, possibly also to elect certain others. Whether there are any other plans behind it, we are quite unable to say. The whole thing is vague and irresponsible, and, but for the unfortunate form which has led members into a serious mistake, it would be too trivial a matter for mention.

While speaking of Institute affairs, we beg to acknowledge with thanks the communications of numerous members, taking strong ground in favor of the present system of publication. We shall not at present publish any of them, since we do not think the subject need be further discussed in its present shape and while the only complaints come from outside. Opinions can be more appropriately ventilated at the Wilkes-Barre meeting. But the recognition so heartily extended to our endeavors to serve the Institute in the past could not fail to be most agreeable to us.

THE BURLEIGH TUNNEL, GEORGETOWN.

Directly under the shadow of the great cliff which rises on the north side of Silver Plume Creek, about a quarter of a mile below the town of Brownville, is the mouth of the Burleigh tunnel, an enterprise which, we believe, was inaugurated in 1869 or thereabouts, and, after being driven into Sherman Mountain for 1,300 feet, was temporarily abandoned by reason of the fact that the veins intersected were all carriers of too low a grade of mineral to be mined with profit. Great hopes were entertained of the ore bodies thought to be in the line of the tunnel which crossed the Bush, Mendota, Cashier, Phœnix, Coldstream, Virgin, and numerous other veins, and much disappointment was felt when work was stopped, because the impression was conveyed to all who passed by its mouth and saw its smokeless stack that the veins of Sherman Mountain were barren and worthless in depth.

For many months no work was done, but at last the owner resolved to push it ahead once more. A force of men was put on, and, discarding the heavy drill carriage, a reduced bore was decided upon, and 600 feet more was driven, making its length between eighteen and nineteen hundred feet. There being no important developments work was again discontinued till last summer, when it was decided to push it 600 feet farther on, and to prospect what is thought to be the Bush lode, which was cut 900 feet from the mouth. The work has since gone steadily ahead, until at present the header is 2,200 feet from the mouth, the last 100 feet being driven almost wholly in ledge matter carrying numerous streaks of ore and showing fair assays. No stop, we believe, is to be made until a length of 2,400 feet is gained, when it is greatly to be hoped enough ore-bearing veins will be crossed to insure the extraction of ore sufficient to at least pay the expenses of continued exploration.

The section of Sherman Mountain undercut by this tunnel shows many veins on the surface, but, with the exception of the Coldstream, Phœnix, Cashier, and Mendota, but little development has been done upon them. It has been thought by some that a low grade belt of lodes existed on this part of the mountain, but wherever extensive work has been done above this idea is positively disproven. The tunnel, as driven so far, indicates that the veins continue downward unmistakably, and had those already cut been explored east and west, as has the New Era or Bush, an abundance of ore would doubtless have been found. We learn it is the intention of the owner hereafter to follow this course. If large bodies of ore are found, the 600 feet of narrow tunneling will be blasted out to full width (8 x 10), a double track laid, and ample accommodations made at the mouth for sorting, storing, and shipping mineral. It would be a real misfortune to the prosperous district around Georgetown to have another suspension of this important work.

The breast of the tunnel is now about 1,800 feet below the surface. Should the Coldstream preserve the dip it has shown on the surface, it will not be intersected short of 3,100 feet from the mouth and over 2,000 feet below its outcrop. The utmost confidence may be felt that when that noble vein is reached plenty of ore will be found, and, should the tunnel reach it, Colorado will have the distinction of having the deepest metal mine on the continent next to the Comstock. The Cashier has already been cut beyond a doubt, but where the tunnel crosses it the vein is split up into a number of minor seams, which so far have discouraged exploration. Where opened upon the surface this lode showed as rich ore as has ever been taken from the mountain, and yielded well until a barren chimney of exceedingly hard rock was encountered, through which the company never penetrated.

Back of the Coldstream lie the Virgin, Epluribus, Quaker, St. Joe, and a host of promising veins. The extensions of the Antelope, Pelican, and Coony City coming in from the east, and of the Brown, Benton, Hercules, and President from the west, must cross the line of the tunnel on or near the crest of the mountain, and it is impossible to believe that large bodies of rich ore do not exist on their course.

From the crest of the mountain down to the level of the tunnel is a distance of not less than 3,000 feet. The opportunity for opening a vast amount of min-

eral ground known to be rich is not to be excelled in any part of the West Sutro has had to drive 1,800 feet to reach the nearest ore seam of the Comstock, and does not gain over 2,000 feet in depth, while the Burleigh tunnel will open the entire mineral belt of Sherman, Brown, and Republican mountains to a depth of 3,000 feet by a tunnel not over 4,500 feet in length. And a careful study of the veins on this range, with their history and production, cannot fail to impress one favorably with the district. ‡

HARD PAN AND WATER IN COMSTOCK STOCKS.

Every one who compares the market values of the Comstock mines in 1871 with those of the same companies in 1876 cannot but be surprised at the liberality with which they have been irrigated. The capitals have grown, like mushrooms, in a night. Large dividends from a few mines have been made the pretext for flooding the whole country with mining stocks. Any one who had, or could lead any one else to believe he had, a location on "the continuation of the Comstock," at once organized a company with a capital of ten million dollars, the stock being issued "fully paid," though, under the California and Nevada laws, still liable to assessment. In the following table the amount of assessments on these fully paid stocks is given, but this does not by any means represent the total amount expended on these mines. Notwithstanding this, and that this list includes only the best mines, the Comstock has made a fine return on the original investment made in it. The wonderful profits earned by some of the mines has, however, been productive of other than good results, for it has converted San Francisco into a city of gamblers, and thousands have been ruined by their senseless investments in mines, while the money is gradually becoming concentrated in the hands of a small number of (now) very rich men. What the end of this concentration of wealth in the hands of a few, who are not using it in general industrial enterprises that would afford occupation to large numbers in California, may yet become, is a problem of dangerous interest. At present the depression to which the East has long been accustomed is beginning to be felt in California, and the worst is not yet. On the 12th inst., basing the market value of the stocks on the closing quotations, 22 of the leading mines were selling in San Francisco for $33,444,000; on the 1st of January of the present year the quotations indicated a total market value of $86,281,800, while on the 11th of May, 1876, one year ago, the market was active and buoyant, the same list of mines selling then at $126,379,200, showing a loss within this period of $92,935,200, or 72 per cent. Here, however, business is certainly reviving, and the worst is past, except, perhaps, in a very few instances.

We give below a very interesting comparison, showing the increase in the shares, capital, etc., of the principal Comstock mines since 1871, also the value of the present shares, based on the original or unwatered issue of shares in 1871:

THE HISTORY OF A GREAT MINE.

Under the excitement produced by the Consolidated Virginia and California bonanza on the Comstock, people have almost forgotten the great $50,000,000 bonanza which, a few years ago, was the wonder of every one interested in Western mines. In 1871 and 1872 the Crown Point and Belcher mines at Virginia City were regarded as the greatest silver mines ever found, and until January, 1875, they sustained their great reputation. When the ore body was exhausted the mines were quickly forgotten by the public even of California, and their remarkable productiveness cast into the shade by the enormous discoveries at the other end of the great lode.

The history of the two mines is one of unusual interest, as showing how great mines like great individuals live and die. Prior to 1867 these properties were of no note. They paid expenses and a small profit, but that was all. In January of that year, however, the Crown Point began paying small dividends and continued them monthly till June 1, by which time it had paid out a little over a quarter of a million dollars. It then ceased paying, and in June, 1868, levied an assessment of $90,000. In May dividends were resumed, and continued for five months, the sums paid aggregating $360,000, when the mine again ceased paying profits. In August, 1869, an assessment of $60,000 was levied, in the November following another of $90,000 was collected, and in January, 1870, still another of $90,000. The mine now managed to pay its way till August, when $36,000 was demanded of the stockholders, and in October of the same year a call was made for $42,000. By this time the patience of a large majority of stockholders was completely exhausted. It was regarded as folly to prosecute operations farther. The mine was considered as exhausted, and many owners of shares forfeited their property rather than pay out any more money, There was strong talk of shutting down the mine as a complete failure. At this juncture, however, several capitalists who had invested heavily in Crown Point and Belcher (which are adjacent properties), and who were loth to give them up and the money they had sunk in them, agreed to put up $1,000,000 for further explorations. This was in the fall of 1870.

Early in 1871, and before one-tenth of the funds pledged had been used, the great ore body which made the two mines famous was struck. In June the Crown Point resumed its dividends, and with the exception of three months in 1871 and seven months in 1872 continued paying until the close of January, during which time it handed to its stockholders $11,040,000. The Belcher, owing to a slight retardation of its developments, did not commence dividends till January, 1872, but after beginning did not suspend except for three months during three years, its total profits to stockholders during that time amounting to $14,560,000. During 1873 and 1874 the two mines paid from $800,000, to $1,000,000 a month and in May and June, 1873, the dividends were respectively $1,832,000 and $2,040,000. Up to and including January, 1875, these two mines levied assessments and paid dividends as follows:

Total dividends	$27,061,200
Total assessments	2,137,800
Net profit	$24,923,400

The two mines have produced since their opening over sixty millions of dollars. One of them—the Crown Point—is again upon the assessment list, while the Belcher is still extracting enough ore to pay its running expenses. The great bonanza which they had is, however, exhausted, and a new ore body must be found before hopes can be entertained of a resumption of dividends, Both mines are being actively explored, and without doubt will be again pro-

NAME OF MINE.	1871. No. of Shares.	1871. Quotations. Highest	1871. Quotations. Lowest	1871. Value of Mine. Highest.	1871. Value of Mine. Lowest.	1876. No. of Shares.	1876. Quotations. Highest	1876. Quotations. Lowest	1876. Value of Mine. Highest.	1876. Value of Mine. Lowest.	Value of present shares on basis of lowest value of mine in 1871.	No. of shares of stock to each foot on vein. 1871.	No. of shares of stock to each foot on vein. 1876.	Total assessments levied to May 18, 1877.	Total div. disbursed to May 18, '77.
Alpha	6,000	$20 00	$3 00	$120,000	$18,000	30,000	$75 00	$21 00	$2,250,000	$630,000	$0 60	20	98	$180,000	....
Belcher	10,400	405 00	4 00	4,212,000	41,600	104,000	38 00	14 00	3,952,000	1,456,000	40	10	100	864,400	$15,397,200
Bullion	5,000	5 00	5 00	25,000	25,000	100,000	68 00	18 00	6,800,000	1,800,000	25	2	106	2,402,000	....
Challar-Potosi	28,000	91 00	27 00	2,548,000	756,000	28,100	147 00	71 00	4,116,000	1,998,000	27 00	10	20	1,282,000	3,080,000
Crown Point	12,000	350 00	10 00	7,200,000	120,000	100,000	28 00	7 00	2,800,000	700,000	1 20	20	183	1,373,370	11,588,000
Consolidated Virginia / California	11,600	12 50	1 62	145,000	18,792	1,080,000	96 00 / 95 00	43 00	51,840,000 / 51,300,000	18,900,000 / 23,220,000	02	10	824	411,200	27,000,000 / 14,040,000
Exchequer / Gould and Curry / Best and Belcher	8,000 / 4,800	18 50 / 178 00	3 00 / 37 00	148,000 / 854,400	24,000 / 177,600	100,000 / 208,800	27 00 / 24 00 / 67 00	8 00 / 12 00 / 42 00	2,700,000 / 2,592,000 / 6,753,600	800,000 / 1,296,000 / 4,233,600	24 / 85	20 / 4	250 / 180	280,000 / 2,242,000 / 236,992	.... / 3,934,800 ....
Hale and Norcross	8,000	145 00	51 00	1,160,000	408,000	112,000	16 00	7 00	1,792,000	784,000	3 64	20	280	2,410,000	1,598,000
Imperial	4,000	85 00	3 50	340,000	14,000	500,000	18 00	2 00	9,000,000	1,000,000	03	16	1,070	375,000	....
Julia	10,000	6 00	30	60,000	3,000	110,000	17 00	5 00	1,870,000	550,000	03	5	37	330,000	....
Justice	21,000	47 00	2 00	987,000	42,000	105,000	30 00	18 00	3,150,000	1,890,000	40	10	50	1,502,500	....
Kentuck	2,000	191 00	30 00	382,000	60,000	30,000	20 00	7 00	600,000	21,000	2 00	21	326	270,000	1,252,000
Ophir / Mexican	16,800	28 00	3 00	470,400	50,400	201,600	76 00 / 44 00	20 00 / 16 00	7,660,000 / 4,752,000	2,016,000 / 1,728,000	25	12	158	2,034,400 100,800	1,394,400 ....
Overman	12,800	41 00	2 00	524,800	25,600	38,400	126 00	60 00	4,838,400	2,304,000	66	11	32	2,337,480	....
Savage	16,000	80 00	33 00	1,280,000	528,000	112,000	24 00	11 00	2,688,000	1,232,000	4 73	20	145	3,082,500	4,460,000
Seg Belcher	6,400	45 00	1 00	288,000	6,400	6,400	110 00	60 00	704,000	384,000	1 00	40	40	244,800	....
Sierra Nevada	20,000	32 00	9 00	64,000	18,000	100,000	28 00	11 00	2,800,000	110,000	18	30	30	1,650,000	102,500
Yellow Jacket	24,000	99 00	35 00	2,376,000	840,000	120,000	130 00	13 00	15,600,000	1,560,000	7 00	20	125	2,838,000	2,184,000
Totals	226,800			$23,184,600	$3,176,392	3,186,300			$191,558,000	$68,612,600		aver. 14.5	aver 214.5	$26,447,442	$86,030,900

The following table needs no comment:

	1871.	1876.	Increase in five years.
Nominal or capitalized value of the above list	$22,680,000	$318,630,000	$295,950 00
Highest market value " "	23,184,600	191,558,000	168,373,400
Lowest " " " "	3,176,392	68,612,600	65,436,208
Aggregate No. of shares " "	226,800	3,186,300	2,959,500
Aggregate No. of feet on the vein " "	21,507	24,453	2,946

The total amount of dividends and assessments to May 18 of all the mines whose stock is quoted at the San Francisco Stock Market is given in the following table:

Districts.	Number of Companies.	Dividends.	Assessments.
Washoe, Nevada	91	$87,161,270	$39,670,957
Ely, "	22	4,432,500	3,837,100
White Pine "	7	31,999	772,961
Cornucopia "	7	102,500	160,000
California Mines	13	2,536,000	934,600
Idaho "	12	575,000	3,359,000
Miscellaneous "	24	2,891,000	2,525,500
Totals	176	$97,790,269	$51,260,118

The total capital stock of these mines is about $319,000,000. The total pro-

ducing in the future, if stockholders, learning a lesson from the past, do not allow themselves to become too easily discouraged.

For most of the statistics in this article we are indebted to the *Evening Bulletin* of San Francisco. ‡

NEW PUBLICATIONS.

REPORTS OF THE UNITED STATES COMMISSIONERS TO THE INTERNATIONAL EXHIBITION HELD AT VIENNA, 1873. VOL. IV. ARCHITECTURE; METALLURGY; GENERAL INDEX. Washington. 1876.

We have already noticed the preceding volumes of this series, although more tardily and briefly than they deserved. In both respects, the present mention of the final volume will again be defective. We can do little more than indicate its contents; and one only consolation is the reflection that a late notice, and a short one, is better than none at all.

Under the head of Architecture, we have, first, a report by Mr. L. BRIDGES, on the Buildings of the Exhibition, which is merely descriptive, without being critical. The great architectural novelty of the occasion—Mr. SCOTT RUSSELL'S iron lantern-dome—is simply pictured and puffed, without a hint of the truth that Mr. RUSSELL'S design was found impracticable by the builders, and that, after the experience obtained at Vienna, this "triumph of skill and art in engineering" is not likely to be imitated. Mr. BRIDGES' discrimination and impartiality are, we trust, not justly represented in his remark (p. 7) that the American school-house "was pronounced by all visitors the most complete school-room at the exposition." Of the far superior Swedish school-house he deigns to say only that it was "in the form of a cottage." We do not know whether Mr. BRIDGES is an architect or not; if he is, he has not betrayed it in this report. His brief and discursive notes on the methods of building in Vienna, brick-making, railway stations and signals, are not without interest, but there is no thorough discussion of anything. The paper reads like the note-book of an intelligent, non-professional traveler—possibly a "railroad man."

The next paper, on the Construction and Embellishment of Private Dwellings in Vienna, by Mr. JOHN R. NIERNSEE, a Fellow of the Institute of Architects, is brief, but exceedingly clear and satisfactory. It contains a historical sketch of the origin of the system of dwellings adopted in Vienna, a description of their construction and embellishment, a discussion of their architectural features, and general criticisms, indicating good judgment and insight. At this time, when the "French flat" system is coming into vogue in the largest American cities, this account of the perfected apartment-houses of one of the most splendid capitals of Europe will be specially welcome to our architects. It is accompanied with numerous plans and elevations.

The contribution of Mr. NELSON L. DERBY, on Architecture and the Materials of Construction, is devoted chiefly to the latter branch. It cannot be said that Mr. DERBY is not critical or that his patriotism blinds him. Under the head of Terra Cotta, he "pitches into" the American practice of using cut granite, and complains (with justice, if not with absolute logical connection) of the monotonous *facade* of the New York Post Office. What he says in favor of brick as a building-material is worthy of consideration. The behavior of stone—especially granite—when exposed to such conflagrations as those of Chicago and Boston, has greatly injured its reputation with us. People are inclined to prefer a material which, having been burned already, can better endure the process over again. As to architectural beauty, as Mr. DERBY shows, and as many fine buildings in this country have proved, brick may be so employed as to serve that end also. Our architects, in feeling after effective combinations of black, red, and white in brick walls and "trimmings," may produce here and there novelties more startling than agreeable; but time will mellow their buildings while its ripens their judgment, and brick will win in the long run—Babel and the Pyramids will be vindicated. Mr. DERBY gives cement and mastic a good word; condemns cast-iron and corrugated iron, and briefly describes the use of stone and wood in Europe, winding up with brief notices of praiseworthy features in foreign architecture, and a vigorous setting forth of the defects in our own practice, especially in acoustics, sanitary, educational, and æsthetic respects. It is wholesome reading for patriots.

Mr. N. M. LOWE reports on the Wood Industries, including veneers, parquetry, marquetry, cooperage, carving, furniture, etc., giving little more than a descriptive catalogue of the exhibits.

Mr. LOUIS J. HINTON'S report on the Working of Stone includes chapters on stone-cutting machines, cut and carved stone-work, paving and tiling, cement, stucco, terra-cotta, and artificial stone. Under the latter head the well-known apœnite, or Ransome stone. is (somewhat unnecessarily) described, and high praise is given to the "universal marble" of a Belgian concern, the manufacture of which is, however, a secret.

The next report is that of Prof. W. P. BLAKE on Iron and Steel. This subject might well have occupied the exclusive attention of a man of science and leisure. That Prof. BLAKE, in the pressure of duties connected with our impending Centennial, should have consented to fill the gap occasioned by the absence of a competent person specially delegated for the work, and that he should have done so much so well, is matter for praise and thanks. But the deficiency which he admits in advance, in his Introduction, we feel also on perusal of the report—a lack of generalization and of due proportion. The report contains what Prof. BLAKE was able to collect with the time and means at his disposal, and the space devoted to each nation or branch of industry is determined rather by the amount of information the author had obtained than by the relative importance of the topic itself. Thus the Austrian Empire receives 49 pages; the German Empire, 60 pages; France, 12 pages; Belgium, 11 pages; Sweden, 41 pages; Spain, Russia, and Siberia, 10 pages in all; Great Britain, 9 pages; the United States, 7 pages; and Asia, 4 pages. This is indeed about the relative proportion of the exhibits at Vienna; so that, for a report on the Exhibition, this distribution of space is not unjust, though unsatisfactory for a report on the industry treated. An examination of the different chapters shows them to be mainly compilations, containing a large amount of useful statistical and technical information. There are very few novelties, the Austrian manufacture of ferro-manganese in blast-furnaces and the process of hydraulic forging being the principal ones. In the matter of illustrations Prof. BLAKE'S industry and judgment have yielded good fruit. There are about fifty sections of blast-furnaces, and many interesting diagrams and machine drawings. The illustrations are, it is true, concentrated on a few subjects, but we have, under the circumstances, only to be thankful for that which is given us, without complaining of the absence of much that we would like to have.

The concluding report, on the Metallurgy of Lead, Silver, Copper, and Zinc, is from the pen of the late HOWARD PAINTER, a young, ambitious, and promising member of our profession, whose untimely decease it was, some months ago, our sorrowful duty to record. Mr. PAINTER'S report exhibits technical knowledge of the subject, and a considerable faculty of independent criticism. Taken as a whole, it is an admirable summary of the state of foreign metallurgy at the time of its preparation. It deals most fully with the processes of lead and silver smelting at Freiberg and in the Hartz, and in this respect it is brought into unfavorable comparison with the work of recent writers, like Mr. EILERS, on the same subject—writers who combine, with a knowledge of foreign practice and literature equal to Mr. PAINTER'S, a superior familiarity with the relative advantages and disadvantages of the various processes, as judged from the standpoint of American conditions. But Mr. PAINTER'S report has a wider range, and covers many topics concerning which it is the latest and best authority in the English language.

The General Index at the end of this volume is complete and well arranged, and constitutes a feature the lack of which in the Paris Reports was a sad defect.

BERGBAU UND HUTTENKUNDE (*Mining and Metallurgy*). VON DR. ADOLF GURLT. Essen, Germany. 1877.

DR. GURLT is a mining engineer and metallurgist of Bonn, whose name is widely known through his scientific papers and inventions. The present treatise is a reprint, in separate form, of a part of the third volume of a popular cyclopædia of the natural sciences, to which various authors have contributed. Of course this thin book of 176 pages cannot contain a full manual of either mining or metallurgy—still less of both. Nor is this its purpose. It is intended primarily to interest and instruct educated non-professional readers. Only the important principles, processes, and machines are described, and these only in general terms. But there is all the difference in the world between an abridgement and generalization performed by a thorough expert and the same kind of work executed by a mere literary hack. Dr. GURLT'S general statements have a sound scientific basis, and his book will be interesting and valuable to students and practitioners as well as to the average reader. For it contains much historical information not elsewhere easily accessible, and it is enriched with numerous excellent engravings. G. D. Baedecker, Essen, is the publisher.

LECTURES ON MINING. By the late Prof. CALLON, of the School of Mines, Paris. Translated by C. LE NEVE FOSTER. 3 vols.: $9 50 per vol. For sale by E. STECHERT, New York; and by D. VANNOSTRAND, 23 Murray Street, New York.

This course of lectures is well known to many of the American engineers who studied in Europe, and it is a subject of congratulation that its translation has been made, and more especially by so competent an engineer as Mr. C. LE NEVE FOSTER, the (British) Government Inspector of Mines for Cornwall.

THE ORIENTAL PORCELAIN QUESTION.

TO THE EDITOR: SIR—I am sorry to see by Mr. Wurtz's letter in your number of the 28th April that he has understood me as wishing to detract from the great credit which is certainly due him for his investigations on the Japanese porcelain materials, a misconception which is partly justified by the slightly altered form in which, if I mistake not, you published my letter, for the sake, I suppose, of making a more extended quotation from Von Richthofen's article. My criticism was really upon you, and not upon Mr. Wurtz—for I had no reason to suppose that he made the claim himself—for crediting that gentleman with the "discovery that Japanese *and Chinese* fine porcelains are *not formed of clay at all*," when Von Richthofen had announced several years back that the Chinese articles were formed of a material made "*by pounding hard rock.*" For more than this announcement—in itself striking enough to have attracted far more attention than it has—Von Richthofen is certainly not to be credited; and as a matter of course it does not follow that because the Chinese "kaoling" is not our kaolin, that the same is true of the Japanese material.

To both of the questions, then, which Mr. Wurtz asks as to the amount of credit justly due him, I would answer most heartily, as far as my knowledge of the matter goes, Yes.

If this little discussion should do its part in drawing attention to the nature of the Japanese and Chinese porcelain rocks, it will not be altogether waste of breath; for have we not a plenty of felsitic or petro-silicious rocks, and may we not make use of them as the Chinese do? Here is an interesting field for investigation, and as a first step towards it I would say that in Central Wisconsin we have a great belt of felsitic rocks, mostly of the class quartz-porphyries and non-porphyritic felsites. Moreover, is it necessary that the property should be confined to the true felsites? May it not be possessed by a number of allied rocks?

ROLAND D. IRVING.

UNIVERSITY OF WISCONSIN, April 30, 1877.

THE "BUCKEYE ENGINE," OF SALEM, OHIO.

By John W. Hill, M.E.

This engine, manufactured by the Buckeye Engine Company, of Salem, Ohio, is a rival of the celebrated "Corliss" and other engines of the same class, *i.e.* automatic cut-off, and is possessed of certain features that render it peculiarly acceptable in districts where the water procured for steam purposes is not the best. It is a fact generally recognized by users and builders of engines in the limestone regions of the West, that the plain slide valve will wear better than any other form of distribution valve, and where face and seat have been worn by use, the plain slide valve is the easiest to repair. Any country machine shop with a planer is competent to renew the surfaces of "seat" and valve "face," and when for lack of time, or distance of shop, it becomes inconvenient to displace the cylinder, the seat and valve may be chipped, filed and scraped to true surfaces by an ordinary mechanic, in a short time and with the most primitive tools; when a valve or seat has been worn beyond recovery, the cost of a new valve or "false seat" is moderate.

The plain slide valve is simple, not easily deranged, and decisive in its action. These features make the slide valve preferable to all others in regions remote from machine shops, and when a high order of mechanical skill is not employed in operating engines.

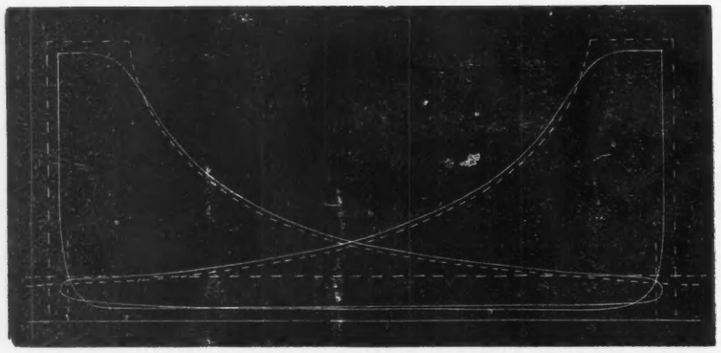
The builders of the "Buckeye" automatic have recognized the importance of furnishing an engine that fully anticipates the requirements of Western steam-power users, and fairly meets the objections urged against other engines of the same class. At the same time, great pains have been taken to develop a high grade of economy in the operation of the engine, and, as it were, "give it a good moral character."

The main valve (balanced) is of the flat slide type. The outer edges of the valve regulate the "release," and "cushion," while steam is admitted to the cylinder by a mortise near each end (of the valve)—the steam side of the valve face is provided with seats surrounding the ports through the valve, traveling on which are plain flat plates, one at each end, united by longitudinal bars in a single casting; this constitutes the cut-off valve, "lead" being regulated by the outer edges of the mortises. The main or distribution valve is driven by a fixed eccentric through the usual rod, rocker, and stem, the stem being tubular to allow the smaller stem of the cut-off valve to pass through it into the chest. The cut-off valve is driven by a free eccentric capable of a partial revolution around the shaft, motion being taken to the valve through an eccentric rod, rocker, and stem; the rocker, however, is possessed of features peculiar to this engine. The cut-off eccentric is controlled solely by the regulator; this is keyed to and revolves with the main shaft, hence partakes of the same angular velocity; the regulator consists of a large disk, two swinging arms with weights at the free ends; two links from these arms to lugs placed diametrically opposite each other, and of equal radial length on the eccentric, and two spiral springs. Rotation of the governor expands the swinging arms, extends the springs, and rolls the eccentric forward on the shaft. The action of the regulator adjusts the cut-off, by varying the angular advance of the free eccentric. Thus we have a variable cut-off engine, with expansion controlled by the governor by means of two simple slide valves and a positive regulator.

It should be observed that the operating parts of the regulator are in duplicate, that is, one-half of the machine may be deranged by accident or otherwise, whilst the other arm, link, and spring are sufficient to actuate the eccentric.

The performance of this engine, however, is such as to command the admiration of the steam engineer, and to demonstrate the economy obtained under average conditions is the purpose of this article.

The diagrams below are from a $22'' \times 44''$ engine, fitted with a "Korting jet condenser;" the engine was making 70 revolutions at time indicator was applied; clearance stated by builders at ·0175 piston displacement; engine in daily operation at La Fayette, Indiana.



The power developed according to the diagram has been calculated thus:

$$\frac{380{\cdot}13 \times 44 \times 70 \times 2}{72 \times 33000} = 5{\cdot}9101 \text{ H. P.},$$

per pound mean effective pressure per square inch of piston. The diagrams were measured with a planimeter, and appear to read as follows:

Mean effective pressure above atm. line	19·976
" " " below " "	10·143
Total	30·119

Then power above atmospheric line becomes

$$5{\cdot}9101 \times 19{\cdot}976 = 118{\cdot}063 \text{ H. P.},$$

and power below atmospheric line

$$5{\cdot}9101 \times 10{\cdot}143 = 59{\cdot}946 \text{ H. P.}$$

Combined power

$$178{\cdot}009 \text{ H. P.}$$

Ratio of power below atmospheric line, to power above

$$\frac{59{\cdot}946}{118{\cdot}063} = {\cdot}50774$$

The total mean pressure, including cushion, is 31·1335, hence percentage of total capacity of cylinder realized

$$\frac{30{\cdot}119}{31{\cdot}1335} \times 100 = 96{\cdot}74$$

The expense of steam to produce the power according to the diagrams has been estimated as follows:

$$\frac{380{\cdot}13 \times 44 \times 70 \times 2 \times 60}{144 \times 12} = 81305{\cdot}532$$

cubic feet total piston displacement per hour.

The release of steam from cylinder appears to have occurred at a trifle in excess of 98 per centum of piston stroke, hence $81305{\cdot}532 \times {\cdot}98125 = 79781{\cdot}05$ cubic feet of steam expended per hour independent of clearance. A portion of this, however, was not expended, but was retained in cylinder by the "closure" of exhaust for "cushion." This appears to have taken place at a distance from end of return stroke equal 9·48 per centum of stroke; hence $81305{\cdot}532 \times {\cdot}0948 = 7707{\cdot}764$ cubic feet of steam retained by cushion independent of clearance. The clearance is stated at 1¾ per cent., hence

$$81305{\cdot}532 \times {\cdot}0175 = 1422{\cdot}846 \text{ cub. ft.}$$

volume of clearance per hour, and total volume of steam consumed to release becomes

$$79781{\cdot}05 + 1422{\cdot}846 = 81203{\cdot}896 \text{ cub. ft.},$$

and the total volume of steam retained in the cylinder, by closure of exhaust, becomes

$$7707{\cdot}764 + 1422{\cdot}846 = 9130{\cdot}61 \text{ cub. ft.}$$

The terminal pressure of both diagrams is $\frac{11{\cdot}5 + 12{\cdot}75}{2} = 12{\cdot}125$ lb., and th weight of a cubic foot of steam at this pressure, by Fairbairn and Tate's formula,

$$\frac{62{\cdot}388}{25{\cdot}62 + \frac{49513}{24{\cdot}7 + {\cdot}72}} = {\cdot}0316 \text{ lb.}$$

and $81203{\cdot}896 \times {\cdot}0316 = 2566{\cdot}043$ lb.

The absolute pressure existing in front of piston at time exhaust port is closed for "cushion" (for both diagrams) is 3·75 lb, and the weight, per cubic foot of steam, at this pressure—

$$\frac{62{\cdot}388}{25{\cdot}62 + \frac{49513}{7{\cdot}639 + {\cdot}72}} = {\cdot}01048 \text{ lb.}$$

and $9130{\cdot}61 \times {\cdot}01048 = 95{\cdot}688$ lb.

Net steam consumed, $2566{\cdot}043 - 95{\cdot}688 = 2470{\cdot}35$ lb., and steam, per indicated horse-power per hour, by the diagrams, $\frac{2470{\cdot}355}{178} = 13{\cdot}878$ lb.

The effective vacuum was 20·66 inches, and the leakage through engine, water entrained in the steam, and extra condensation, probably 15 per cent. Hence, actual water per indicated horse-power per hour, $\frac{13{\cdot}878}{{\cdot}85} = 16{\cdot}327$ lb.

Estimating an evaporative effect of connected boilers at 9 lb. of water converted into steam per pound of coal burned, then the cost of the power in coal becomes $\frac{16{\cdot}327}{9} = 1{\cdot}814$ lb. per indicated horse-power per hour.

In a series of experiments upon the Coast Survey steamer *Bache*, Mr. Charles E. Emery found the saving due to the steam-jacket on single cylinder, operated at the most economical point of cut-off, to have been in round numbers 12 per cent. The Buckeye engine has no jacket, the cylinder being simply covered with a layer of cement and lagging; had this engine been jacketed, according to Mr. Emery's deductions the cost of the power in coal per indicated horse-power per hour would have been, $\frac{1{\cdot}814 \times 88}{100} = 1{\cdot}596$ lb. It is probable that this economy of daily performance has never been obtained with any other single cylinder stationary engine.

WOOD'S "ANALYTICAL MECHANICS."

TO THE EDITOR—SIR: Prof. Wood's reply to my review of his work on *Mechanics*, published in your issue of April 21, raises the question of the origin of the general equation of energy, which is one of considerable scientific interest. In that review I said (referring to the equation given by Prof. Bartlett and Prof. Wood): "Nor was any such equation discussed in the *Mecanique Analytique*, nor did the author of that masterpiece of analysis propose or attempt to base the science on any single formula. Almost the first words in the book are, 'I propose to reduce the theory of that science [mechanics], and the art of resolving the problems which belong to it, to *general formulas*.'" Prof. Wood remarks: "Had our critic quoted the next line from Lagrange, he would have confirmed my position. The omitted words are, 'of which the simple development gives all the equations necessary for the solution of the [each] problem.'" Prof. Wood's "position" is that Lagrange developed the science from a *single* formula. Does this confirm it?

The question, as Prof. Wood remarks, is one of *fact*. The equation given in his reply is *not* given by Lagrange as the general equation of mechanics. From it Lagrange does *not* deduce the general equation of statics by making the accelerations equal to zero, or in any other way. Lagrange very clearly indicates his opinion that statics cannot be regarded as merely a subordinate department of dynamics, and that each of these separate branches of the science requires its own fundamental formulas independently established. Lagrange first determines the general equation of statics by means of the principle of virtual velocities, and afterwards establishes the general equation of dynamics by the further aid of the principle of D'Alembert. There is no evidence that he ever conceived of such a thing as a general equation of energy. Nor has Poisson discussed a general equation of mechanics. He employs Lagrange's fundamental equations exactly as Lagrange employed them.

But Prof. Wood says that Prof. Bartlett also first establishes the equation for statics and afterwards that for dynamics. Prof. Bartlett does nothing of the kind. The process by which the general equation was deduced in the old editions of his work might possibly give some faint color to such an assertion; but in the new edition, which has now been several years in print, the general equation is deduced with the utmost generality, and, having been deduced, is described as "the one fundamental equation which embraces in its discussion the whole of physical and mechanical science." *Now*, can Prof. Wood see the difference between Lagrange's formulas and Bartlett's equation?

Although it has nothing to do with the question, it is true that Prof. Bartlett did take the "muffle" demonstration of the principle of virtual velocities from

Lagrange; but he gave it back again. It was left out of the new edition; for it is generally regarded as fallacious. The demonstration given by Prof. Wood involves the same error.

I said in the review that no such equation (as Prof. Bartlett's) was discussed in the *Mecanique Analytique*. This is strictly true; but as Lagrange's general equation of dynamics is really the same equation under another form, I should have expressed my meaning better had I said that no such equation was there given or discussed as a general equation of mechanics. I have no desire to claim the invention of this equation for Prof. Bartlett. Lagrange and Poisson have both used it as the general equation of dynamics, *but not as the general equation of mechanics*. Rankine also uses the equation in the very form in which it is employed by Prof. Bartlett, *but he does not use it as the expression of the one fundamental law of all physico-mechanical action*. What I claim for Prof. Bartlett is clearly expressed in the following paragraphs from the preface of his *Analytical Mechanics*:

"Twenty years ago the course of mechanics taught for several previous years to classes in the U. S. Military Academy was published in the first edition of this work. In that edition the following assertion was made: 'All physical phenomena are but the necessary results of a perpetual conflict of equal and opposing forces, and the mathematical formula expressive of the laws of this conflict must involve the whole doctrine of mechanics. The study of mechanics should, therefore, be made to consist simply in the discussion of this formula, and in it should be sought the explanation of all effects that arise from the action of forces.' From the single fundamental formula thus referred to, the whole of analytical mechanics was then deduced. That formula was no other than the simple analytical expression of what is now generally called *the law of the conservation of energy*, which has since revolutionized physical science in nearly all its branches, and which at that time was but little developed or accepted. It is believed that this not only was the first, but that it even still is the only treatise on analytical mechanics in which all the phenomena are presented as mere consequences of that single law."

This is Prof. Bartlett's claim, and I am confident it cannot be shaken.

Prof. Wood's error with reference to the authorship of the *Mecanique Analytique* was not corrected in my copy of his book, which contained no Errata.

I have criticised the statement that force is transmitted by matter, only in connection with Prof. Wood's definition of force as a cause. In that connection it is absurd.

In his final paragraph, Prof. Wood has misrepresented me deliberately. I did not say "that the intensity of a force cannot be measured by the standard pound," nor that "a single couple acting upon a body will not produce rotation"; and he has no right to put his own language in quotation marks, so as to make it appear that it is mine. Neither have I said that he uses density in analytical formulas in a different sense from any other author. Nor have I used *any* language which conveys the ideas expressed by the words which he *quotes*. For the rest, I am forced to the belief that Prof. Wood thinks a body can overcome resistance; that the intensity of a central force need not be a function of the distance; and that the moment of inertia of a body with reference to a given axis does not measure the capacity of a body to store up work during a motion of rotation about that axis. I do not care to discuss these points with Prof. Wood.

Finally, I wish to say that I am not responsible for the last two paragraphs of the review, which I did not write, and which I am unwilling to indorse.

WEST POINT, May 8, 1877. CHAS. W. RAYMOND.

[In publishing the review of Prof. WOOD'S book, prepared at our request by Capt. RAYMOND, we assumed the responsibility of the general views expressed, and therefore took the liberty of adding the paragraphs which Capt. RAYMOND now disclaims. Since he has chosen to rejoin in his own name to Prof. WOOD'S reply, we of course print his communication as we receive it; but we adhere to our opinion, that Prof. WOOD is not guilty of deliberate misrepresentation or of blunders of ignorance, but that he is extremely careless. Even in his reply, the translation of LAGRANGE'S phrase "*chaque probleme*" as "*the* problem" instead of "*each* problem" is, we are satisfied, a mere oversight, though it might well arouse the wrath of a suspicious opponent. For "*the* problem" might mean the problem of mechanics, which is, according to BARTLETT'S system, under all disguises the same, viz. the solution of the equation of energy, whereas "*each* problem" occurring in this connection merely means that LAGRANGE'S general formulas (not formula) were considered by him adequate to each individual case that might arise. In his use of quotation marks, Prof. WOOD certainly does go too far.—ED.]

THE ALLOUEZ MINE AND ORE DRESSING, AS PRACTICED IN THE LAKE SUPERIOR COPPER DISTRICT.*

By Charles M. Rolker, E.M.

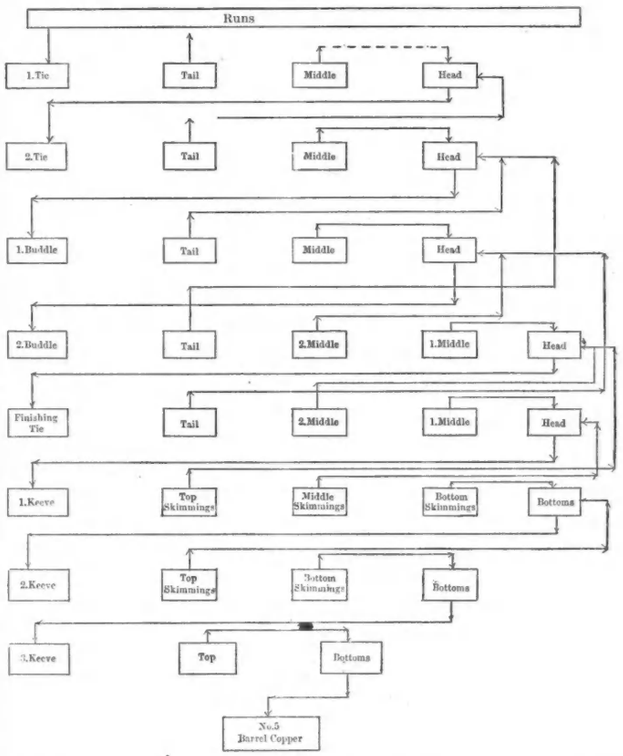
(*Concluded from page* 315.)

At the Atlantic the product of the rotating table is finished on a second rotating table, and the product of the second table is keeved, while the tailings of the second table are worked over again on the first rotating table. Another favorable feature of the Atlantic mill is that the products of two different sieves are never mixed. The product of a 10 sieve is never mixed with the product of a 12 sieve, as they do at the Allouez, where the 10 and 12 goes to the 16 sieves. They use at the Atlantic sieves with 64 meshes up to sieves with 1,225 meshes to a space 25 × 25 mm. (1 square inch), against the 100 up to 900 mesh sieves of the other mills. Turning again to the mill plan, we see that the tailings from the bottom machines, the rotating tables, the overflow of the box S, and the slime-collecting boxes go to the tail-houses, which is shown below the mill plan, Fig. 16 *A*.

In the tail-house, *a* is a launder connecting with the launders from the top machines; *b* is the launder carrying the tailings from the bottom machines, rotating tables, etc.; *c* is the clean water head-box; *d* is the head-box of tailings; *e* is a keeve; *f* and *g* are the tailing runs; *l* is a run for the buddle and ties; *k* are the ties; *h* is a buddle; *i* is a finishing tie; *n*, a trough leading to the ties. All the machines, except the ties, have been described. A tie is a square box 3·2 meters 12½ feet long), 1·066 meter (42 inches wide), and 0·762 meter (30 inches) high. It has on one end a distributing board 0·305 to 0·356 meter (12 inches to 14 inches) long running across the table. Its slant is 61 mm. per 1 meter (¾ inch to 1 foot). The ties are connected with the trough *n*.

In the tail-house the tailings are allowed to fill the runs *f* and *g*; it is so managed that *f* is full when *g* is empty, and *vice versa*. The tailings are thrown into the trough *n* from out of the runs. The trough *n* is a sort of separator with a channel allowing the water to flow out of it. The tailings are worked through in the trough *n* by boys, and are then thrown on the ties. When the tie is full, the trough is empty. The tie is divided into three parts, head, middle, and tail. The mode of working the tail-house is best shown by the annexed tree.

TAIL-HOUSE.



The size of the heads, tails, etc., cut out varies with the richness of the material, which is ascertained by taking a sample and vanning it on the shovel. To ascertain how to cut, the heads and tails are always vanned. When the material is rich, a long head and a short tail is taken; when poor, on the contrary, a short head and a long tail is taken. Heads are allowed to accumulate till there is enough to work a tie; the same is the case with the buddle. It will be seen from the tree that over 50 operations are necessary to produce the No. 5 copper. This averages from 35 to 40 per cent. copper. Two barrels weigh about 2,600 pounds, and are produced per month. The ties are worked daily, the buddle 20 days, the finishing ties 2 days in the week, and the keeve only once a week. Cast-off stamp feeder shovels are used in the tail-house; they serve here still 6 months. Besides 3 of these, a hoe for the keeve and one broom is used. The latter has to be replaced about every 3 weeks.

The products of the mill are 4 grades of "barrel copper," averaging: No. 2, 93 to 94 per cent.; No. 3, 81 to 82 per cent.; No. 4, 41 to 45 per cent.; No. 5, 34 to 40 per cent. At the Atlantic mill they produce 90, 80, 60, 50, and 40 per cent. barrel copper.

The labor account in a mill stamping from 300 to 350 tons, 3 heads running, would be, per 24 hours, with 56 machines:

In the Mill:		Spare men cleaning up	2
Stamp feeders	12	In the Tail-house:	
Firemen	8	Man	1
Engineers	2	Boys	5
Machinists repairing	2		—
Blacksmith	1	Total labor in Mill	47
Copper dressers	2	" " Tail-house	6
Boys on the wash	18		

The same for a mill stamping 180 tons, with two heads, per 24 hours and 28 machines:

In Mill:		Boys on wash	9
Feeders	6	In Tail-house:	
Firemen	6	Man	1
Engineers	2	Boys	3
Machinists	2		—
Blacksmith	1	Total labor in Mill	30
Headrunners	3	" " Tail-house	4
Copper dressers	2		

The losses at Lake Superior in dressing are still large, and are partly due to scaly copper being floated away, partly due to fine copper being contained in the rock which is washed on the beach.

According to assays made at different times:

			Per cent. Cu.				Per cent. Cu.
Tailings from No. 2 and 3		contained	1·32	Tailings from No. 4		contained	0·84
" " " 2, 3, and 4		"	1·21	" " " 5		"	1·36
" " " 2, 3, and 4		"	0·87	" " rotating table		"	0·90
" " " 3 and 4		"	1.03	" " " "		"	0·82
" " " 4		"	0·98	" " " "		"	0·78

Those results were certainly obtained in the wet way, and not by fire assay.*

* A paper read before the American Institute of Mining Engineers, at the New York meeting, February, 1877.

* The Allouez mill commenced last July the erection of a separate mill of 28 Cornish heads to restamp the coarser sands, their attention having been called to the great losses incurred by letting the coarse sands be washed on the beach. Up to the 1st of January, 1877, not half of the mill was completed, and I have not learned since whether they succeeded in finishing it.

I affix a table showing the economical results of different mills for 1875-76:

Localities.	No. of tons stamped.	pounds of mineral produced.	Per cent. of rock in mineral.	Per cent. of rock in ingot.	Average per cent. of mineral produced.	Tons of rock stamped per cord wood.	Cost of Milling per ton rock
* Allouez	51,135	1,875,397	1·83	1·40	76·25	1	$1·08
* Atlantic	80,000	2,178,8 7	1·36	0·99	71·92	14 0979	..
* Franklin	58,942	1,498,120	1·27	0·99	77·915	10·84	·783
+ Central	17,118f	2,407.437	3·78	b2·68	70·82	10·27a	·867
+ Quincy	70,501	.....	....	2·44	....	12·48	....
‡ Phœnix	80,000	c2,177,600	1·361	0·979	d71·93	.....	0·8796
* Calumet & Hecla	.....	.....	5·50	4·75			.....

* = Use Ball stamps.
\+ = Use Cornish stamps.
‡ = Use atmospheric stamps.

a One head averaged per 24 hours 5·87 tons of rock. 32 heads were running for 91 days.

b Calculated from official figures: $3·78 \times 70·82 = 2·68$.

c " " " " $\frac{1·361 \times 80,000}{100} \times 2000 = 2,177,600$

d " " " " $\frac{0·979 \times 100}{1·361} = 71·93$

e " " " " $\frac{4·75 \times 100}{5·50} = 86·36$ = instead of 78·50 per cent. The Houghton *Gazette* gave all three data. 78·50 per cent. is probably correct.

f Mine produced mass copper besides.

g Per ton coal.

An inspection of the foregoing table would lead us to give the Ball stamp the preference as to cheapness of treating one ton of ore. The result of the Atlantic mill, though lower than the Quincy already, will show a reduction in the cost of milling and stamping from 1876-1877. I was informed it would be about 70 cents per ton. The Quincy cost for 1876 was 91 cents per ton. The improving and remodeling which the present managers had to do after taking charge of the mine and mill hardly permits me to take these results as final, and yet the Atlantic mill compares now already favorably with any on the lake. When once old mistakes have been entirely overcome, the Atlantic mill will show how a Ball stamp compares with the old Cornish stamp, circumstances being alike, and I do not hesitate to say that the Ball stamp will prove to be the cheaper one, and in the course of time do away with the Cornish stamp in this district.

Another machine much in use in the tail-houses of Lake Superior is the round convex buddle, essentially the same as the one described in Dr. Raymond's *Report West of the Rocky Mountains for* 1873. The report also gives the common percussion table as well as Rittinger's and Gaetschmann's *Aufbereitungs Kunde*. The quantity of water used in dressing is also variable.

The Atlantic mill, with three heads running, stamping on an average 320 tons per 24 hours and using 56 jigging machines, consumes 8·316 liters (2,200 gallons) of water per minute. Or, in other words, 41·35 tons of water enter the mill for every ton of rock stamped during 24 hours. At the Allouez mill they use 5,882 liters (1,556 gallons) of water per minute; they have two heads and stamp on a good average 180 tons per 24 hours. The number of jigging machines is only 28. Expressed in tons of water, they use 52 tons of water per 24 hours for each ton of rock stamped. This is generally conceded to be too much. A statement which was given to me by the gentleman in charge of the Allouez mill distributes the water in the following way (this statement was prepared last September):

Total quantity of water which enters the mill, 5,882 liters (1,556 gallons) per minute.			
Two heads, each 756 liters (200 gallons) per minute	1,512	liters or	400 gallons.
28 machines or 56 mashers, each 56.7 liters (15 gallons) per minute	3,175	" "	840 "
4 separators, each 226.8 liters (60 gallons) per minute	907	" "	240 "
2 rotating slime tables, each 64.26 liters (17 gallons) per minute	129	" "	34 "
Total	5,723	" "	1,514 "
The remaining 159 liters (42 gallons) per minute are used for the hand-buddle, the tossing-keeve, feeding the boilers, etc.	159	" "	42 "
	5,882	" "	1,556 "

I am sorry I am not able to place a detailed statement of the Atlantic mill against this, but I was not able to obtain it. I may state that the impurities in the different grades of barrel copper or mineral—the latter is the expression used at Lake Superior—are for the grades No. 2 and No. 3 copper (at the Allouez mill), mainly not removed parts of the common conglomerate gangue. Besides this, however, I observed notable portions of peroxide of iron. The latter is more predominant in the material found on the tail-finishing sieves of the mill. It is present there to such an extent that I have repeatedly picked out pieces with a pair of pincers with the naked eye. I mention this fact because it is, as a rule, impossible to see any peroxide of iron in the conglomerate rock with the naked eye or even with loup. Only once I was fortunate enough to find a piece of conglomerate on the filled cars going to the mill, in which I could see two specks of black appearance, which proved to be the peroxide of iron upon testing them in the laboratory. The percentage of the peroxide in the conglomerate must, however, be very small, inasmuch as the quantities which I observed in the mineral were constituents concentrated from a mass of, say, from 150 to 3½ tons. The remaining impurity is metallic iron, derived from the stamp shoes. This is especially present to a marked and very large extent in the No. 5 copper which is derived from the tail-house. It occurs here nearly as fine as flour up to thin scales 13 mm. (1-12 inch) long. Here also the peroxide is found. I was not able to detect any magnetite in either of the grades of copper.

The mineral at Lake Superior is packed wet into the barrels, and the average percentage of water at the Allouez is:

For No. 2 copper	3.00	per cent.	of water at the mine.	
" 3 "	7 to 7.5	"	"	"
" 4 "	12	"	"	"
" 5 "	12 to 13	"	"	"

The only mill to my knowledge which dries its mineral is the Franklin mill, and this on rather a costly apparatus. Why a common drying floor heated by the exhaust steam is not introduced in this district is more than I able to say. The drying with the exhaust steam certainly does not cost as much as the charge of the smelting works is for so and so many pounds of water smelted. The charge for smelting a ton of mineral is $18, and the charge for driving out a ton of water is the same. The idea prevalent with some persons on the lake to extract the metallic iron with a magnet, I consider at present impracticable. According to experiments, which I have made to satisfy persons, I found that with every extraction of metallic iron 50 per cent. of the extract was thin metallic copper drawn over with iron. The only thing, in my estimation, which will decrease the quantity of metallic iron in the lower grades of copper, is a larger number of slime-settling boxes and likewise of the rotating tables. The latter are decidedly worked over their capacity. The tail-houses all over Lake Superior hardly pay for the keeping of them, if it was not that they are to some degree a check on the working of the mill proper. I think the time is not so far off as many may think when people will do away with the present mode of working the tail-houses, and when the treatment of tailings will become a special system of dressing at Lake Superior. The bottom jig is decidedly one of the most perfect jigs we have, allowing of such very fine adjustment; introducing a larger number of these in the mills could only be beneficial to economical results, besides what I mentioned before.

An idea which some on the lake may experiment upon is to give the hydraulic separator a slant of the bottom in its longitudinal direction towards the lower end where the fine sands are collected. This will effect a more complete settling of the fine sands because the water will remain longer in each separator and the present vehement stream will be comparatively eased, and less material will be thrown upon the crowded rotating tables, on which the losses are still large. That the slant must vary with the quantity of rock treated or water used, I need hardly say. Finer sieves on the jiggers will easily stop any running off of the fine copper, which fine copper is so characteristic of the Allouez rock.

THOUGHTS ON THE THERMIC CURVES OF BLAST FURNACES.*

By H. M. Howe, A. M., E. M.

(*Continued from page* 319.)

Assuming 557° C. as a probable temperature for the mouth of the furnace, I have constructed Table III., placing, as before, in the first column the distances of several points above the hearth, in the second the temperatures found at those points by Bell, and in the third the temperatures which would exist after an increase of height sufficient to cool the gases to an extent which would raise the minerals 50° C. (I have assumed that none of the heat thus gained will reach the hearth; but the results would not be materially different if we supposed the hearth also to have its temperature raised 50° C., nor yet if any other probable temperature were assumed for the escaping gases.)

TABLE III.

Height above Hearth.		Original Temperature.	Temperature after Increase of Height.	Height above Hearth.		Original Temperature.	Temperature after Increase of Height.
Meters.	Feet.	Cent.	Cent.	Meters.	Feet.	Cent.	Cent.
14·6	= 48·00	557°	605°	8·6	= 28·35	954°	954°
13·1	= 42·65		640°	8·2	= 27·00		981°
12·8	= 41·65	605°		6·6	= 21·79	1039°	1039°
11·3	= 37·00	640°	677°	6·1	= 20·00		1059°
10·5	= 34·49		850°	3·14	= 11·28	1410°	1410°
10·3	= 34·00	850°	884°	3·05	= 10·00		1420°
10·11	= 33·24		891°	0		2079°	2079°
9·1	= 30·00	891°	921°				

Temperature of Zone.	A. L, Original Length of Zone.		B. L¹, Length of Zone after Increase of Height.		C. $\frac{L^1}{L}$
Centigrade.	Meters.	Feet.	Meters.	Feet.	
605° to 640°	1·41 =	4·64	1·62 =	5·35	1·15
640° " 850°	0·91 =	3·00	2·43 =	8·10	2·72
850° " 891°	1·22 =	4·00	0·37 =	1·25	0·31
891° " 954°	0·91 =	3·00	1·49 =	4·89	1·63
954° " 1039°	2·13 =	7·00	2·00 =	6·56	0·93
1039° " 1410°	3·05 =	10·00	3·37 =	11·51	1·151
Above 1410°	3·05 =	10·00	3·06 =	10·28	1·028
605° to 850°	2·32 =	7·64	4·12 =	13·51	1·77
Above 850°	10·36 =	34·00	10·49 =	34·49	1·01

Here, as in the case of the 24-meter furnace, we find the cool zones lengthened much more than the hotter ones; the zone of 605° to 850° is lengthened about 77 per cent., while the whole region below it, and hotter than 850°, is lengthened only about 1 per cent.

A comparison of the lengths of the several zones of the 24 meter and the 14 meter furnace which I have made in Table IV. bears out fully the previous reasoning, and shows that, whether it be sound or not, its conclusions are in accordance with facts. Obviously the validity of this comparison does not depend upon any of the assumptions I have made.

TABLE IV.

Temperature of Zone.	L, Length of Zone in 14 Meter Furnace.		L¹, Length of Zone in 24 Meter Furnace.		$\frac{L^1}{L}$	Excess of L¹ over L.	
Centigrade.	Meters.	Feet.	Meters.	Feet.		Meters.	Feet.
Under 640°			5·48 =	18	∞	5·49 =	18
Between 640° and 850°	4·27 =	14	4·27 =	14	1	0	
" 850° " 891°	1·22 =	4	1·83 =	6	1·5	0·61 =	2
" 891° " 954°	0·14 =	3	1·52 =	5	1·67	0·61 =	2
" 954° " 1039°	2·13 =	7	1·63 =	5·36	0·77	0·5 =	1·64
" 1039° " 1410°	3·05 =	10	4·14 =	13·58	1·36	1·09 =	3·58
Over 1410	3·05 =	10	5·50 =	18·06	1·81	2·46 =	8·06
Under 850°	3·35 =	11	9·75 =	32	2·91	6·40 =	21
Over 850°	11·28 =	37	14·63 =	48	1·29	3·35 =	11
Under 891°	5·49 =	18	11·58 =	38	2·11	6·10 =	20
Over 891°	9·14 =	30	12·80 =	42	1·40	3·36 =	12

In the second and third columns of Table IV. are the lengths, L and L¹, of the several zones in the 14·62 meter and in the 24 meter furnaces respectively; in the fourth are the ratios, $\frac{L^1}{L}$, and in the fifth the excesses of L¹ over L. The length of that portion of the furnace which is cooler than 850° C. is nearly three times as long in the 24·3 meter as the 14·62 meter furnace, while the region hotter than 850° C. is only one-quarter longer in the former than in the latter.

Moreover, two-thirds of the total excess of length of the 24·3 meter furnace goes to lengthen the region cooler than 850° C., and only one-third to lengthen the region hotter than 850° C.; and while the 24 meter furnace is only 67 per

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, October, 1876.

cent. longer than the 14 meter, the region in the former which is cooler than 850° C. is 2·91 times as long as the corresponding region in the hotter furnace.

Since the lengthening the upper zones in a greater proportion than the lower ones, by an increase in height, depends solely upon the curves being mainly convex to the axis OX, we should expect it even had we not these examples of the Clarence furnaces. For the general convexity of the curve to OX merely means that the temperature increases on the whole at an accelerated rate as we descend in the furnace. Most of the heat is generated in the hearth, near the tuyeres, by the combustion of C to CO. That portion of this heat which is carried to the rest of the furnace by radiation and conduction will, of course, tend to produce a rapidly accelerated rate of increase of temperature as we approach the tuyeres; that is, as we approach a place where combustion is occurring, we may, in general, expect the temperature to increase at a highly accelerated rate.

As a second and much less important source of heat is the combustion of CO to CO_2, with the O of the ore in the upper part of the furnace, we should expect to find, as we do, a convexity of the curve from the throat to the level where this combustion is most active, which is at the 19·50 meter (64 feet) and 10·97 meter (48 feet) furnaces respectively. But this convexity would naturally be less marked in this combustion to CO_2 [which is spread out over 12 meters (40 feet) in the 24·3 meter (80 feet) furnace, and causes slight elevation of temperature, owing to the simultaneous absorption of heat by the reduction of the iron oxide] than in the combustion of C to CO, which is entirely effected within a very short distance of the tuyeres.

II.

Let us go a step further, and look at the practical bearing of the facts I have tried to establish:

We know that the productive power of a furnace is practically limited; that when we try to increase its production beyond a certain point, we first lower the grade of the product, producing closer iron, poorer in carbon. If we still further hasten it, we eventually produce white iron, then a black, scouring cinder of silicate of protoxide of iron, and finally our furnace chills.

These phenomena tell us that we have two elements which limit the productive power of the furnace. First, the cooling of the hearth, as indicated by the lowering of the quality of the iron, and, finally, by the danger of chilling; secondly, the tendency to form scouring ferrous slag, which endangers the structure of the furnace itself.

Considering now the first of these elements, we know that, since the grade of the product is dependent upon the temperature of the hearth, the rate at which we can produce iron of any particular grade is limited by the fact that, if we drive the furnace beyond a certain speed, we make the hearth too cold to produce iron of that grade.

Now, how is it that increasing the speed of the furnace cools the hearth?

The heat in the hearth is derived from—

(1.) The heat of the blast.

(2.) The combustion of C to CO; and

(3.) The heat intercepted by the descending column of minerals from the gases, and returned to the hearth.

It is consumed—

(1.) In melting the iron and slag.

(1.) In heating the gases; and

(3.) In direct radiation and conduction.

Now, when we increase the speed of our furnace, we increase the first two elements of the heat requirement of the hearth; that is, we have more iron and slag to be melted and a greater weight of gas to be heated per minute. We also increase two elements of the heat development in precisely the same ratio, provided we do not derange the working of the furnace; that is, the weight of blast, and with it the heat brought in by the blast, are increased at the same rate, as is also the weight of C burned to CO.

The third element of the heat development will be increased in nearly the same ratio, as a corresponding greater mass of minerals will arrive at the hearth per minute. They will not, however, be at quite so high a temperature, as the gases will pass through the furnace more rapidly than before, and will not give up their heat quite so fully to the minerals.

The third element of the heat requirement, viz., the loss by radiation and conduction, will be hardly increased at all. We should, therefore, on the whole, expect that an increase of speed would be followed by a slight rise of temperature.

The reason why the hearth is cooled is that, when we try to push the production beyond a certain point, we do derange the working of the furnace to some extent, and thereby lessen the supply of heat from the second source, the combustion of C to CO, and also from the third and chief source, that intercepted and returned by the descending minerals. The quantity of heat they will bring to the hearth will depend upon the amount of heat generated in the furnace, upon the region of the furnace where it is generated, and upon the length of time the minerals and the gas are in contact.

When the speed of the furnace is increased too much, the iron oxide is hurried through the upper cool zones, in which the CO_2, formed by the reaction,

$$(1.)\ \mathrm{Fe\,O}x + y\,\mathrm{CO} = \mathrm{Fe\,O}(x-y) + y\,\mathrm{CO_2},$$

is not liable to be reduced by the reaction,

$$(2.)\ \mathrm{CO_2} + \mathrm{C} = 2\,\mathrm{CO}.$$

[Reaction 1 takes place very readily at low temperatures; but reaction 2 does not readily occur at temperatures much below 800° C. (1,472° F.), and is greatly favored by hotter temperatures.] The result of this is that a greater or less portion of the oxide remains to be reduced lower in the furnace, at temperatures so high as to favor the reduction of the resulting CO_2 by reaction 2, which necessarily causes an enormous loss of heat.

Secondly, as the formation of CO by the succession of reactions 1 and 2 is accompanied by a very considerable lowering of temperature, an undue hastening of the speed of the furnace not only increases the great loss of heat by reaction 2, but also causes this lowering of temperature to take place nearer and nearer to the hearth. Now, of course the nearer to the hearth such a lowering of temperature takes place, the stronger is its effect in lowering the temperature at which the descending column of minerals reaches the hearth.

Thirdly, reaction 2, which inevitably takes place when the ore is hurried through the cool zones too fast to be properly reduced in them, causes a great and useless consumption of carbon, leaving just so much the less to be burned at the hearth, and thus diminishing the second of the sources of heat previously enumerated.

Fourthly, the increase of speed diminishes the time during which the gases are in contact with the minerals, and thus lessens the heat intercepted by the latter.

Summing up these points, the fall of temperature in the hearth is mainly, or almost wholly, due to the ore's remaining too short a time in the cool zones of the furnace.

It may be urged very plausibly that, if the lowering of the temperature of the hearth be the only thing that limits the productive power of the furnace, it is an obstacle which need not give us much trouble. All that is necessary to overcome it is to erect a pair of Mr. Whitwell's most excellent hot-blast stoves, and to increase the sensible heat introduced by the blast. No doubt they do increase the production of furnaces in this very way in many cases. Yet there is a limit even to the temperature attainable by Whitwell stoves; and beyond this limit it is plain that we will again be in danger of cooling our hearth too much, if we attempt to drive our furnace too fast.

Coming now to the second of the elements which we have been considering as limiting the productive power—the tendency to produce ferrous slag—we find that it is wholly due to a too short exposure to a low temperature. If the iron oxide is hurried through the cool zones so fast that it arrives at the temperature of incipient fusion before it has been thoroughly reduced, it will then unite with the silicious matter of the charge to form a black scouring slag of ferrous silicate. This slag is very fusible, but very difficult to reduce. If the speed of the furnace is very high, and if the ore is exposed to temperature below the point of fusion for a very much less than sufficient time, the amount of unreduced iron oxide which will thus enter the slag will be very great, and we will have a ferrous slag with a large percentage of base, which, having a strong affinity for silicic acid, attacks the brickwork lining of the furnace, and thus imperils the structure itself. If a lining could be devised which would resist the chemical action of such a slag, such as bauxite lining, it would still be foolish to run the furnace in such a way as to produce a highly ferrous slag, as it implies the waste of a very considerable portion of the iron oxide of the charge. It is probable that the tendency to produce white iron when a ferrous slag is formed is in part due to the ferrous oxide of the slag being reduced at the expense of the carbon of melted iron, when the two lie in contact with each other in the crucible of the furnace.

Now this formation of a ferrous slag can only be avoided in one way, and that is by exposing the iron oxide to the reducing action of C and CO, at a temperature below that of incipient fusion, for a length of time sufficient to insure its practically complete reduction, which means having the cool zones sufficiently long. Raising the temperature of the blast may prevent the cooling of the hearth to a certain extent, but it can only favor the formation of ferrous slag, by raising the general temperature of the furnace, and so shortening the cool zones, and bringing the iron oxide to the temperature of fusion sooner after its entrance into the furnace. It is probable that a long exposure in the zone of carbon deposition (an action which, according to Bell's researches, takes place only at low temperatures, and ceases altogether at a full red heat) is absolutely necessary, at least if we wish to obtain anything but the very hardest and whitest iron. Here, again, a higher temperature of the blast would merely shorten the zone of carbon impregnation.

Therefore, we may say that a sufficiently long exposure to a low temperature in the upper part of the furnace is absolutely necessary, and that without it we cannot prevent the formation of scouring slag. Moreover, having this, we are protected against the great loss of heat which the reduction of CO_2 would cause, and we allow the iron oxide to become properly impregnated with carbon. Of course if we seek for great speed this exposure can only be attained by having the cool zones very long.

Having sufficiently long cool zones, it seems as if the length of the hot zones were immaterial. For their function is merely to heat and fuse the iron and slag, and there is every reason to believe that no desirable action, either chemical or mechanical, takes place in them for which much time is needed; certainly none which requires more time than it is sure to get, provided the ore remains long enough in the cool zones.

Indeed on some accounts it is desirable not to expose the ore to a high temperature any longer than is absolutely necessary; for it is only at very high temperatures, apparently, that phosphoric and silicic acids are reduced, and anything which shortens the stay of the ore in the zones which are hot enough to permit the reduction of these acids has a tendency to lessen the amount of P and Si which will enter the pig iron. Of course, when we seek for a high percentage of Si in our product (a thing generally to be avoided, although sometimes required for the Bessemer process, as in Hunt and Wendel's method), this observation does not apply.

Thus, it seems probable that the length of the hot zones does not limit the productive power of the furnace (unless, perhaps, for highly siliconized pig iron), but that it is determined by the length of the cool zones. For instance, if we are running a furnace so fast as to be in danger of chilling, and are threatening its destruction with a scouring cinder, we can return to the normal condition of things, either by letting the minerals pass through the cool zones more slowly (which means diminishing our production), or by lengthening these zones so much that the minerals will remain in them a proper length of time in spite of their rapid rate of descent.

Now, I have tried to show that a slight increase of the length of the furnace will greatly enlarge the cool zones, and that a rate of descent which would be destructive in a short furnace might be made perfectly practicable by the great increase of the size of the cool zones, which is caused by a slight lengthening of the furnace. Thus, if we wish to triple the productive power of our 14 meter furnace, and for that end to triple the length of its cool zones, it will only be necessary (as regards length alone) to elongate the furnace by something like 67 per cent. For, as we have already seen, although the 24 meter furnace is only 67 per cent. longer than the 14 meter furnace, yet the space in the former which is cooler than 850° C is 2·91 times as long as the corresponding space in the latter. If this should enable us even to double the production of the furnace (all the other elements which are necessary for such an increase co-existing), the tendency to reduce silicic and phosphoric acids would probably be very much lessened by the now doubled rate at which the minerals descend through the several zones; for the length of those zones which are hot enough to permit the reduction of these acids would be hardly increased at all by the elongation of the furnace, and the stay of the minerals in them would thus be greatly shortened.

We have not such exact information about the temperature at which manganese begins to be reduced as to enable us to foretell whether its reduction would be favored or not by such a change in the relative sizes of the different zones of the furnace as we have been considering. But it seems highly probable that at least its reduction would not be hindered so much as that of Si and P.

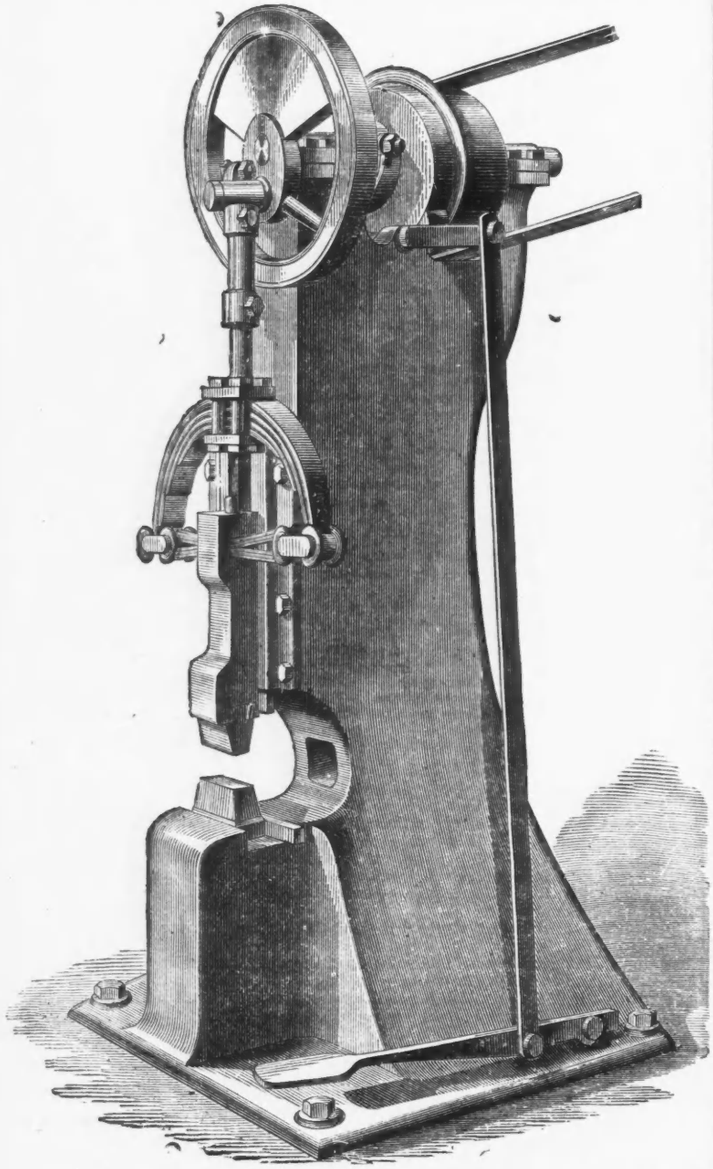
And this, I believe, is the way in which increasing the height of furnaces has sometimes led to very much more than proportionate increase of production; and I infer that, even though lengthening a furnace may cool the gases very slightly, and produce no saving of fuel, it may yet greatly increase its productive power without necessitating a proportionate increase of cost of construction or of labor.

DISCUSSION.—The discussion on this paper will appear in our next number.

DEAD STROKE POWER HAMMER,

Manufactured by the Hull & Belden Company, Danbury, Conn.

The advantages claimed for this Hammer are that they can be run at high speeds without breaking themselves to pieces. They have neither cylinders, valves, nor piston-rods, consequently repairs are trifling. They take up less space, require less power to drive, strike harder and truer blows than either trip or tilt hammers of double the weight of ram. They can be worked to strike good alternate blows on a 3-inch and ⅜-inch bar when a 100-lb. Hammer is used. They can be used on die work to a great advantage. They are sent complete and ready to work as soon as secured in foundation, and can be run with a belt at almost any angle, and are fully warranted to work as claimed.



Prices vary from $300 for a 15-lb. Hammer to about $2,000 for a 500-lb. Hammer.

CHROMIUM PIG IRON.—A quantity of pig iron which has recently been made in Australia, instead of having the ordinary qualities of pig iron, was found to be exceedingly hard, and to present the appearance of the specimen exhibited. The ore employed in the manufacture had been analyzed in this country by six or seven different chemists, all of whom, with one exception, had overlooked the presence of chromium, which might perhaps be accounted for by the fact that the specimen of ore sent over contained but a mere trace of chromium. The pig iron from this ore, however, contained 6 to 7 per cent. of chromium, as might be seen from the analysis given of two samples:

	1	2		1	2
Chromium	6·984	6·287	Phosphorus	*nil*	·055
Carbon	4·418	4·200	Iron	—	88·343
Silicon	1·460	·976	Manganese	·125	*nil*
Sulphur	·102	·207			

From this it could readily be seen that the relations between the amount of carbon and sulphur were quite abnormal.

As some 1,200 tons had been manufactured, it was important to know what to do with it. It had been stated that chromium plays the same part as manganese in iron, but in experiments made to ascertain if this chromium pig iron could be substituted for spiegeleisen in the manufacture of Bessemer steel, very unsatisfactory results were obtained, the steel breaking up under the hammer. When mixed with one-half hematite and puddled, it melts with difficulty; but although the chromium soon goes out in the cinder, the iron produced would not weld.—*The Engineer.*

LECTURES ON MINING.—No. XXXIX.

By Prof. W. W. Smyth, M. A., F. R. S., Royal School of Mines, London.

The mode of working coals which contrasts most fully with the system of pillar work is that called long wall, or it is sometimes spoken of as long work, in contradistinction to square work. This method has been practiced for a long time in the central districts of England and on the Continent. In Derbyshire, Shropshire, Staffordshire, Somersetshire, and in some parts of Lancashire the long wall system has long been worked. The lecturer thought that after the long and repeated discussion, after a great deal of acrimony has been shown by the supporters of the rival system, there could be no question that the simplicity and economy of this method has caused it to be introduced into some districts where it was not in use some years ago. Mr. Buddle was so prejudiced against the system that although he gave way sufficiently to allow an experiment to be carried out, yet that experiment was not made under fair conditions.

If we take a case which was presented to us many years ago in the ironstone districts and coal seams of Staffordshire and Shropshire, up to 6 feet thick, we shall find that a couple of pits are put down not far from one another, or a single bratticed pit in other cases. A couple of main roads—gate roads—are driven at from 5 to 12 yards asunder, communicating at intervals, and these are carried to the boundary of the piece of coal to be worked. In all these methods there are two courses open, either to drive out the narrow openings to the extremity and then work home, or by "backstroke," or as soon as we have got clear of the shaft pillars we may begin to get the coal, or work by "outstroke." In the former case you have to subsist on your capital till the first part of the work is done, and it may take several years to sink the pits and drive the two levels to the boundary; so that it is only when the workings belong to individuals, or to a large company, that this method can be adopted. In the other plan you have the formation of goaf in close proximity to the shaft, which may endanger the shaft or main roads, or be a reservoir for gas. Still if the area or royalty be very large you cannot avoid getting the coal before you reach the boundary. In the central parts of England, where the seams are not at very great depths, and consequently the pits are much more readily sunk, and where the areas are marked off by faults, it will generally be the case that the levels are driven at once to the boundary, and then the coal worked back, having the advantage of leaving the goaf behind. The levels will be maintained by walling or timber, so that ventilation may pass round. Along the working face the roof will be supported by timber, and the distance between the face and the broken-down roof will be affected in the first place by the character of the roof, and in the second by the nature of the precautions taken to keep it up. Props will usually be placed in two lines, alternating with each other, and the roof will be supported additionally, or mainly in some places, by pieces of stone packed up; of late years instead of these nogs of stone nogs, or "chocks," of wood are placed transversely, as before described. These are very conveniently placed on a little heap of rubbish, so that when the pressure comes on, and the timber has to be removed, it can easily be taken down by taking away a little of this rubbish. In the meantime the dust, or parting, or impurity among the coal will be thrown back, and help materially to let the roof down gently. In some cases the roof will bend down behind the props, so that it may be secured to a nicety, and the pressure may be so managed that after the coal is holed it may need very little wedging, and rarely gunpowder is needed to bring it down; and in some cases it may come down of itself, or with the aid of a little crowbar. In this way a great advantage is gained. This method we have been considering enables you to dispense with any roads through the gob or goaf. If the roof be strong enough to allow rails to be laid between the props and the coal, a great advantage as regards cheapness will be gained, otherwise the coal will have to be dragged along the face a distance of 30 yards, and this will be a considerable item in the colliery expenses.

In Staffordshire and Shropshire workings it is usual that the labor of holing and getting the coal is divided, one set of men holing the coal, and then another set coming in afterwards. The holers, or true colliers, will not only cut under the coal, but in some cases, where the coal does not come away with facility, they cut vertically into it to a depth of about 3 feet, so that it is supported only by the roof and the mass behind. The other set of men (in Shropshire called "brushers") will bring down the coal by wedging, or, if necessary, powder, remove it, build up the broken stone in between the props, and take out the back row of props, and place them in front. In the Derbyshire collieries, where they work outwards, you may sometimes see several hundred yards of face; in other cases they prefer to cut them out into stopes, each man having his own stall, and the pressure will act differently according as the work is arranged. You will find that this district compares very favorably with the other districts of Great Britain as regards the number of lives lost in getting the coal; though the circumstances vary so considerably that in other cases we must not always blame either the manager or the men. Roads are laid up to about the middle of each face through the gob, and it is on the circumstances connected with these roads that a great part of the economy and success depends. The way in which these are kept up is far more simple than would be imagined—by a packwall on either side of the stone of the district 4 to 6 feet thick, or if the roof comes down abundantly it may be from 8 to 15 feet. The roadway will be carried as narrow as is consistent with the requirements of the carriage, and if there should be thrown into the interior a quantity of gobbing the roof, when it begins to come down, will press this wall together. And you may often observe that however much you may assist it by timber, or other contrivance, the level will diminish in size, and soon it will be necessary to obtain additional headway for the horses by cutting away some of the roof. Every yard, therefore, of these gob roads is a source of expense, and under some circumstances this is so serious as to limit the dimensions to which they can be carried. Sometimes the pressure will cause the floor to rise, and you may find the coal and measures which were originally at the level of your head now at your feet. Where this system is carried on it is necessary to employ a set of men—roaders—who work during the night, to repair these roads, in order not to interfere with the other workings. When in consequence of a series of accidents in the Barnsley district strenuous attempts were made to introduce the long wall system, it was found so difficult to keep up these gob roads, that they were shortened by filling up all these separate roads through the gob, leaving only a short distance at the end nearest the workings, and making these communicate with one cross road, which again ran into one of the principal roads. Another plan adopted, where there was a level further up the rise, was to drive down the hill, if the angle was such as to allow of the coal being drawn up from a certain distance down the dip. In the Scotch districts, where the face is cut into steps or stopes—tooth work, as it is there called—each of these steps is served by a cross road, which branches off from a principal roadway.

In the Somersetshire (Radstock) district one can see this system carried out in a peculiar way in thin seams of coal. Seams there of 12 or 13 inches, which would be thought unfavorable in other districts, are worked, but this is due

partly to very favorable natural causes. It has been thought by some authors and some viewers that this system could only be worked in thin seams of coal, but in the midland counties some seams of more than average size are worked on this system. Thus, at Church Gresley, in Leicestershire, a seam 15 feet thick is wrought in this manner; but it is helped by a parting, and worked in two portions. In the Forest of Dean, and in some South Wales collieries, there is no preliminary driving; the work is commenced at once, and carried forward in long pieces, 12 to 30 yards long, as one productive face. The principal roads and the main lines of level are supported by pack walling, branch levels passing off the faces. Some have thought that it would be best to leave a rib of coal between the roadways and to the rise beyond; but the lecturer had known several instances in which it appeared best to remove the whole of the coal, and trust to packwork. And Mr. Greenwell, some years ago, tried the experiment in the Radstock collieries of leaving a thin pillar of this kind, and found the expense was so great, owing to the tendency to produce creep and thrust, that it was best to let the roof come down at once. Sometimes you may see that ironstone is got from a shale falling down with the roof. but this is not a very desirable system, although it accompanies the long wall method.

It is sometimes the case that the small coal which is left accumulating is extremely apt to take fire, so as to cause a great deal of trouble; and in Staffordshire the managers are always on the alert for the peculiar smell which accompanies this. In some cases they have to be very cautious about this matter; the best way to avoid it apparently has been to build up along the side of the roadway a wall of well tempered clay, to a thickness of about 1 foot from roof to floor; this will prevent any air from the airways getting through to the small coal among the gob. In some of the North Country collieries they have laid out larger pillars than usual, for the purpose of afterwards getting them by a sort of long wall method. There are some cases in foreign countries where this method of long wall work is applied to seams inclined at a very high angle. In some of the Saxon coal fields, where the beds are tilted at a very high angle, the working is rendered exceeding like that of a metalliferous mine. The ground is worked away in overhand stopes, the men being supported on stages, for the purpose of cutting the coal; the rubbish of the mine is packed up behind, and the coal is tipped into shoots left among the attle, with a door at the bottom, which is opened when the wagon is brought underneath. In Belgium and Westphalia also the ground is more or less worked on this system, but with special precautions, from the very fiery nature of the roof and floor. It used to be worked on a system of dividing the ground into districts, 60 feet in height, and each of these worked by a series of men standing on platforms, and throwing down the coal. One set of men thus interfered with the others, so that now the method is different. There is a lower level, supported by stemples, with wall plates wedged in between, and these wall plates kept asunder by struts, and behind are laid laths. The material from the coal is packed in over the roof of the level, and it is found that by this means about double the coal can be got in a day between two levels as could be obtained by the old method. In this and other methods of long wall the work should always advance as regularly as possible so much—say 1 yard—per day, because in that case you may reckon on the roof coming down much more regularly.—*London Mining Journal.*

MINING NEWS.

Staff Correspondence of the Engineering and Mining Journal.

MAGNOLIA.

Magnolia has brightened up considerably of late. Those who have regarded the camp as in a dull condition would probably think otherwise if an inspection was made of the mines. A short trip to the camp furnished the following notes of progress:

The Keystone is working under lease, employing ten men, and taking out ore that it is confidently expected will mill in the vicinity of $100 per ton. The shaft is down 214 feet.

The Rebecca reports a recent strike, in the bottom of the mine, of 2½ feet of good pay. This lode is bonded for sale.

At the *Little Maud* quite a quantity of rich ore is coming out, and the owners are in excellent spirits.

The Golden Ledge may possibly be reopened shortly. This mine has two shafts, 38 and 48 feet deep respectively, and has shown good ore in both, ranging from 2 to 8 inches in width, that assays very high. It is thought that the vein will pay $40 from wall to wall.

Magnolia is under lease. The mine is 100 feet deep, and is shipping some ore of good grade, with more in the mine to be broken soon.

There are a number of lesser prospects, such as the Vanna, Lizzie Brown, Poorman, Grant, Lowell, Fortune, Crœsus & American Eagle, which, in time, will develop into good properties. The opening of tellurium mines is slow, and often discouraging work, unless an unusually rich pocket is struck directly at the surface, but very few of this class of lodes sunk to a depth of 100 feet or over fail to show excellent ores. Magnolia has suffered more by reason of the sharp transactions of the last year on the Keystone and Mountain Lion than by any difficulties met with in opening the mines. A number of sales are now under headway in the district, and, probably, this season's work will result in enough new development to give an added impetus to mining. The location of the camp is one quite favorable to inexpensive work.

MONTANA.

The stoppage of work on the Trout & Hope mines at Phillipsburg, Montana, has for a time made a great change in that fine camp. The Phillipsburg mines are ranked among the best in Montana, and under careful management would have continued producing handsomely, and in greater quantities each year. Unfortunately, however, the two mines mentioned have fallen into legal or financial trouble, from which they may not emerge for some months; and while this inaction continues the business of the district suffers correspondingly.

Of the other mines of the vicinity, the Algonquin is the most developed. Concerning its present condition, the resident correspondent of the *New North-West* reports as follows:

"Water level has been reached in the western shaft on the Algonquin at 150 feet. It is confidently expected the whim now constructing will enable them to add 100 more feet to the depth it has already attained. The different cross cuts in the 80-foot levels show the ledge from 60 to 130 feet in width. A cross cut at the bottom of the western shaft develops 65 feet of a ledge and 12 feet of pay ore in place. In the eastern shaft 23 feet of pay ore is visible, and but one wall has been reached. There are now over 300 feet of well-timbered levels in the mine, and it is estimated that not less than 5,000 tons of ore are in sight. The vertical shafts are now to be pushed down to 250 feet, when the vein will again be cross-cut. A connecting level and western level of 150 feet will, it is thought, at that depth prove it the king mine in Montana. The value of the ore does not materially vary from Trout ore, which it very closely resembles, although less base and more economically reduced. Under Mr. Pardee's management his company will soon know whether they have a monster silver mine in the Algonquin or whether it has a bottom convenient to the surface."

UTAH.

THE BISMUTH MINES OF BEAVER COUNTY, UTAH.—The following information concerning the Bismuth mines of Beaver County is from a recent report of Prof. Clayton:

The Bismuth mines are situated twelve miles westerly from Beaver City, the county seat of Beaver County. They occur in a group of three or four apparently parallel veins, situated in the eastern foothills of a range of mountains called "Mineral Range" on the map. The nucleus of this range is a syenitic granite flanked by upturned beds of the silurian and devonian ages, and probably some portions of the subcarboniferous age.

The general course of the upturned beds and the lodes is N. 20° E. magnetic (variation 17° E.), and the dip of the lodes as well as the beds varies from 60° to 80° west; but the general appearances are that the outcroppings have been pressed over to the east by the great central mass of the mountain; hence I infer that at no great depth the lodes and the conformable beds of altered limestone will assume a vertical position, and finally assume a dip eastward in a high angle.

The altitude of the mines, by barometrical measurement, is 6,450 feet above tide-water.

The formation in which the lodes occur is a highly metamorphosed magnesian limestone of the silurian age, of grayish-white appearance, with streaks and bunches of a darker and greenish hue, somewhat approaching a serpentinous character, with lime garnets and bunches and seams of tremolite and its allied species.

I will designate the veins Nos. 1, 2, 3, and 4, beginning at the base of the hill and taking them in their order of occurrence going up the mountain.

No. 1 is a small vein at the base of the steep part of the hillside. This lode is about one foot thick, with well defined walls, and showing bismuth ore in small streaks and bunches through the gangue stone. This may be an independent lode, but it is covered with debris along the line of outcrop, and there has been no tracing, but cuts or drifts, by which its true relation to the other may be determined. It is possibly only a spur or offshoot of the main lode.

No. 2 is situate about 150 feet southwest of No. 1, on the steep side of the hill going up to No. 3. This is a somewhat stronger lode, of 1 to 3 feet thick, showing some very good ore in seams and nodules in the serpentinous gangue. This also has the appearance of being an offshoot of No. 3, but the exploration is not sufficient to enable me to say with certainty that it is so.

No. 3 appears to be the true central and persistent lode, to which the others are subordinate. The vein has been prospected by several open cuts along the outcrop, by which it is traced a distance of 800 to 1,000 feet. The principal opening is a shaft some 40 or 50 feet deep, showing the lode to be 6 to 10 feet in thickness. Two other shafts of less depth have been sunk on the lode further south. At the ravine, about 600 feet south of the main shaft, a tunnel has been driven north on the vein a short distance, which shows good ore in larger quantities than any of the other openings; and still further south, up the slope of the next ridge, another opening has been made, showing the lode continuing south.

No. 4 is a small vein of iron oxide, 70 feet west of No. 3, carrying bismuth and silver with a variety of other minerals. This is a contact lode between the limestone on the east and the granite on the west side. It has not been much prospected, but the surface indications are favorable for a lode of persistence in depth and length.

This group of mines should all be worked from the same general opening as soon as a depth is reached that requires it. The surface ores can be extracted from each independently for considerable distances below the surface, but when the water line is reached all the workings should be connected to one point of drainage.

The mines are well situated for economical working—near the edge of a beautiful and productive valley that is intersected by several streams of water that unite to form Beaver River. Good roads up to the mines from the valley, an abundant supply of fuel for reduction purposes flanking the adjacent hills, and a mild climate favorable for mining enterprise.

I am unable to give an opinion as to the commercial value of these mines, from the fact that I am not familiar with the methods and cost of reduction of bismuth ores. The percentage of ore contained in the entire lode is not large, but ranging, I should think, from 1 to 5 per cent. Some of the gangue rock contains scarcely a trace, while other portions are quite rich in the metal in the form of sulphide and oxide of bismuth. The ore is, however, easily assorted from the waste rock, and proper concentration works would complete its preparation for the furnace. Of this part of the subject you are perhaps better able to give definite information than I am.

LABOR NOTES.

AT FORESTVILLE, BUTLER COUNTY, PA., wages for mining coal have been reduced to 6cc. per ton. Drivers are paid from $1.10 to $1.50 per day.

THE CASTLE SHANNON (PA.) COAL MINING COMPANY has reduced the price for mining coal to 2½c. per bushel.

THE MINERS AT THE CURTIS HILL COAL MINE, at Sharon, Pa., are paid 48c. per ton for mining coal from a four foot vein.

THE CARBON COAL AND MINING COMPANY, at Scranton, Kansas, has reduced the wages for mining coal from 6½c. to 5½c. per bushel. The miners have struck.

THE HOCKING VALLEY, OHIO, COAL MINERS' strike ended on the 1st inst. by the operatives yielding to the demand of the miners.

THE MINERS IN THE CONNELLSVILLE AND MOUNT PLEASANT COAL REGIONS have nearly all gone to work at the same wages they received before the strike.

AT THE BEACON, IOWA, COAL MINES, the companies have contracted with the miners to mine coal for 3½c. per bushel, for four months, and 3c. per bushel for eight months.

THE STONEBORO COAL MINERS in Mercer County have struck because of a change in the size of the screens. 95c. per ton is paid here for mining coal. The miners claim that this change in the screens is equal to a reduction of 15c. per ton.

AT THE CAMPBELL'S CREEK COAL MINES, W. VA., 2½c. per bushel is paid for mining coal. The miners at Raymond City, Putnam County, W. Va., are on a strike against a reduction of from 2c. to 1¾c. per bushel. The usual shipments from this place are about 14,000 bushels per day.

THE NEW-STRAITSVILLE, OHIO, COAL MINERS, to the number of 400, struck on the 30th ult. against a reduction in the price of mining to 30c. per ton. The strikers marched to Shawnee, and the miners from Shawnee and Straitsville, will go to Nelsonville. Trouble is expected.

EAST BROAD TOP RAILROAD AND COAL COMPANY.—The daily wages of some of the employes of this company, on the coal shutes at Mount Union, Huntingdon County, Pa., have been reduced to 90c. per day of ten hours. The company has not yet paid its men for March.

THE STRIKE OF THE TENNESSEE COAL MINERS, which embraced those of every mine in the State except three, operated by convict labor, has been ended by a general resumption of work on the part of the men. The rates for mining coal are hereafter to be, as they were in the past, 3c. a bushel, with the difference that the pay is to be in cash, instead of goods at "company" prices.

THE WAGES OF MINERS ON THE COMSTOCK LODE.—A correspondent to the *Virginia City Enterprise* says: The regular or standard wages paid to men on the

Comstock is $4 per day for eight hours' work, including car men, some of whom have to work twelve hours per day; also watchmen, who have to be on duty from twelve to thirteen hours, receive $4 per day. Some who handle wood and only work ten hours, and day-shift all the time, receive $3.50 per day, which is the lowest wages paid to my knowledge.

THE ISABELLA FURNACE EMPLOYES AT PITTSBURG, PA., have struck for an increase of 10 per cent. in their wages. Last fall fillers were reduced from $1.58 to $1.45 per day; keepers from $2.25 and $1.80 to $2 and $1.62; top fillers from $1.68 to $1.55; under-wheelers from $1.58 to $1.40.

THE WHEELING, W. VA., HEATERS went out on strike on the 7th inst., in a body, on account of a proposed reduction in their pay of 5c. per ton. The price now paid is 70c. There is a sufficient supply of iron on hand in the mills to last from two to three days, when the mills will shut down, as both operatives and operators seem determined to hold out. From present indications there is no prospect of any violence.

HARD TIMES AND WAGES FOUR DOLLARS A DAY.—Mr. Alexander MacDonald, M. P., is reported at a recent meeting of miners in England to have advised young men to go to the Western States, California, and Nevada, where they can earn $4 and $5 per day. He did not state that when $4 a day is paid it is in mines so hot as to seriously endanger the men, and make their labor exceedingly arduous, so much so, in fact, that miners who can earn even half that amount elsewhere will not go there.

THE following extract from the Virginia City, Nev., *Chronicle* shows the actual condition of the men of the district to which Mr. MacDonald advised the young English miners to go. Our English exchanges will do a service by circulating the information. "We want no more miners here at present, for those we have are unable to get employment, though we hope it will be otherwise in the course of another year."

If the "young English miners with a little money" want to engage in agriculture, then we can offer them plenty of room and a certain future of competence for those who are industrious and frugal.

THE STRIKE OF THE STREATOR, ILL., COAL MINERS.—A despatch from Streator, Ill., dated the 15th inst., says: The coal miners at that place who struck some time ago, and whose places were filled by new men, but who were subsequently taken back for the most part, so that only 100 new men were retained, have for a long time been kept separate from the "blacklegs," as the novices are called, to avoid trouble from the jealousy of the old miners. Of late, however, the two gangs have been allowed to mingle, and yesterday the rankling heat of the old miners found expression by some of their number putting poison in the dinner buckets of the new men. Last night some 60 of the victims were in the throes of agony, and many of them will undoubtedly die from the effects of the poison, while the lives of all of them hang upon threads.

FOR THOSE WHO THINK OF EMIGRATION.—Of great importance to the majority of intending emigrants are the homestead laws. The following is a synopsis of those laws: Any person twenty-one years of age and over, male or female, native or foreign born—married women excepted—may obtain one hundred and sixty acres of government land on payment of fourteen dollars fees, and after a residence of five years on the land they can have a clear deed of it from the government. After six months' residence, if it be preferred, they may get a deed on payment of two hundred dollars, and no further residence will be required. Soldiers may deduct time spent in the service of the Union, not to exceedthree years, from the five years. By the Pre-emption Act any person over twenty-one years of age—except a married woman—may take one hundred and sixty acres of government land on payment of two dollars fees, and after residing on it for six months, or for any time not exceeding three years and a half, may get a deed on payment of two hundred dollars and giving evidence of settlement and improvement. The timber law gives one hundred and sixty acres to any one planting one-fourth of it in trees and cultivating for eight years; forty to eighty acres may be taken on like conditions. The fees are the same as for homesteading.

THE WELLINGTON, BRITISH COLUMBIA, COAL MINERS' STRIKE.—The *Colonist* of the 25th ult. says: The direct loss to Nanaimo, through the strike, is $20,000 per month. The difference between the miners and the company is 20c. per mined ton—the miners demanding $1.20 and the employers tendering $1. The outlook for Nanaimo and the Province is bad—very bad. Heretofore it has been supposed that law reigned supreme in British Columbia. Now it has gone forth that a mob of men who decline to work for high wages virtually hold possession of a piece of property that has been a source of wealth to the Province in general and of Nanaimo in particular, and prevent its development. The miners refused to vacate the houses belonging to the company and resisted the efforts of the Sheriff to eject them. A dispatch of the 4th inst. says: "The militia are on their way back from the Wellington mines, having arrested six persons, and stood guard while the Sheriff and a posse evicted miners from the coal company's houses. There was great excitement, but no disturbance occurred."

EMIGRANTS FOR AUSTRALIA.—The clipper ship Star of the West, which leaves this port on the 25th inst. for Sydney, New South Wales, will carry the last party of emigrants from this country under the auspices of the government of New South Wales, the $62,500 appropriated to assist the enterprise being now exhausted. The following list shows the number of emigrants assisted:

Date.	*Ship.*	*Emigrants.*
February 3	Annie Boyton	95
March 3	Sierra Nevada	153
April 16	Annie H. Smith	355
To leave May 25	Star of the West	186
Total		789

Messrs. R. W. Cameron & Co., of South William Street, the emigrant agents of the government of New South Wales, state that they are returning money every day to people who had sent it to engage "assisted passages." Within a week a telegram may be expected from Sydney announcing the arrival of the first vessel which left here—the Annie Boyton, which sailed February 3.

HARD TIMES IN THE SILVER STATE.—The shadow of hard times seems to be slowly creeping over the Comstock, and the man who stands in the sunshine to-day may be under the cloud to-morrow. Hundreds of miners who have been out of employment for months go about willing to perform any kind of labor for anything in the shape of money. A few months ago they were striving to see their wives and children presentably clothed and supplied with the little luxuries of life. To-day they think only of keeping them fed. They have no longer credit at the grocer's, and the butcher will not furnish them meat without the ready cash. Scores of these men are walking the streets aimlessly, or lingering about the mines begging for work. A miner falls down the shaft and is dashed to pieces. A hundred rush to fill the place, content to have their faces fanned by the ill wind that has blown him into eternity. They stand about the gambling tables watching the ebb and flow of other people's fortunes. A man with a dollar in his pocket is deliberating whether to buy flour for his family or put the money on the board to double up. He pushes it over a card, and sees it make its way into the dealer's till. Then he walks away with teeth tightly clenched. You may see such sights nightly at any of the gambling houses. Strong, able-bodied men call daily at the dwellings of citizens, asking for food, or the chance of a night's lodging. The funds of the Relief Committee are exhausted.

NOTES.

RESTRAINED FROM MINING COAL.—In the case of Mahanoy City *vs.* The Philadelphia & Reading Coal and Iron Company, a bill in equity to restrain the defendants from mining coal in such a way as to let down the surface, thereby destroying the property and endangering the lives of the complainants, citizens of Mahanoy City, and others, the Court recently has made a decree enjoining the respondents from mining coal in breasts nearer the surface than 70 yards from the gang-ways of the veins, and that the pillars be widened and the breasts be narrowed to not less than 24 feet as they approach the borough limits, and that no more coal be taken from the breasts numbering 64, 65, 66, 67, 68, 69, 70, and 71. Residents of Mahanoy City can now sleep contentedly, for a while at least.—*Evening Chronicle.*

A Virginia City (Nev.) Press dispatch says the attorney for the Bonanza firm in court on the 5th inst. announced their readiness to confess judgment for the amount due by them for delinquent taxes, amounting, with fees and costs, to $300,000.

HOOPER'S DRY PROCESS FOR SEPARATION OF ORES.—The New York Ore Separator Company have placed on exhibition at No. 125 Mott Street, in this city, three of Hooper's Dry Machines for the separation of ores from the gangue, which are worthy the attention of those interested in mines. We had the pleasure of seeing them work on copper and argentiferous galena with beautiful results, and also were shown very fine samples of concentration on graphite, zinc, and other ores. Hooper's *Dry* Process comprises a Blake's Crusher, one or more pairs of rolls for pulverizing, a revolving screen for sizing the ore, and one or more separators for each size. Each machine delivers at the first operation a considerable percentage of metal ready for smelting or shipping, and of tailings containing very little of value, the middlings being run into another machine, where the same operation is repeated. An exhaust fan draws off the dust through pipes from the rolls, screens, and separators, passing through a spray of water or stream which converts it into a slime, which, if of sufficient value, can be run over a slime machine, separating the particles of metal from the rock. In addition to the *Dry* Process, this company has also Revolving Buddles, Dumping Buddles, Trough Jigs, and a Revolving Jig, especially for iron, which will treat 4 to 5 tons per hour, cleaning it perfectly from the gangue. The dry process is especially suited to the concentration of low grade ores, and for use where water is an expensive luxury. It also works well upon tailings, of which there are large accumulations at many mining camps. Any further information concerning these machines may be obtained by addressing Mr. George C. Wetmore, No. 247 Broadway, New York, whose card will be found in our advertising columns.

THE WASHINGTON MONUMENT—INSUFFICIENCY OF THE FOUNDATION—REPORT OF THE COMMISSION.—Washington, May 2, 1877.—The commission heretofore appointed to examine into the sufficiency of the foundation of the Washington Monument, consisting of Lieutenant-Colonels Kurtz, Duane, and Gillmore, submitted their report as follows: *First*—That the stratum of sand and clay upon which the monument rests is already loaded to the limit of prudence, if not, indeed, to the limit of safety, and that it does not offer sufficient resistance to compression to justify completion of the shaft in accordance with the modified design or any other design that will load the underlying soil beyond 10,000 pounds per square foot. *Second*—That the additional weight imposed at the top of the structure will, in all probability, cause additional and probably extensive spilling and splitting in the ashlar facing near the base. *Third*—It is evident that the masonry foundation was not given spread enough to carry safely the weight it was designed to place upon it. If sufficient spread and depth had been originally provided, the full height of the structure might have been placed upon it, and the weight distributed over a larger area, so as to be within the limits of security. *Fourth*—There has been an actual compression of the soil to the extent of between eight and nine inches: the shaft is sensibly out of plumb, and the foundations show an increasing departure from horizontality. The imperfections may be expected to increase as additions are made to the weight of the structure, if not to a dangerous degree, at least to an extent that will make the monument very unsuited to the purpose for which it was designed. If it were a tower, or shaft, or chimney, intended for manufacturing or industrial uses, such defects might be overlooked and useful results still expected from it. But this structure is to be an exposition to the world of the estimate which is placed upon Washington by his countrymen. It is a great bare obelisk, plain to severity—a conception, perhaps, most suitable to symbolize the great character it would commemorate, but for these very reasons exacting in all its parts and particularly in its foundations. The stones which compose the foundation should be strong and perfect, and truly shaped and accurately placed together. There should be no yielding of the parts and no disturbance of the levels. Upon such a foundation a monument could be reared fit to commemorate Washington, and worthy of the nation of whose foundation he was the chief master-builder.

CENTRAL COPPER MINING CO.—(Annual Report.)—We take the following table from the *Portage Lake Mining Gazette*, of the 3d inst., showing in a very clear and concise manner the comparative operations of this company for four years past:

	1873.	1874.	1875.	1876.
Product stamp copper	527¼ tons	603¾ tons	647¼ tons	649½ tons
" kiln "	134¼ "	190¾ "	190½ "	269⅜ "
" masses	376¾ "	406 "	366 "	484⅝ "
Total product mineral	1,027½ "	1,200½ "	1,203¾ "	1,403⅛ "
Yield in ingot	72·64 per cent.	72·45 per cent	70·82 per cent.	71·22 per cent.
Product in ingot	740¼ tons	869¾ tons	852½ tons	999¾ tons
Pounds of ingot	1,402,456	1,739,423	1,704,947	1,998,563
Mining cost of ingot per pound	15·20 cents	11·59 cents	10·67 cents.	10·29 cents
Smelting, marketing, etc	3·58 "	3·24 "	3·01 "	3·37 "
Average cost per pound marketed	18·78 "	14·83 "	*16·51 "	*14·01 "
" price of sales per pound	29·00 "	20·81 "	22·56 "	20·86 "
Net profit per pound	10·22 "	5·98 "	6·05 "	6·85 "
Total receipts, *a*	$442,637.58	$366,208.23	$373,634.29*b*	$425,026.45
" expenses	280,254.74	257,958.06	281,535.25*	280,060.45
Net profit	162,382.84	108,250.17	92,099.04	144,966.00
Dividends paid†	160,000.00	80,000.00	100,000.00	140,000.00
Surplus remaining	201,737.82	229,987.99	222,087.03	227,053.03
Total dividends paid	840,000.00	920,000.00	1,020,000.00	1,160,000.00
Deepest shaft	1,196½ feet	1,227 feet	1,301 feet	1,385 feet
Number of levels	15	16	17 "	18 "
Ground open January 1—fathoms	17,539	18,305	19,435	20,587
" opened for year	2,711	3,271	2,924	not given.
" stoped for year	1,945	2,141	1,772	" "
Yield per fathom, mineral	777 pounds	910 pounds	746 pounds	863 pounds
" " " ingot	564 "	660 "	528 "	614 "
Total rock stamped	15,903 tons	15,668 tons	17,118 tons	12,658 tons
Cost of stamping and washing	$19,499.90	$16,772.77	$14,852.15	$12,984.96
" per ton of rock	1.22	1.07	0.86¾	1.02½
" of breaking and tramming	20¼ cents	17⅝ cents	15⅓ cents.	15⅞ cents.
Yield of rock per ton	3·32 per cent.	3·85 per cent.	3·78 per cent.	5·13 per cent.
Total men employed	217	215	212	234
Of which, miners	162	161	158	184
Wages of miners per month	$64.79	$53.14	$52.65	$51.39

* Includes $48,289.98 building and construction account, equal to 2.83 cents per pound in 1875, and $7,000 in 1876, for "loss on loan made in 1873," say $\frac{35}{100}$ of a cent per pound.

† The dividends in each case are those paid the February *following* the year of earnings, and the surplus is net, deducting the dividend. To be more explicit, the $140,000 under head of 1876 is the dividend paid February, 1877 (out of the earnings of 1876), and is deducted from the surplus.

a Including "silver and interest," $6,168.92 in 1873; $3,933.23 in 1874; $4,755.32 in 1875, and $4,836.71 in 1876.

b This sum is not equal to 22½ cents on the whole product, because a large amount of mineral was held over and estimated at a lower figure than the actual sales.

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 May 12, and years from Jan 1st.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	51,040	747,099	48,385	645,433
D. L. & W. RR. Co.	52,186	729,128	23,311	447,527
Penn. Coal Co.	23,847	348,106	18,857	320,595
L. V. RR. Co.	20,941	252,100	9,873	315,277
P. & N. Y. RR. Co.	1,067	16,761	....	9,082
C. RR. of N. J.	39,215	500,993	36,399	385,070
Penn. Canal Co.	13,682	64,398	9,509	50,570
	201,978	2,658,585	146,334	2,173,554
Lehigh Region.				
L. V. RR. Co.	69,062	947,864	16,870	681,512
C. RR. of N. J.	35,921	505,847	32,311	345,815
D. H. & W. B. RR.	160	5,902	206	12,798
	105,143	1,459,613	49,387	1,040,125
Schuylkill Region.				
P. & R. R. RR. Co.	147,646	1,825,712	103,469	1,239,537
Shamokin & Lykens Val.	16,922	176,290	18,930	237,434
	164,568	2,002,002	122,399	1,476,971
Sullivan Region.				
Sul. & Erie RR. Co.	507	4,495	1,816	20,696
Total	472,196	6,124,695	319,936	4,711,346
Increase	152,260	1,413,349	....	....
Decrease	....	....	....	....

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

Receipts of Coal at Boston, for the week ending May 11, and years from Jan. 1.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
From				
Alexandria and Georgetown	2,340	6,668	1,772	9,718
Philadelphia	23,498	149,094	19,541	127,874
Baltimore	4,662	37,706	1,828	31,341
Other places	6,303	76,496	5,338	80,410
Great Britain	....	797	...	3,407
Nova Scotia	...	3,669	....	199
Total	36,143	274,340	28,479	252,949

Perth Amboy business:

	Tons.
Received for the week	26,290
Shipped for the week	37,134
On hand May 12	129,153

The Exports of Coal from Baltimore for the week ending May 11, were ... tons, and since Jan. 1st, 13,938 tons as against 10,860 tons for the corresponding period of 1876.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 26,402 tons, as compared with the corresponding period in 1876.

The Receipts of Coal at Rondout, N. Y., by the Delaware & Hudson Canal for the five days ending May 16 were 286 boats, carrying 36,969 tons.

Belvidere Delaware RR. report for week ending May 12.	Week	Year. 1877.	Year. 1876.
Coal for shipment at Coal Port (Trenton)	652	5,743	52,197
" " " " South Amboy	19,491	226,786	168,871
Coal for distribution	3,428	63,069	51,997
Coal for Company's use	358	28,233	18,578

The production of Bituminous Coal for the week ending May 12, was as follows:

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

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb	39,462	495,786
Barclay Region, Pa.		
Barclay RR. tons of 2,240 lb	5,454	126,848
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	†	150,938
*East Broad Top	1,087	17,319
Clearfield Region, Pa.		
*Snow Shoe	876	16,635
*Tyrone and Clearfield	25,228	456,057
Allegheny Region, Pa.		
*Pennsylvania RR	3,540	68,377
Pittsburg Region, Pa.		
*West Penn. RR	3,536	68,360
*Southwest Penn. RR	315	16,131
*Penn & Westmoreland gas coal, Pa. RR.	13,830	266,477
*Pennsylvania RR	8,391	132,619

*For the week ending May 7.
† This report was not received this week.

The Production of Coke for the week ending May 7.

Tons of 2,000 lb.	Week.	Year.
West Penn. RR	656	26,114
Southwest Penn. RR	10,389	205,666
Penn & Westmoreland Region, Penn. RR.	1,671	29,914
Pittsburg, Penn. RR	1,750	51,840
Total	14,466	313,534

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 18, 1877.

Anthracite.

The effect of the Delaware & Hudson Canal Company's circular, which we published in our last, has been quite demoralizing; very much unsettling the views of buyers, and reducing the volume of sales. The meeting of the companies on Tuesday, and the proposition to suspend operations for one or two months, as the necessities of the case might suggest, had, however, the influence of bringing out a few orders and giving more life to the trade than existed previously. Prices have been very weak, and are lower now than at any previous time.

On Tuesday representatives of all the anthracite coal interests met at the office of the Delaware & Hudson Canal Company to receive the report of the committee appointed to complete the arrangements for a combination to restrict production and advance prices at least fifty cents per ton on June 1. The original plan appears to have been abandoned, and in lieu thereof the simple proposition to suspend production for one or two months, as might be necessary to reduce the supply to the requirements of the market, was offered. This was agreed to by all but the Philadelphia & Reading Railroad Company.

The proposition was cabled to Mr. Gowen, the president of the company, who had just arrived in Europe. His reply will be heard on Monday, when another meeting will be held. It is quite improbable that he will consent to a curtailment of the company's production. He has quite plainly shown that he realizes the necessity of independent action. He has driven his business in every direction, selling large quantities of coal by meeting the views of buyers. He has now orders for a very large quantity of coal, which will occupy considerable time in its delivery, and while most of the companies have large stocks on hand the Reading has only an accumulation of such sizes as are naturally quiet at this season—mostly stove. Several of the companies have stocks that would not be exhausted in a month, while if the Reading Company were to suspend production it would have to cease doing business within a week after such course, which would be simply asking it to step out of the market, that the other companies can take the business that may come up, and even supply the wants of those whom the Reading Company has contracted to supply. The manner in which the company continues to push its sales does not indicate that the sales agent anticipates a suspension of production. In this connection the following, which is from a circular issued by the company, under date of May 10, speaks for itself:

"The increase of the trade of this company throughout Connecticut is such as to warrant the establishment of an office and a resident agency at some convenient point on Long Island Sound, to which our customers can have easy and ready access. For this purpose the company has taken an office in Clark's building, No. 87 Church Street, New Haven, and Mr. W. S. Wells has been appointed resident agent. We shall be prepared at all times to furnish our customers on the lines of railroads running from Stamford, Norwalk, Bridgeport, New Haven, Saybrook, and New London, with all the varieties of Anthracite Coal mined by this company, in such quantities as may be desired."

With Mr. Wells' usual energy and his thorough familiarity with the wants of the trade, his appointment to this agency cannot do otherwise than result in a considerable increase in the business of the company in this field.

The Reading Company is reported to have contracted during the week, through Mr. Austin Wellington, to deliver to the City of Boston 20,000 tons of broken and stove coal at $4.50 per ton, delivered in the bins of the school-houses in all parts of the city, including Brighton, Brookline, Jamaica, etc. It is estimated that the cost of cartage will average $1 per ton. If so, it does not seem that the company will be able to cover the cost of mining and delivery, unless a profit is anticipated in transporting the coal from the mine to tide-water.

The Erie Canal has reduced its tolls on coal 50 per cent. They are now as follows: to Buffalo 19¾c., Rochester 14c., and Utica 6c. Freights, which are at present high, are as follows: to Rochester 55c., Buffalo 60c., and Utica 45c. At these rates, adding all other charges, coal can be delivered and discharged in Buffalo from our shipping ports at a charge of about $1.12, or at a total cost on present prices of coal of say from $3.85 to $4.15 per ton; and when the season is more advanced, it can probably be delivered in Chicago at an additional cost of 50c. to 75c. per ton. The prices delivered in Buffalo are considerably less than are being asked by the Anthracite Coal Association, and are likely to create a revolution in the Western markets. Already we learn of Lehigh coal taking advantage of this route, and it is quite probable that the Reading will be giving the Lackawanna and Wyoming Companies as much trouble in the Western markets as it has on the Hudson and in the East.

The production of anthracite coal for the week ending May 12 was 472,196 tons, as compared with 462,995 tons for the previous week, and 319,936 tons for the corresponding week of 1876. The total production since January 1 has been 6,124,695 tons, as against 4,711,346 tons for corresponding period of last year, showing an increase this year of 1,413,349. An apparent discrepancy exists in our report as compared with last week's statement. This is the result of an irregularity in the report of one of the companies last year.

Bituminous.

The business in this description of coal has been very quiet and without a feature. Under date of the 15th inst. the Hon. A. P. Gorman, President of the Chesapeake & Ohio Canal Company, replied to President John W. Garrett, of the Baltimore & Ohio Railroad, in a lengthy communication, very pointedly reviewing the difficulties existing between these companies, and the positions they have held in the past. Mr. Gorman's remarks, unlike those of Mr. Garrett, are confined to the points of issue. He fully reviews the efforts of the Baltimore & Ohio Railroad Company to entice the producers of Cumberland coal to transfer their shipments to the Baltimore & Ohio Railroad by secret offers of concessions in freight, a matter which received no mention in Mr. Garrett's letter, although it was the immediate cause of the existing difficulties. He expresses a desire to enable Cumberland coal to be placed in market at the lowest possible cost, that it may meet all competition. He shows the great necessity of maintaining competition against a company whose past history has shown that it would ruin any industry dependent strictly upon it for a means of transportation. Mr. Garrett deprecated the action of the Maryland Legislature in reducing the rates of freight on the Cumberland & Pennsylvania Railroad, and stated that it would result in deterring capitalists from investing in that State, and he assigned to this action the decline in the market value of the stock of the Consolidation Coal Company. Mr. Gorman, however, says:

"The decrease in the value of the stock of the Consolidated Coal Company from 50 to 25 per cent. of its par value may be accounted for in part by the same causes which have depreciated nearly all other like securities, and in part by the fact *that its management is controlled by your company*, which must ultimately be more interested in maintaining its rates as a carrier than in the profit on coal at the markets to which it is carried."

To what other causes, it may be asked, can Mr. Garrett attribute the decline in Baltimore & Ohio Railroad stock from 173½ in January, 1876, to 116¾ at present?

The following is an illustration of the destructive policy of the Baltimore & Ohio Company, as stated by Mr. Gorman:

"Your rate to the consumers in the City of Baltimore is $1.87 a ton. For street delivery at private yards or switches 30 cents a ton is added to this charge, which makes a difference against the citizens of Baltimore of 75 cents a net ton. Again, take your rates on gas coal, which as announced are $4.50 per ton from points on the Pittsburg division to Baltimore. If the same coal is taken to Locust Point wharves and shipped from thence to points east of Cape Cod, you allow a drawback of $1.40 a ton. In other words, your company charges the people of Baltimore 75 cents per ton more for Cumberland Coal than you do a citizen of Boston who sends his vessel to your wharves at Locust Point.

"The Gas Companies of Baltimore pay $1.40 more a ton for coal delivered to them in Baltimore than is paid by the Gas Companies of *Bangor, Maine*, for the same coal delivered to them at Baltimore.

"So great has been this discrimination against the City of Baltimore that in 1874 coal was shipped from the mines on the Pittsburg Division to Cumberland, transferred to canal boats, thence carried 184 miles by canal, transferred to vessels at Georgetown, taken down the Potomac River, and up the Chesapeake Bay, to Baltimore Gas Companies, at a lower rate than your company would carry it by its roads from the same mines. It is true that as soon as it was known that the canal company were delivering gas coal at Baltimore your company so increased its charges from the mines to Cumberland as to prevent us from continuing to supply the City of Baltimore with cheap gas coal."

In this connection we may say that the oppressive policy of this company has compelled the gas companies of Baltimore to make purchases in Nova Scotia and on the line of the Chesapeake & Ohio Railroad. The bark *Edwin*, 800 tons capacity, is now loading at Little Glace Bay, C. B., with coals for a Baltimore gas company. Provincial coals can be delivered at that city at a cost, duty paid, not exceeding $4.24 per ton, while gas coals for eastern shipment from Baltimore are quoted at $4.50 per ton.

It will be observed that the actual cost of Provincial

coals, delivered to the Baltimore gas companies, is less than is charged in freights alone on the gas coal coming from Western Pennsylvania and West Virginia intended for consumption in that city. The inroads upon this trade must eventually result advantageously to the consumers in Baltimore, but in accordance with the policy of the railroad company, this effect will only be fully realized when the situation becomes so serious as to force a concession from the company. This, however, may only be another means adopted by Mr. Garrett of increasing the commerce of the city of Baltimore.

The tyranny of the Baltimore & Ohio r oad does not cease with oppressive rates of freight, in the absence of competition, but in the gas coal trade it goes so far as to dictate the markets in which the mining companies shall sell their coal.

Mr. Gorman very forcibly meets the appeal of Mr. Garrett to the mechanics and laborers, and shows in the following that the necessity of discharging large numbers of each is attributable to the war with the trunk lines and not with the canal company. He says:

"The truth is, that the depression in all branches of industry has greatly reduced the business of the country and curtailed the receipts of all lines of transportation, while the struggle which has been going on between the great trunk railway lines of the country has impaired their resources. These contests, and not the rates upon the canal, have required your company to reduce its expenditures. The mechanic and the laborer, unhappily, always first experience the evil results of a mistaken policy of management."

We regret that our limited space does not permit us to give a more extended review of this able communication.

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	$4 50	$5 50
" " at S. Amboy.	5 00	5 50
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt	4 50	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 86
Fairmount, West Va., " "	4 40	5 70
Newburg Orrel, Md. " "	4 50	6 00
Cannelton Cannel, West Va.	....	10 00
" Splint " at Richmond.	6 00	7 00
" Gas Coal at Richmond	4 14	5 65
Peytona Cannel W. Va. at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va.	3 00@3 15	4 40
Cumberland, at Baltimore	3 15@3 25	4 70
Clearfield f. o. b. Canton, Baltimore	3 25@....	4 50

Clearfield "Eureka" at mines per ton 2,000 lb., 75c.; f.o.b. Baltimore and Philadelphia per ton of 2,240 lb., $3.25; f.o.b. South Amboy, $4.25; alongside at New York, $4.50.

Foreign Gas Coals.

	Sterling.	Am. cur'cy
Newcastle, at Newcastle-on-Tyne	8 6@10 6	5 50@ 6 00
Liverpool House Orrel, at Liverpool	25/	13 00
Ince Hall Cannel "	35/6	18 06
" Gas Cannel "	25/6	10@10 50
Scotch Gas Cannel, at Glasgow, nominal,	25 Gold.	7 50
Block House at Cow Bay, N. S.	1 75	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
International mines at Sydney	1 75	4 50
Pictou, Vale mines, at Pictou	2 25	....

New York and Philadelphia.

Wholesale Prices of Anthracite Coal 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 Hoboken and Rondout	2 90	2 90	2 90	3 05	3 25	3 10
Wilkesbarre at Port Johnston	2 90	2 95	3 05	3 10	3 35	3 00
Plymouth, R. A	....	....	3 05	3 10	3 45	3 10
Susque: Coal Co., (S. H. Brown & Co.,) At Amboy	2 85	2 85	2 90	3 00	3 60	2 25
Susquehanna coal at Philadelphia	2 75	2 75	2 60	2 65	3 25	2 75
Kingston at Hoboken	2 90	2 95	3 05	3 10	3 35	3 15
Pittston at Newburgh:						
A. S. Swords	2 95	2 95	2 95	3 00	3 40	3 25
Penn. Coal Co	3 10	3 10	3 10	3 20	3 60	3 25
Wyoming at Perth Amboy	....	3 00	3 00	3 10	3 40	3 35
Lehigh Coals.						
Old Company at port Johnston	3 75	....	3 25	3 25	3 65	3 25
Old Company's Room Run "	3 75	....	3 25	3 25	3 65	3 25
Sugar Loaf, Hobok. & Amb."	3 75	....	3 25	3 25	3 65	3 35
Lehigh at Perth Amboy	3 75	....	3 25	3 25	3 40	3 35
Honey Brook Lehigh	3 75	....	3 25	3 25	3 65	3 25
Beaver Meadow at South Amboy	3 75	....	3 25	3 25	3 65	3 25
Mount Pleasant at Hoboken	3 75	....	3 15	3 15	3 50	3 30
Cross Creek at Elizabethport	3 75	....	3 25	3 25	3 75	3 25
Schuylkill Coals *at Port Richmond, Philadelphia.*						
Schuylkill white ash	2 75	2 75	2 75	2 75	3 10	2 75
Schuylkill red ash	....	....	....	2 85	3 20	2 75
Lorberry	....	....	3 50	3 50	3 50	3 00
Lykens Valley	....	....	3 75	3 75	3 75	3 00

‡Boats towed by the D. & H. Co. at its expense to and from New York Harbor.

Per ton.

Freight from Hoboken and Weehawken to New York 35c.
" " Elizabethport & Port Johnston to N. Y. 35c.
" " South Amboy to New York 35c.

Freight by the boats of the companies from Hoboken, Rondout, Port Johnston, Weehawken, South Amboy and Perth Amboy to New York City and vicinity 50c.

Pittston coal at New York delivered by Penn. Coal Co.'s boats 60c. per ton additional.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Retail Prices in New York.

Anthracite.

Per 2000 lbs.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$3 90	$4 20	$3 90
Lackawanna coal, in yard	3 25	4 00	3 90
Wilkes-Barre, delivered	5 00	5 30	4 60
Lehigh and Locust Mountain, del'd	5 50	5 50	5 00
Schuylkill Red Ash, del'd	5 25	5 50	4 75

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb			$18 00
Liverpool House Cannel	"	"	18 00
American	"	"	11 00
Cannelton Block, or splint,	"	"	10 14
American Orrel	"	"	11@00
Red Bank Cannel	"	"	9 00
Cumberland	"	"	7 00

Baltimore. May 16, 1877.

Specially reported by Messrs. E. Stabler Jr., & Co.

Wholesale Prices.

AFLOAT BY CARGO PER TON OF 2,240 LB.

Lump and Steamboat	$3 40	Stove	$3 65
Broken	3 25	Chestnut	3 40
Egg	3 30		

In cars in dealers' yards or on switch, 15c. per ton additional.

Lykens Valley Red Ash.

AFLOAT BY CARGO.		BY RAIL IN CARS.	
Broken	$3 98	Broken	$4 15
Egg	4 13	Egg	4 30
Stove	4 13	Stove	4 30
Chestnut	3 36	Chestnut	3 80

From wharf or yard to the trade, 50c. per ton additional.

Bituminous.

George's Creek, f. o. b. at Locust Point	$3 50 to $3 60		
Clearfield, " Canton	3 30 to 3 40		

Boston. May 12, 1877.

Coal is dull and depressed. Soft coals are now very quiet. We quote freights to Boston as follows: Philadelphia, $1.60 @$1.62½; Baltimore, $1.60@$1.65; New York, $1.20$1.25; Alexandria and Georgetown, $1.70 @$1.75.

We quote Boston wholesale prices as follows:—

Anthracite, broken	$4 40@4 75	Cannel, English	$16 00
do. egg	4 40@4 75	do. Buckeye	10 00
do. stove	4 65	Lingan	4 75
Cumberland	5 00	Picton	5 25
Clearfield	4 50	Penn	6 00
Westmoreland	5 00	Youghiogheny	5 00@6 00
Caledonia	4 50		

—*Commercial Bulletin.*

Buffalo. May 15, 1877.

Specially reported by Lee & Loomis.

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville Coke	$5 00	....	.....	....
Brookfield Coal	4 15	....	.....	....
Briar Hill	4 00	....	2 85	....
Youghiogeny	4 00	3 15	.....	....
Monterey	3 50	....	.....	2 40
Catfish				
Stoneboro	....	....	2 75	2 40
Sterling Cannel	5 00	broken 4 75	4 50 nut & slack	....
Reynoldsville	3 50	3 15	2 65	2 40
Cameron	....	3 15	.....	2 40

In New York city funds.

Chicago, Ill. May 14, 1877.

Specially reported by Messrs. Reno & Little.

Lackawanna Stove	$8 00	Erie and Brier Hill	$6 00
" Chestnut	8 00	Wilmington and Ill.	3 50@4 25
" Grate and Egg.	7 50	Blossburgh	7 00

Cincinnati, O. May 15, 1877.

Specially reported by the Consolidated Coal and Mining Co.

	AFLOAT. Per bush.	AFLOAT. per ton 2,000 lb.	DELIVERED. Per bush.	DELIVERED. per ton 2 000 lb.
Youghiogheny lump	7c.	$1 94	10c.	....
" nut	5½c.	1 53	9c.	....
" slack	4½c.	1 25	8c.	....
Camden, W. Va.	5½c.	1 53	9c.	....
Peytona Cannel	16c.	4 57	20c.	....
Connellsville coke	7c.	3 60	10c.	....
Youghiogheny coke	5c.	2 64	8c.	....
Crushed coke	....	....	10c.	....
Anthracite, Wilkes-Barre or Lehigh by car load				$6 70
" " "			delivered	8 00

Cleveland, O. May 16, 1877.

Specially reported by Messrs. Lambie & Bates.

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

WHOLESALE.

Briar Hill (Church Hill)	3 50
" No. 2 Grades	3 35@3 40
Straitsville Lower Vein	2 80
Hocking Valley	2 80
Massillon	2 85
Mineral Ridge (Cambria Mine)	2 85
Tuscarawas Valley	2 30
Columbiana	2 30
Nut coal, various grades	2 20@2 50
Screenings, " "	1 35@1 75
Youghiogheny gas coals	3 75@3 85

The following are the prices established by the Coal Exchange until further notice:

RETAIL TRADE.

	1 to 10 tons.	10 tons upw'd.
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 70
" " " nut	3 75	3 55
Straitsville Lower Vein, Hocking & Shawnee, l'p.	3 60	3 35
" " " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 00	7 25

Lehigh $1 25 per ton higher.

All sales to be strictly cash with order or C. O. D.

Hamilton, Ont. May 15, 1877.

Specially reported by V. Barnard.

Prices as quoted below give the present state of our market for coals that are in demand:

Grate	$5 95	Briar Hill screened	6 00
Egg	5 75	" " unscreened	5 50
Stove	6 50	Blossburgh	6 00
Nut	6 50		

Indianapolis, Ind. May 15, 1877.

Specially reported by Messrs. Cobb & Branham.

Wholesale on board cars, and retail delivered to consumers.

BITUMINOUS.

White River, per ton	$ 2 50	Peytona Cannel, per ton.	$ 5 75
Brazil Block, "	2 25	Indiana Cannel	4 50
Highland, grate, "	2 00	Hocking Valley	4 25
Block coal, nut, per car.	18 00	Youghiogheny	4 50
Highland "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas Cake, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre).

Broken	$7 60	Nut	$6 70
Egg	7 60	Stove	6 70

Lehigh Anthracite.

Broken	$7 60	Nut	$7 30
Egg	7 60	Stove	7 70

Retail, per bushel, delivered.

Sand Creek	13c.	Block Nut, steam	8c.
White River	13	" Slack, "	0
Brazil Block	13	Virginia Cannel	27
Highland Grate	11	Youghiogheny	16
Block Nut, domestic use.	11	Blossburg	26
Highland Nut, " "	11	Piedmont	26
" " steam	8		

GAS COKE (measured.)

Crushed	14c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$7 50 per ton.
Lehigh, retail	8 50 per ton.

Louisville, Ky. May 15, 1877.

Specially reported by Messrs. Byrnes & Speed.

Below find latest quotations:

WHOLESALE.

Pittsburg	7c. per bush.	Pine Hill	8½c. per bush.
Raymond City	7c. "	Kentucky	7½c. "

RETAIL.

Pittsburg	11c. per bush.	Pine Hill	11c. per bush.
Raymond City	10c. "	Kentucky	10c. "
Indiana Cannel	17c. "	Honeywell Can'l	19c. "
City Make Coke	8c. "	Anthracite	$8 50 to $9 per ton.

Milwaukee, Wis. May 14, 1877.

Specially reported by Messrs. R. P. Elmore & Co.

Retail price per ton of 2,000 lb.

Lehigh Lump	$8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes)	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	4 00
		Steam coal	6 00

Montreal. May 14, 1877.

Specially reported by Messrs. Robert C. Adams & Co.

Wholesale per ton of 2,240 lb.

Scotch Steam	$4 50	Cape Breton Steam	$3 75
Picton	4 25	Newcastle Smiths	6 50

Anthracite at retail, per 2,000 lb. delivered.

Egg	$6 50	Chestnut	$7 00
Stove	7 00		

Philadelphia, Pa. May 17, 1877.

Specially reported.

The trade is moving along pretty brisk and vessels in fair supply. The rates of freight are firm at $1.60 to Boston, $1.30@$1.35 to the Sound, 80c. to Washington and Richmond, 70c. to Norfolk. The dealers are rapidly filling up. The question which absorbs the attention of the trade at present above all others is, What will Mr. Gowen's cable answer be? Amongst producers a stoppage in June and July seems to be popular. Anything for a change or to avoid the war threatened, and which but few see as inevitable, no matter what temporary expedient is adopted to patch up and prolong the agony.

Pittston, Pa. May 17, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional

Richmond, Va. May 17, 1877.

Specially reported by S. H. Hawes, Dealer in Coal.

Per ton of 2,240 lb., f. o. b.

Kanawha Cannel	$9 00	New River Bituminous	$3 60
Coalburg Splint	5 70	Clover Hill Coal	3 00
Lewiston "	5 70	James River Bitum	3 50
Kanawha Gas Coal	4 90	" " Carbonite	5 25

San Francisco, Cal.

From the *Commercial Herald* of May 10, 1877.

Coal—Imports from January 1st to April 16th:

	Tons.		Tons.
Anthracite	8,996	Mt. Diablo	21,531
Australian	17,534	Vancouver Island	29,518
Coos Bay	11,793	Rocky Mountain	43
Cumberland	7,822	Seattle	38,695
English	35.223	Bellingham Bay	3,800
Chile	2,904		

The ship Rokeby Hall has sailed for Valparaiso with her inward cargo of English steam coal. say 657 tons. The Aureola from Seattle is on hand with 1,320 tons. This with other receipts comes under contract. The present supplies of nearly all descriptions are very liberal, causing low prices to prevail as for a long time past. The only inquiry is for the better kinds of Australian which are in lessened stock and with few cargoes to arrive. Some invoices of coke have recently been sold to arrive at very low prices. Our quotations must be looked upon as entirely nominal. The Nanaimo mines are producing freely, supplying the Pacific Mail Company liberally. The Seattle Company have yet a running contract with the Pacific Railroad. Bellingham Bay, Coos Bay, Black Diamond, and Mt. Diablo coals arive freely, all selling at low prices from the wharf, say for cargo lots $7.50 @ $8. Vancouver Island Coals $8 @ $9 by the cargo; Scotch and English Steam $7.50 @ 8; Australian cargoes to arrive, $9 @ $9.25.

Towing.

For rates of towing we refer to our issue of April 28.

Freights

Representing the latest actual charters up to May 17.

Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me.	....	3 50	....	....
Albany	...	1 60	....	....
Alexandria, Va	85	75	....	....
Annapolis, Md.	....	....	....	....
Bangor, Me.	....	1 85	....	1.15-1.25
Bath, Me.	1 60	1 75	....	1.15-1.25
Baltimore	65	....	....	....
Boston, Mass.	150@175	1 75	1 75	1 25
Bridgeport, Ct.	....	1 50	1 55	50
Bristol, R. I.	....	....	....	80
Beverly, Mass.	....	....	....	1 30
Cambridgeport, Mass.	1 60	....	....	1 25§
Charleston, S. C.	1 60	....	....	....
Danversport, Mass.	1 75†	....	....	....
East Greenwich, R. I.	....	....	....	....
Fredericksburg, Va.	....	....	....	....
Fall River	....	1 50	1 60	80
Gloucester	1 60	.. .	....	....
Greenport, N. Y.	1 30	....	....	....
Hartford, Conn.	1 13	2 00	....	....
Hoboken	....	....	1 40	35
Hudson	....	1 50	....	....
Jersey City	....	....	1 40	35
Lynn, Mass.	160@170	....	125@130	....
Middletown	....	....	....	80
Marblehead, Mass	...	....	....	....
Newark, N.J.	...	1 40	....	....
New Bedford	130@135	1 50	1 65	85
Newburyport	....	1 90	....	1 40
New Haven	....	1 50	1 55	50
New London	....	1 50	1 60	65@7
Newport	1 30	....	....	80
New York	80@90	....	1 45	35
Norfolk	70	70	....	75
Norwalk	....	1 60	....	50
Norwich	1 30	1 60	....	....
Pawtucket	....	1 65	....	90
Philadelphia	....	80	....	....
Portland	135@160	1 75	1 70	1 25
Portsmouth, N. H.	160@165	1 85	2 00	1 35
Providence	130@135	1 50	1 60	80
Poughkeepsie, N. Y.	....	....	....	....
Quincy Point, Mass.	1 60	....	....	....
Richmond, Va.	80	....	....	....
Salem, Mass.	1 65	1 75	....	1 25
Sangus, Mass.	1 60	....	....	....
Savannah Ga.	1 22	....	....	....
Somerset, Mass.	130@135	....	....	....
St. John's, N.B.	1 15	....	....	....
Troy	....	1 65	....	....
Trenton, N.J.	....	....	....	....
Washington	75@90	75	....	....
Weymouth	1 60‡	....	....	....
Wilmington, Del.	....	80	....	....
Wareham	....	1 60	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

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. (117 miles) via Central Railroad of New Jersey	1 36	1 22	1 80	1 1	1 92
† Mauch Chunk, Pa., via Central Railroad of N. J.	14	...	58	49	0
† Phillipsburg, N. J., 46 miles	0	56	1 14	1 05	1 26
Elizabethp't, 114 miles Pt., Johns,, Hoboken & South Amboy, N. J., shipping and wharfage 15c. and.	1 02	86	1 44	1 35	1 56
High Bridge, N. J.	1 80	1 60	2 58	2 19	2 30
Elizabeth, Cranford, Westfield & Elizabethport, for consumption.	1 80	1 60	2 18	2 19	2 30
Jersey City, N. J., (121 miles) and New York, via L. V. RR.	1 59	1 22	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City‡ via Lehigh Valley RR. $1 12

From *Mauch Chunk* to *Philadelphia* (93 m) via L. V. and L. and S. RR. and North Penn. RR. 1 25

From *Mauch Chunk* to *Philadelphia* (92 m) via L. V. and Perkiomen RR. 1 40

For way points between *Mauch Chunk* and *Phillipsburg* on the New Jersey Railroads. 1 00

From *Phillipsburg, N. J.*, to *Hoboken* (84 m) for shipment via Delaware, Lackawanna & Western RR., Morris and Essex Division. 65

From *Phillipsburg, N. J.*, to *Newark* (75 m) via Delaware. Lackawanna & Western RR. 66

** 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 $1 00 per ton.

‡ On coal received by canal at Jersey City, a charge additional to the freight, of twenty cents per ton, will be made for transferring it from boat to boat, and thirty cents per ton for placing the same on the wharves and reshipping.

The distances in the above table are computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *Upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

OFFICE OF THE PA. &. N. Y. R. R. CO.,
Bethlehem, May 1, 1877.

On and after this date the rate on coal for Buffalo, for Watkins, Ithaca, and Weedsport, for water shipment; Auburn, for New York Central R. R.; Sterling, for Lake Ontario Shore R. R., and Fair Haven, will be 90 cts., per gross ton, between Coxton and Waverly. On all coal transhipped at Waverly into broad guage cars, an additional charge of 10 cts. per ton will be made to cover the expense thereof. The full rate from Coxton to Buffalo is $2.46; to Rochester, $2.22.

ROBERT H. SAYER, President.

For freights on *Schuylkill Coals* we refer to our issue of April 28.

For freights on coal *via Geneva, Ithaca and Sayre Railroad* we refer to our issue of May 12.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, May 18, 1877.

American Pig.—The Thomas Iron Company reports sales of about 1,400 tons on the basis of $19 for No. 1 foundry. The demand is generally very light, and such transactions as do take place are mostly at low prices and are kept private. Makers desiring to dispose of large lots for cash would have to offer considerable concessions. We quote No. 1 foundry at $18.50@$19; No. 2 foundry, $17.50@$18; and forge, $17@$17.50.

Scotch Pig.—This market, in sympathy with the one abroad, holds quite firm, although the business is very limited. We note sales of 100 tons of Coltness, and 100 tons of Glengarnock on private terms. We uote Eglinton at $25.50; Glengarnock, $27@$27.50 and Coltness, $28.50@$29.

Rails.—The business in steel rails, which we noted in our last without particulars, was 10,000 tons for the Pacific road, taken from the Western mills, and 4,000 tons for delivery at Amboy. There was also a sale of 1,000 tons of iron rails. We quote steel rails at mills at $46@$50; and iron at $33@$37.

Old Rails.—We note a sale of $5,000 tons at a private price, and quote nominally at $19.

Scrap.—There is no business doing in wrought which is quoted at $24.50.

Baltimore, Md. May 16, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The iron market remains dull and depressed with but little doing in the business. Prices unchanged. We quote :

Baltimore Charcoal	$29@31	Mottled and White	$16@17 00
Virginia Charcoal	28@32	Charcoal C. B. Blooms	58@60 00
Anthracite No. 1	21@22	" " Billetts.	60@63 00
" " 2	20@21	Refined Blooms	43@45 00
Anthracite No. 3	19@20	Scrap Blooms	.....

Boston. May 12, 1877.

Pig continues depressed, and sales at $1, lower prices than before are quoted at the mills. The Glendon Iron Company are reported to have sold 20,000 tons gray forge for future delivery, on private terms, and other companies have made sales on private terms aggregating several thousand tons. We quote $22.50@24 for No. 1, $22 for No. 2, and $21@22 for gray forge. Scotch pig is firm but very dull. We quote $27@30 for store lots, these being the best figures that could be actually obtained.

Bar is dull, quoting $46@47 for refined, and $37@38 for common. Nails are in light demand at the reduction.—*Commercial Bulletin.*

Chattanooga, Tenn., May 15, 1877.

Specially reported by J. F. JAMES, dealer in pig iron, ores, etc.

PIG IRON.—The general tone of this market has been quite healthy during the past week. Several large buyers from the West have visited me here. I made contracts for round lots for the next sixty days' delivery. The sales effected last week amount to 850 tons. An offer for 2,500 tons at present price for delivery between now and the 1st of November next was declined. Our furnacemen labor under the delusion that the troubles in Europe and Asia will cause an advance to the prices of five or six years ago.

BAR IRON.—Better demand for standard qualities, with no improvement in prices.

MUCK BARS.—Large inquiry, but prices too low for our mills here to accept.

OLD CAR WHEEL, OLD RAILS, AND WROUGHT SCRAP.—In good demand at nominal prices. I have to report sales of 200 tons old rails and 50 tons of old wheels equal to $17.75 here.

NAILS.—Dull, without any change in prices.

Tenn., Ala. and Ga. Charcoal, No. 1 Foundry	$18 00@19 00		
Tenn., Ala. and Ga. Charcoal, No. 2 Foundry	17 00@18 00		
Tenn , Ala. and Ga. Charcoal, Gray Forge	15 00@16 00		
Tenn., Ala. and Ga. Coke, No. 1 Foundry	19 00@20 00		
Tenn., Ala. and Ga. Coke, No. 2 Foundry	17 00@18 00		
Tenn., Ala. and Ga. Coke, Gray Forge	16 00		
Charcoal or Coke, white and mottled	14 00@15 00		
Tenn., Ala. and Ga. Cold Blast (car wheel)	22 00@28 00		
Old rails	18 00@19 00	Wrought scrap,	
Old car wheels	16 00@17 00	No. 2	12 00
Wrought scrap.		Cast scrap	10 00
No. 1	17 00	Muck bar	32 00@33 00

Iron Ores.

Red Hematite (about 55 per cent. metallic iron) f. o. c. at mines	1 25
Brown Hematite (about 55 per cent. metallic iron)	1 75

Cincinnati, O. May 15, 1877.

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

Our market remains very quiet without any change in prices. Stone coal and coke irons are in large supply, while charcoal irons are not very plentiful. We quote :

CHARCOAL.		
Hanging Rock No. 1 Foundry	$25 00@	—4 mos
" " 2 "	23 00@24 00	—4 mos
" Soft Silver Gray	22 00@23 00	—4 mos
" Mill	21 00@22 00	—4 mos
Tennessee, No. 1 Foundry	23 00@23 50	—4 mos
" " 2 "	22 00@22 50	—4 mos
" Mill,	21 00@	—4 mos
STONE COAL.		
Ohio, No. 1 Foundry	22 00@22 50	—4 mos
" " 2 "	21 00@21 50	—4 mos
" Soft Silver Gray	20 50@21 00	—4 mos
" Mill	20 50@21 00	—4 mos
COKE.		
Ohio & W. Va. No. 1 Foundry	24 00@25 00	—4 mos
" " " 2 "	22 50@23 00	—4 mos
" " Mill	21 00@21 50	—4 mos
CAR-WHEEL.		
Hanging Rock, C. B	38 00@40 00	—4 mos
Tennessee, "	28 00@32 00	—4 mos
Missouri, "	30 00@33 00	—4 mos
Alabama, "	28 00@32 00	—4 mos
BLOOMS.		
Charcoal	50 00@55 00	—cash.
SCRAP IRON.		
Cast	45c.@ 85c.	— "
Wrought	90c.@ 1 30	— "

Louisville, Ky. May 15, 1877.

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

The market has developed a heavier feeling in foundry and mill irons. Demands for present wants up to the average with no purchasers for the future without liberal concessions from prices quoted below. The usual time—four months—is allowed on the quotations below.

FOUNDRY IRONS.	
No. 1 Hanging Rock, Charcoal	$24 00@25 00
No. 2 " " "	22 00@23 00
No. 1 Southern Charcoal	22 00@25 00
No. 2 " "	20 50@21 00
No. 1 Hanging Rock, Stonecoal and Coke	23 00@24 00
No. 2 " " " " "	21 00@22 00
No. 1 Southern Stonecoal and Coke	21 00@21 50
No. 2 " " " " "	20 00@21 00
"American Scotch"	23 00@23 50
Silver Gray	19 00@21 00
MILL IRONS.	
No. 1 Charcoal, Cold-short and Neutral	20 00@21 00
No. 1 Stonecoal and Coke, Cold-short and Neutral	19 50@20 50
No. 2 " " " " "	19 00@19 50
No. 1 Missouri and Indiana Red-short	24 00@24 50
White and Mottled, Cold-short and Neutral	16 00@17 00
CAR-WHEEL AND MALLEABLE IRON.	
Hanging Rock, and Cold Blast	37 00@40 00
Alabama and Georgia "	28 00@35 00
Kentucky Cold-blast	28 00@40 00

Montreal. May 8, 1877.

Pig iron is selling in lots on a small margin; bars and manufactured iron are in fair demand. Owing to the competition from the Americans, the nailmakers of this city have had to reduce their trade list prices rather than lose their customers. We quote pig iron Gartsherrie, $19 to $19.25; Summerlee, $18.50 to $19; Eglinton and Clyde, $18 to $19; Hematite, $26 to $27; American, $19 to $19.50. Bars—Scotch and Staffordshire, $1.90 to $2; best do., $2.25 to $2.35; Swedes and Norway, $4.50 to $5 Lowmoor and Bowling, $6.25 to $6.50.—*Monetary Times.*

Pittsburgh, Pa. May 15, 1877.

Specially reported by A. H. CHILDS.

In this market the situation remains very much as heretofore reported. If there is any change the tendency is toward a weakening in prices. Foundry iron is especially dull.

	4 mos.		4 mos.
No. 1 F'dry	$22 00@24 00	Mottled & White	$17 50@20 00
" 2 "	21 00@22 00	Hot blast C'coal.	21 00@28 00
Gray Forge	19 00@22 00	Cold " Western	40 00@45 00

Philadelphia, Pa.

[Weekly Report of the Philadelphia Iron Market, furnished for THE ENGINEERING AND MINING JOURNAL, by JUSTICE COX, Jr., & Co., Iron Manufacturers, 333 Walnut Street, Philadelphia. Week ending May 17, 1877].

PIG IRON.—There has been a little more demand for No. 1 and No. 2 the past week, but nothing better as to price. The foundries are moderately busy just now, with good prospects for work most of the time. The mills are running, but mostly on day time, very little

night work being done just now. We report sales of about 3,000 tons of No. 1, No. 2, and No. 3 at quoted prices. We quote No. 1, $19 to $20.50; No. 2, $17.50 to $18.50; Gray Forge, $17 to $19 as to brand.

Manufactured Iron.—The demand for bars continues dull, with a few small orders being placed at low prices. We quote bars at 2 to 2 and 2-10c. per lb. Plate and tank iron is moving in a small way at terribly low prices. We quote 2½ to 2.7c. per lb.

Skelp.—It is reported that 1,000 tons of skelp has been placed at less than 2¼c. per lb. We quote 2¼ to 2½c. per lb.

Rails.—The demand for steel rails continues, but nothing of importance has transpired of late. The demand for light section of iron rails continues. We report the sales of 1,500 tons of 35 and 30 lbs., prices and terms private. We quote steel $47 to $50; iron, $34 to $36, all at mill.

Muck Bars are quoted $35 to $37.

Old Rails are dull of sale and quoted $20 to $21.

Scrap.—Wrought is dull at $24 to $26; cast, $14 to $19.

Old Wheels are in plentiful supply at $17 to $20, as to lots and delivery.

Richmond, Va. May 14, 1877.

Specially reported by Asa Snyder, Esq.

Charcoal pig iron continues dull. We quote :

Virginia Cold Blast Charcoal Pig Iron, cold blast					$21 to $25
" " " " " "				neutral	30 to 32
" Warm " " " "					24 to 28
" " " Coke " "				1 X	23 to 24
" " " " " "				2 X	21 to 22
" " " " " "				2	20 to 21
" Anthracite	1 X				22 to 23
" "	2 X				21 to 22
" "	2				20 to 21

METALS.

New York, Friday Evening, May 18, 1877.

The metal market has been very quet all through without feature except in lead, which has continued its downward course.

Gold Coin.—During the week under review the price of gold has ranged from 107¼ to 106⅝, and bullion 107.

Bullion.—Nearly $5,000,000 of silver has been sent to India and China during the past three weeks from London and San Francisco, and but for the continued sales of the German Government, silver would unquestionably be higher. As India exchanges are again weaker, Wednesdays' bills having been sold at ⅝d. per rupee lower than those of the previous week, silver has receeded somewhat, and is weaker. The quotations are as follows: London 54¼d., New York 118½ @ 119, and San Francisco 9 per cent discount; gold bars are quoted at ⅛ per cent. premium,

Copper.—The sales for the week have aggregated about 300,000 lb. at 19⅛ @ 19¼, closing at 19¼c. asked. The latest London cable quoted best selected at £76 10/., and Chili bars £69 10/. There is no feature to the market for this article. New copper is expected to arrive next week.

Messrs. Von Dadelszen & North, of London, under date of May 3, say of copper: "Chili Bars, after fluctuating between £70 and £72, have fallen to £68 10/ for G. O. B. on the spot, the markets showing more steadiness during the last two or three days, and closing quotation is £69. Statistics are not favorable, and the smelters, after having secured a considerable amount of furnace stuff, find a poor demand for their fine copper, while manufactured is affected by the Indian Exchange. The charters for the first half of April were 1,800 tons, of which 50 tons were for the Continent. The arrivals of Chili in Liverpool and Swansea during the month were 4,867 tons, and deliveries 3,400 tons. Australian.—At the public sale held on the 17th ultimo, the 386 tons Wallaroo Cake realized an average of £76 3/6; 20 tons ingot, £77; and the 200 tons Burra Cake, £75 4/6. The market has since declined, and the latest quotations are £75 for Wallaroo, and £74 for Burra. English has been dull; our closing quotations for tough, £76 to £77; select, £77 to £78; strong sheets, £81 to £82; India sheets, £80 10/. The following are the stocks :

	Apr. 1 1877. Tons.	May 1 1877. Tons.	May 1 1876. Tons.	May 1 1875. Tons.
Stock, Liverpool & Swansea	13,847	15,305	9,643	12,966
" Havre	10,450	9,382	4,000	1,895
" London	3,936	4,034	7,358	6,971
	28,233	29,321	21,001	21,832
Chili produce afloat and chartered by mail and cable	11,700	11,500	13,500	6,900
Total	39,933	40,821	34,501	28,732
Australian afloat	2,612	2,418	1,475	1,443

Tin.—Straits in London is quoted at £70 10/., and at Penang at $19.25 perpicul, with exchange at 4/ 1. The shipments for the first half of May were, according to cable advices, 325 tons to Europe and America. There is but little doing in this market. Quotations in gold per lb. are as follows: Straits on spot, 16⅝ @ 16¾ c., and to arrive 16¼c.; Refined English 16⅝c., L. & F. 16c., and Banca 18½c,

Messrs. Von Dadelszen & North of London, under date of May 3, say: Tin, during the past month declined to the lowest point yet touched, £68.15 having been accepted for Straits. Since the statistics have been published, and their effect considered, there has been a decided and rapid improvement, thus confirming, in rather a striking way, what was foreshadowed in our last circular. Contrary to what has been going on for some long time past, our fresh supply during the month has been less than the delivery, and the arrivals in London show a considerable deficit, compared with 1876 and 1875. Against this, on the other hand, the delivery itself is smaller, when thus compared, while the actual stocks are larger, and the quantity afloat larger also, although less than last month. So much depends on the favorable change in the position being continued, that it may be premature to anticipate any considerable advance, but it is patent enough to check any further fall at present. How far actual war may affect this particular trade and those with which it is connected, time will show. This seems to be an age of contrarieties, and to argue from the past a sure way to lead one into error. The deliveries for the month have been from London 884 tons (of which 157 overside to America) and from Holland, Banca 554 (of which 74 to London), Billiton 140, or a net delivery of 1,534 tons. The shipments for April from the Straits and Australia have been very small, according to the telegraphic advices, but as regards those from Australia there must be something to account for it which will be explained on receipt of mail advices. Straits declined during April from £70 to £69, yesterday suddenly advanced to £71, but to-day has declined again to £69.10. Australian declined to £68.5 yesterday, and touched £70, and to-day is quoted £68.15 to £69. Banca in Holland has ruled from f.42¼ to f.43. Billiton at f.41½ to f.42. The Billiton sale in Batavia of the 9th ult. was at an average of f.46.42 per picul, costing about f.42 per 50 kilos, to sell, ex steamer in Holland. English has been pressed for sale by smelters, but had a wider margin than usual, according to make, quotations being for some time £72.10 to £74, closing with £74 to £75 for Ingots. The following are the statistics for foreign tin, here and in Holland, compared with the past month and the two preceding years:

	Apr. 1 1877. Tons.	May 1 1877. Tons.	May 1 1876. Tons.	May 1 1875. Tons.
Banca on Warrants, Holland	1,508	950	620	643
Billiton Warrants, Holland	950	1,154	1,186	916
Australian " "	720	720	....	....
Foreign tin in warehouse, London	8,990	9,139	6,379	4,668
Total available stock	12,168	11,963	8,185	6227
Billiton afloat for Holland	1,100	1,020	1,000	768
Straits " " London	665	520	630	950
Australian " " "	2,400	2,000	1,770	....
Total afloat	4,165	3,540	3,400	1,718
Banca arrived for coming sales	405	850	2,092	2,726
Banca afloat per sailing vessels	540	74	320	724
Price of straits	£71	£69 10	£72	£82

Tin Plates.—These are more quiet than they have been and are quoted, in gold, per box, as follow: Charcoal tins, $6.62¾@$6.75, and ternes, $5.87½ @$6 : coke tins, $5.75, and ternes, $5.25@$5.37½.

Messrs. Robert Crooks & Co. of Liverpool, under date of May 3, say of Tin Plates: "All through the past month the utmost depression has prevailed, and prices show a still further decline. Demand from America continues light and insufficient to cope with production. Until there is a change in this position, we are afraid we cannot look for a permanently improved tone in the market."

Lead.—The market for this article is in a state of thorough demoralization. The sales for the week have been 250 tons at 5⅝c.@5¾c., and a lot of 200 tons at 5½c. The closing price is nominally a little firmer, being 5⅝@5¾c. Mr. E. A. Caswell, in a circular dated May 15, says that "this year not only has Missouri kept increasing, but the output of argentiferous bullion in the first four months of 1877 exceeded that of 1876 by over 4,000 tons. * * * While the stocks on hand January 1, 1877, throughout the country were not much over 3,000 tons, they are to-day nearer 6,000 tons." The San Francisco *Commercial Herald*, of May 10, reports the *Seminole* for New York with 200,000 pounds of pig lead.

Spelter and Zinc.—Domestic spelter is only in moderate request at 6.20c.@6.25c. in currency. Sheet zinc is moving in a quiet way at 7⅜c.@7½c., currency.

Antimony is quoted in London at £50. This market is quiet at 12c., gold.

Quicksilver—

The San Fransisco *Commercinl Herald* of May 10 says: "The Pacific Mail steamship Alaska for the Orient carried 1,008 flasks, and the Rokeby Hall for Valparaiso 100 flasks. Since the sailing of the Alaska the market has become rather sluggish. The asking price is 42c. It is probable that very little business will be done until about the sailing time of the O. and O. steamship Belgic for Hongkong, announced for the 16th inst. The price in London having fallen to £7 2/. 6d per bottle, can to-day be bought here at 41c.

FINANCIAL.

New York Stocks.

New York, Friday Evening, May 18, 1877.

The business of the week in the coal stocks shows quite an increase over several weeks past. The market, however, has been very feverish under the uncertain action of the coal companies. The transactions in Delaware, Lackawanna, & Western Railroad have aggregated 330,726 shares, at from 45½ to 42½, closing weak at 43¾. The sales of Delaware & Hudson Canal Company have amounted to 67,412 shares, at from 38 to 41, closing weak at 38¾. It is said that this company will discharge a number of its employes, in order that those who are really needed may have regular work on full time. This is adopting a sound business principle, and although it will be hard on those who may lose employment, yet it will enable the company to continue the prevailing low rates of wages. Had this principle been adopted by all the companies when it was first suggested by the Engineering and Mining Journal, their financial positions would be stronger to-day.

Cumberland Coal and Iron Company.—The annual meeting of this company will be held ou the 4th of June.

Pennsylvania Coal Company.—The annual meeting of this company will be held at Hawley, Pa., on the 19th day of June.

United New Jersey Railroad & Canal Company will hold its annual meeting at Trenton, N. J., on the 29th inst.

American Coal Company.—200 shares of the stock of this company were sold at auction during the week at 37½ per cent.

Pennsylvania Coal Company.—146 shares of the stock of this company were sold at auction during the week at 180 per cent.

Pennsylvania Coal Company.—146 shares of the stock of this company were sold at auction during the week at $180 per cent.

The United Nickle Company will hold its annual meeting on the 5th of June.

Cumberland & North Branch, Md., Railroad.—This company has filed articles of incorporation in Maryland, to build a railroad from a point near Cumberland, Md., southwest to Westernport, and thence up the north branch of the Potomac to the West Virginia line, about 60 miles, with a capital of $500,000. Nearly all the parties are connected with the Chesapeake & Ohio Canal.

Philadelphia Stocks.

Philadelphia, Friday Evening, May 18, 1877.

The business in this market has been considerably greater than during the previous week, all the stocks which we quote closing under the opening prices. The transactions in Pennsylvania Railroad have aggregated 68,020 shares at from 34⅞ to 33, closing at 33½ per share. Lehigh Valley Railroad has been very active as compared with past transactions, the sales having aggregated 10,100 shares, declining from 35 to 33, and closing at the latter figure. A very liberal business has been done in Lehigh Coal & Navigation Company stock, the sales amounting to 6,130 shares at from 19 to 18, closing at 18¼.

Sale of the South Mountain Railroad Company.—This property, including about 20,000 acres of land, called the Pine Grove estate, in the counties of Cumberland and Adams, Pa., with the railroad of the South Mountain Iron Company, extending from the Cumberland Valley Railway to the mine banks of the South Mountain Iron Company, with all the depots, warehouses, stations, machine shops, equipments, &c., were sold at auction on the 15th inst. The sale was under a decree of the Common Pleas Court, of Cumberland County, to secure the payment of the sum of $150,000 due the Cumberland Valley Railroad Company, a mortgage debt. The entire property brought $160,000.

Sale of the Clover Hill Railroad—This road was sold at Richmond, Va., April 26, including 14 miles of road from Clover Hill, Va., to the Richmond & Petersburg road, and a considerable coal property. Purchased for $45,200 by John W. Johnston for the bondholders.

Washington & Ohio Railroad.—At a meeting of this Company, held in Alexandria, Va., on the 9th inst., it was determined to contract for the completion of the road to Winchester and the coal fields of Grant County.

Westmoreland Coal Company.—65 shares of the stock of this company were sold at auction during the week at $76 per share.

Tremont Coal Company.—$2,000 of the 7 per cent. bonds of this company were sold at auction during the week at 80 per cent.

Philadelphia & Reading Coal & Iron Company.—$8,000 of the 7 per cent. purchase mortgage bonds were sold at auction during the week at 50 per cent.

Southern Pennsylvania Iron & Railroad Company.—$1,000 of the 6 per cent. first mortgage gold bonds

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

Name and Location of Company.		Feet on Vein.	Capital Stock	Shares. No.	Shares. Par Val.	Assessments. Total levied to date.	Assessments. Date and amount per share of last.	Dividends. Total paid to date.	Dividends. Last Dividend.	Dividends. Rate per Ann.	Highest and Lowest Quo. per Share in Currency. May 12. H.	May 12. L.	May 14. H.	May 14. L.	May 15. H.	May 15. L.	May 16. H.	May 16. L.	May 17. H.	May 17. L.	May 19. H.	May 19. L.	Sales.
Coal Stocks.			$			$		$		Pr.ct													
Consol. Coal	Md.	....	10,250,000	102,500	100	... ..	.. ...	...	Jan., '77, 2½	10	24	..	..	..	..	..	..	..	..	..	..	..	22
Del. & H. Canal	Pa.	....	20,000,000	200,000	100	.....	.....	....	Aug., '76, 4	8	41	3 1/16	40½	38	40¾	38	40¼	38¼	40¼	39	39⅝	38¾	67,412
Del., Lac. & W. RR.	Pa.	....	26,200,000	524,000	50	.....	.....	....	April, '76, 2½	10	44⅜	43⅜	45⅛	42⅞	45⅛	42⅜	45½	42½	45⅜	43⅞	44⅜	43¼	332,726
Lehigh C. & N.	Pa.	....	10,448,550	208,971	50	.....	.. ...	....	Sep., '76, 1½	6	37½	..	37¾	36	37	36¼	37½	36⅜	38	37½	36¾	36½	6,130
Lehigh Valley RR.	Pa.	....	27,042,900	540,858	50	.....	.....	....	April, '77, 1½	6	70	69	69½	67	68¾	66	68½	60	70	68½	66¾	66	10,169
Maryland Coal	Md.	....	4,600,000	44,000	100	.....	.....	....	Jan., '76, 1½	1½	10	..	10	..	10	..	..	..	..	..	..	..	....
N. J. Central RR.	Pa.	....	20,600,000	206,000	100	.....	.....	....	April, '76, 2½	10	..	..	..	..	8½	..	8¾	..	..	..	..	..	450
Penna. Coal	Pa.	....	5,000,000	100,000	50	.....	.....	....	Feb., '77, 5	20	170	..	*195	..	..	..	..	..	180	..	..	..	....
Pennsylvania RR.	Pa.	....	68,868,700	1,377,376	50	.....	.....	....	Feb., '77, 2	8	69¼	69	69¾	68¼	68	66¾	67	66	68	67	67¾	67	68,020
Phil. & Read. RR.	Pa.	....	34,278,755	685,575	50	.....	.....	....	Jan., '76, 2½	10	24¼	24	24	23	23	22	22½	22¼	24	23	22¾	22¼	9,944
General Mining Stocks																							
Alpha Cons. G. S.	Nev.	300	3,000,000	30,000	100	180,000	Aug., '75, $1.	....	.....	..	7½	7¼	6⅛	5¾	8½	8¼	8	7½	7⅛	7	9⅛	9	2,700
Am. Flag, G	Colo.	5,300	600,000	60,000	10	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	10C	**	2,500
Belcher, G. S.	Nev.	1 040	10,400,007	104,000	100	864,400	Feb., '77, $1.	15,397,200	April, '76, $1.	12	..	..	2⅞	2¾	3⅜	3¼	2⅝	3⅛	3¼	3	3¾	3½	1,900
Bertha, G	Vir.	645 acs.	300,000	30,000	10	**	.....	...	.....	..	9	..	6¼	6⅛	..	..	..	..	..	..	..	..	300
Best and Belcher, G. S.	Nev.	545	10,080,000	100,800	100	236,992	Feb., '77, $1.	....	.....	..	9	..	9½	9	9¾	..	10	9¾	9¾	9½	..	..	1,360
Bobtail, G	Colo.	2,500	1,136,630	227,326	5	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	1.55	1.50	1,782
Bobtail Tunnel, G	Colo.		100,000	20,000	5	6,000	July, '73, 30c.	20,000	Dec., '76.	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Bullion, G. S.	Nev.	943½	10,000,000	100,000	100	2,402,000	April, '77, $2.	....	.....	..	2¼	2	2½	2⅛	3	2¼	..	..	2¾	2⅜	3⅜	3¼	1,510
Caledonia, G. S.	Nev.	2,188	10,000,000	100,000	100	1,310,000	Feb., '77, $1.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
California, G. S.	Nev.	600	54,000,000	540,000	100	....	.....	14,040,000	May, '77, $2.	24	27½	27	28	27½	..	..	26½	26¼	26⅞	23½	29	28¾	1,700
Centennial, G	Cal'f	66 acres	1,000,000	100,000	10	....	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Chollar Potosi, G. S.	Nev.	1,400	2,800,000	28,000	100	1,282,000	June, '76, $5.	3,080,000	Feb., '72. $1.	..	17¼	17	18¼	..	2 ⅞	21¾	19⅞	19¾	20⅜	20⅛	22	21½	2,125
Cleveland, G	Colo.	3,715	250,000	25,000	10	**	.....	....	.....	..	7⅞	7⅛	7¼	7⅛	7¼	..	7½	7¾	7⅝	7⅜	7¾	7½	4,200
Cons. Hercules & Roe	Colo.	16,500	1,000,000	100,000	10	**	.....	120,000	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Cons. Imperial, G. S.	Nev.	468	50,000,000	500,000	100	375,000	March, '77, 25c.	....	.....	..	1	..	..	..	..	..	..	..	1⅛	..	..	..	300
Con. N. Slope & E. C. T.	Colo.	15,000	500,000	10,000	50	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Cons. Virginia, G. S.	Nev.	710	54,000,000	540,000	100	411,200	June, '73, $3.	27,010,000	May, '77, $2.	24	29⅜	29	28½	28⅛	..	..	25¾	..	27	26¾	28	27¾	1,400
Confidence, G. S.	Nev.	130	2,496,000	24,960	100	243,840	March, '73, $1.	78,000	May, '65, $8.1/3.	..	..	..	1¾	1⅝	1⅜	..	..	..	..	..	2¾	..	1,300
Crown Point, G, S.	Nev.	600	10,000,000	100,000	100	1,373,370	Apr., '77, $1.	11,588,000	Jan., '75, $2.	..	3½	..	3½	2⅜	2⅜	..	4	3⅞	4½	..	4⅞	4¾	2,200
Douglas	Colo.	21,000	1,000,000	10,000	100	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Eureka Cons. G. S. L.	Nev.	..	5,000,000	50,000	100	100,000	May, '76, $1.	1,000,000	Aug., '75, $1.	..	..	..	16½	..	..	..	16	15⅞	16	..	..	..	600
Eureka G. Mg. G	Cal'f		1,000,000	10,000	100	.....	.....	2,094,000	May, '77, $2.	..	..	..	..	..	..	..	..	..	2	1¾	..	..	....
Exchequer, G. S.	Nev.	400	10,000,000	100,000	100	280,000	Sept., '76, $1.	....	.....	..	1½	1⅜	1½	1¼	..	..	..	..	1⅜	1⅛	4¾	2¼	1,600
Gould and Curry, G. S.	Nev.	621	10,800,000	108,000	100	2,242,000	April, '77, $1.	3,934,800	Oct., '70, $10.	..	3¼	..	..	..	5	4⅞	4¾	4⅝	..	..	5½	5¾	1,900
Granville Gold	N. C.	9,000	1,000,000	100,000	10	**	.....	....	.....	..	2¼	..	2⅛	..	..	..	..	..	..	..	..	..	300
Hale & Norcross, G. S.	Nev.	400	11,200,000	112,000	100	2,410,000	April, '77, 50c.	1,598,000	April, '71, $1.	..	1⅜	..	2½	..	..	..	1¾	1⅝	2	1⅝	2⅜	2¼	1,300
Henry Tunnel	Nev.	3,000	2,000,000	80,000	25	**	.....	....	.....	..	..	..	6⅝	..	..	..	..	..	..	..	..	..	200
Hukill, G. S.	Colo.	3,288	1,000,000	100,000	10	**	.....	40,000	May, '77, 10c.	12	4	..	4	..	..	..	..	..	..	..	..	..	150
Indian Queen, S.	Nev.	1,000	3,000,000	60,000	50	....	.....	60,000	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Julia Cons., G. S.	Nev.	3,000	11,000,000	110,000	100	330,000	April, '77, $1.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Justice, G. S.	Nev.	2,100	10,500,000	105,000	100	1,502,500	Sept., '76, $5.	....	.....	..	2¾	..	3	2⅞	..	..	4½	..	..	..	4½	4⅜	1,200
Kentuck, G. S.	Nev.	95	3,000,000	30,000	100	270,000	Dec., '74, $1.	1,252,000	March, '70, $5.	..	..	..	..	..	..	..	2½	..	..	..	2½	..	200
Kossuth, G. S.	Nev.	2,700	5,400,000	108,000	50	405,000	Aug., '76, 50c.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Lacross	Colo.	3,900	1,000,000	100,000	10	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	36C	34C	2,900
Leopard, L. G. S.	Nev.	1,500	5,000,000	50,000	100	50,000	March, '76, $1.	162,500	Dec., '76, 50c.	..	..	..	..	..	1½	..	..	..	1⅛	1	1½	1¼	1,600
Lucerne Mining	Colo.	4,200	5,000,000	500,000	10	**	.....	....	.....	..	..	..	1½	..	..	..	..	..	..	..	..	..	100
Mariposa, preferred	Cal.	44.387	5,000,000	50,000	100	1,350,000	Feb., '77, $1.	....	.....	..	..	..	..	..	..	..	..	..	..	..	3	..	300
" common	"	acres.	10,000,000	100,000	100	1,350,000	Feb., '77, $1.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Mer. & Min. Tun.	Colo.	30,000	500,000	50,000	10	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Merrimac, S.	Mass.	1,500	500,000	50,000	10	**	.....	60,000	May, '77, 10c.	12	7¼	6½	7¼	7⅛	7¼	..	7	6⅝	..	..	..	..	1,700
Mexican, G. S.	Nev.	600	10,080,000	100,800	100	100,800	Sept., '76, 50c.	....	.....	..	3⅝	3½	3½	..	..	..	..	..	..	..	..	..	500
Morning Star	Nev.	1,600	8,000,000	80,000	100	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
N. Y. & Colo., G	Colo.		1,000,000	50,000	20	**	.....	20,000	March. 17, 20c.	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Northern Belle, S.	Nev.	1,600	5,000,000	50,000	100	....	.....	1,200,000	May, '77, $1.	12	15	..	13⅜	..	..	..	13¼	13⅛	..	..	15	14⅞	900
Ophir, G. S.	Nev.	675	10,080,000	100,800	100	2,034,400	May, '75, $2.	1,394,400	March, '64, $4.	..	7¾	7½	..	..	..	..	8⅜	8½	8½	8¼	10	9⅞	900
Original Comstock, G.S	Nev.	....	10,000,000	10,000	100	....	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Overman, G. S.	Nev.	1,200	3,840,000	38,400	100	2,337,480	April, '77. $3.	....	.....	..	5	4⅜	..	..	..	..	5¼	5	4⅝	4⅜	9⅜	..	1,350
Pleasant View, G	Colo	1,200	200,000	20,000	10	**	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Quicksil. preferred	Cal.	8.500	4,291,300	100,000	100	....	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	600
" common	"	acres.	5,708,700	"	100	....	.....	....	.....	..	15	..	15	14⅞	..	..	..	..	..	..	..	..	700
Raymond and Ely, G. S.	Nev.	5,000	3,000,000	30,000	100	540,000	Dec., '76, $1.	3,075,000	Sept., '73. $3.	..	3⅜	..	3¼	..	3	..	3	..	4	..	5	4⅞	1,250
St. Joseph, L	Mo.	2600 acs.	1,000,000	100,000	10	....	.....	250,000	.....	..	4¼	..	..	..	..	..	..	..	..	..	.	..	100
Santiago, G. S.	Nev.	2,000	11,200,000	112,000	100	....	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Savage, G. S.	Nev.	800	11,200,000	112,000	100	3,082,500	Mch., '77, $1.	4,460,000	June, '69, $3.	..	..	..	..	..	..	..	2⅜	..	..	..	..	..	100
Seaton, G. S.	Colo.	1,700	500,000	50,000	10	**	.....	10,000	May, '77, 10c.	12	3⅛	2¼	2⅞	2½	2¾	2⅛	2½	..	2⅛	..	2⅜	..	3,200
Seg. Belcher, G. S	Nev.	160	640,000	6,400	100	244,800	April, '76, $5.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Sierra Nevada G. S.	Nev.	3,650	10,000,000	100,000	100	1,650,000	April, '77, 50c.	102,500	Jan., '71, $1.	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Silver City, G S	Nev.	3,900	6,310,000	63,100	100	115,775	Nov., '76, 25c.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Silver Hill, G. S.	Nev.	5,400	5,400,000	54,000	100	918,000	April, '77, $1.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
South Comstock, G. S.	Nev.	1,500	10,000,000	100,000	100	54,000	Jan., '77, 25c.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
South. California, G. S.	Nev.	1,500	5,000,000	50,000	100	....	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Southern Star. G. S.	Nev.	1,500	6,000,000	600,000	100	....	.....	....	.....	..	..	..	..	..	..	..	..	..	1	..	..	..	20
Trenton, G. S.	Nev.	..	10,000,000	100,000	100	....	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Union Cons., G. S.	Nev.	850	10,000,000	100,000	100	260,000	March, '76, $1.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
West Belcher, G. S.	Nev.	1,000	10,000,000	100,000	100	....	.....	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Yellow Jacket, G. S.	Nev.	1,200	12,000,000	120,000	100	2,838,000	March, '77, $1.	2,184,000	Aug., '71, $2.50.	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Young America, S.	Nev.	1,000	3,000,000	30,000	100	6,000	Oct., '76, 20c.	....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Boston Stocks.											May 11.		May 12.		May 14.		May 15.		May 16.		May 17		....
Allouez, C	Mich	..	1,000,000	20,000	50	940,000	May, '76, $5.	....	.....	..	7 50		7 37½		7 62½		7 25		7 00		7 00		....
Calumet & Hecla, C.	Mich.	..	2,000,000	80,000	25	1,200,000	.....	11,450,000	Feb., '77, $5.	20	179 00		178 50		179 00		178 00		175 50		173 00		....
Central, C	Mich.	..	500,000	20,00C	25	100,000	June, '62, 65c.	1,160,000	Feb., '77, $7.	28	37 75		37 50		38 00		37 50		37 50		37 00		....
Copper Falls, C	Mich.	..	1,000,000	20,000	50	535,000	May, '76,	100,000	Nov., '71, $1.	..	2 12½		2 06¼		2 00		2 00		2 06¼		1 62½		....
Dana, C	Mich.	..	500,000	20,000	25	68,000	Jan., '73, 50c.	....	.....	..	.7		7		7		7		6		6		....
Dawson, S	Ont..	..	1,200,000	60,000	20	....	.....	....	.....	..	11		10		10		10		10		10		....
Duncan, S	Ont..	..	1,200,000	60,000	20	75,000	July, '76, 41 2-3.	....	.....	..	3 00		3 06¼		3 00		2 62½		2 25		2 06¼		....
Franklin, C	Mich.	..	500,000	20,000	25	360,000	June, '76. $5.	585,000	Nov., '71, $1	..	11 25		11 co		10 75		10 25		10 00		10 00		....
Humboldt, C	Mich.	..	500,000	20,000	25	100,000	Sept., '76, 15c.	....	.....	..	20		20		20		20		20		20		....
International, S	Ont..	..	1,200,000	60,000	20	....	.....	....	.....	..	35		37½		38		37½		37½		30		....
Madison, C	Mich.	..	500,000	20,000	25	123,000	Sept., '76, 10c.	....	.....	..	20		20		20		20		20		20		....
Mesnard, C	Mich.	..	500,000	20,000	25	160,000	April, '76, 50c.	....	.....	..	75		70		65		65		65		60		....
Minnesota, C	Mich.	..	1,000,000	20,000	50	436,000	June, '69, $1.	1,820,000	March, '76, 50c.	..	1 20		1 20		1 20		1 20		1 25		1 20		....
National, C	Mich.	..	500,000	20,000	25	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	..	42		40		37½		37½		37½		37½		....
Osceola, C	Mich.	..	1,000,000	40,000	25	880,000	May 1, '76, $2.	....	.....	..	22 50		22 75		22 25		22 00		22 00		21 00		....
Petherick, C	Mich.	..	500,000	20,000	25	165,533	March, '76, 50c.	...	.....	..	17		16		15		13		12		12½		....
Pewabic, C	Mich.	..	500,000	20,000	25	185,000	June, '68, $3.	460,000	July, '73, $1.	..	2 00		1 87½		1 87½		1 75		1 75		1 75		....
Phœnix, C	Mich.	..	1,000,000	20,000	50	817,500	Sept., '70, $3.	20,000	Jan., '76, $1.	..	....		....		....		....		....		....		....
Quincy, C	Mich.	..	200,000	20,000	10	....	.....	2,130,000	Feb., '77, $4.	..	38 00		37 25		37 00		37 50		38 00		37 50		....
Ridge, C	Mich.	..	500,000	20,000	25	200,000	.....	90,000	Feb., '75, $1.	..	3 50		3 62½		3 50		3 50		3 50		3 50		....
Rockland, C	Mich.	..	500,000	20,000	25	495,000	Jan., '74, $1.	....	.....	..	20		20		20		18		17		17		....
Star, C	Mich.	..	500,000	20,000	25	265,000	March, '76, 50c.	....	.....	..	17		15		15		15		15		15		....
Superior, C	Mich.	..	500,000	20,000	25	340,000	March, '74, 25c.	....	.....	..	8		8		8		7		6		6		....

G. Gold. S. Silver. L. Lead. C. Copper. ** Non-Assessable.

Total Assessments levied to date ..... $40,646,128 | Total Sales of Coal Stocks for the week ..... 402,873 shares.
Total Dividends disbursed to date ..... 112 415,400 | Total Sales of Mining Shares for the week ..... 50,117 "

of this companp were sold at auction during the week at 25 per cent.

Sharpsville, Wheatland, Sharon, & Greenfield, Pa., Railroad.—Surveys are being made for an extension of this road down the west branch of the Neshannock for 2½ miles from Bethel, Pa. This extension will reach several coal mines, some of which have recently been opened.

Mount Carbon & Port Carbon Railroad.—7 shares of the stock of this company were sold at auction during the week at $59 per share.

Mill Creek & Minehill Navigation Company.—3 shares of the stock were sold at auction during the week at $26 per share.

Schuylkill Valley Navigation & Railroad Company.—3 shares of the stock of this company were sold at auction during the week at $26 per share.

Salt Lake Ore and Metal Market.

The prices given below were received by telegraph to-day, the 18th inst. The market is lower, quotations are too high, however, to induce business.

Argentiferous Lead (Base Bullion).—$60 to $65 per ton for lead. $1.19 per ounce for silver. $20 per ounce for gold. The quotations for silver are based upon the silver contents in the lead of 70 ounces per ton of 2,000 lb.

The *Inter-Ocean's* correspondent under date of the 10th inst. writes: The bullion market continues nomi-

nal and no sales have been made. The shipments that are going forward are upon contracts made some time ago. The shipments of ore and bullion for the week ending May 5 were as follows: Seventeen cars bullion to Omaha; 6 to Chicago; 1 to Philadelphia; 5 to New York; 11 to Pittsburg; 7 to St. Louis; 10 lead ore to Pittsburg; 8 to Hilliard, Total bullion, 985,142 pounds; lead ore, 383,580 pounds. Grand total, 1,368,722 pounds.

The receipts of lead ore over the Bingham Canon Railroad for the week ending May 7 were 1,617,410 pounds.

SILVER QUOTATIONS IN LONDON.

The quotations of silver in London for the week ending May 18, are given in the following table:

May 12th	54⅛d.	May 16th	54⅛d.
" 14th	54 9-16d.	" 17th	54⅛d.
" 15th	54⅛d.	" 18th	54⅛d.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here and at Philadelphia, for the week ending the 18th inst. are given in the following tables. The Philadelphia quotations will have a * affixed.

STOCKS.

	Quotations. High-est.	Low-est.	Clos-ing.	Sales Shares.
American Coal Co	—	—	40	500
*Cambria Iron Co	—	—	60	—
*Pennsylvania Salt Manf'g Co.	—	—	65	—
*Westmoreland Coal Co	—	—	77¼	—
*Buck Mountain Coal Co	—	—	40*	—
*Schuylkill Nav. Co	—	—	—	—
St. Louis, I. M. & S. RR. Co	5⅞	5¼	5	1.100
Spring Mountain Coal Co	—	—	—	—

BONDS.

D., L. & W. 7s, Convt., 1892	J. & D.	—	—	103¾	—
" " 2d mtge., 1881	M. & S.	—	—	—	—
N. J. C., 1st mtge., new	F. & A.	109	108½	108½	11,000
" " 1st mt., cons. 1899	Q.	55¾	55	55	47,000
" " Convt	M. & N.	52	51½	51	50,000
L. & W. B. Coal Co., cons.	Q.	29½	26	25	44,000
Am. Dock & Imp. 7s	J. & J	—	—	40½	—
D. & H. C. Co., 1st m., 1884	J. & J	97⅞	—	97	4,000
" " " " 1891	J. & J.	98½	97	97	21,000
" " " " 1877	J. & J.	97½	97	97	3,000
" " " " reg., 1894	A. & O.	—	—	88	—
" " " " coup., 1894	A. & O.	89½	—	88	5,000
St. L. I. M. & S., 1st mt. 1892	F. & A.	98¼	97	98	35,000
Ches. & Ohio, 1st mt., 1899	—	22	—	22½	2,000
*L. V. RR., con. m. 6s, 1923	J. & D.	93½	93	92	29,000
" " 2d m., 7s, 1910	M. & S.	107¾	107½	—	7,000
" " reg., 1898	J. & D.	—	—	107¾	2,000
" " coup., 1898	J. & D.	107¾	—	107¼	—
*P. RR., 1st mtge., 1880	J. & J.	—	—	105¾	—
" Gen. mtge. reg., 1910	A. & O.	107¼	—	107¼	1,000
" Con. m. 6s, cou., 1905	J. & D.	—	—	94½	—
" " " reg. 1905	Q.	—	—	93¾	—
" gen. M. Coup., 1910	J. & J.	106	105¾	106¼	8,000
*P. & R. RR., 7s, 1893	A. & O.	—	—	—	—
" " con. m. 7s, cou. 1911	J. & D.	95¾	95¼	95¼	25,000
" " Deb. 6s, 1893	J. & J.	39	—	37	1,000
" " New convt. 7s, 1893	J. & J.	50	49	50	20,700
" " Con. mtge. 7s, reg.	J. & D.	95	94¾	94	41,000
" " 6s, 1880	J. & D.	103	—	103	5,500
*P. & R. C. & I. Co. Deb. 7s	M. & S.	—	—	—	—
*P. & R. C. & I. Co	—	*53¼	—	—	6,000
*L. C. & N. Co. 6s, 1884	M. & Q.	100	—	101	300
" " RR. loan 1897	F. & Q.	100	98½	99	2,100
" " Con. mtge. 7s.	J. & D.	—	—	—	—
" " Cvt. gold, 1894	M. & S.	—	—	—	—
" "Gold Loan, 1897	J. & D.	87	—	87	1,000
*Schuylkill Nav., 6s. 1897	M. & Q.	86	—	57	5,000
*Pa. and N. Y. Canal, 7s	J. & D.	108½	108⅛	108	7,000
*Pa. Canal Co	J. & J.	65	—	—	6,000
*Susquehanna Coal Co. 6s.	—	75	—	—	2,000

Total transactions for the week $391,600

* Helfenstein Tract.

Copper Stocks.

Reported by Wilson W. Fay & Co., Bankers and Brokers Room 7, Traveler Building, 31 State Street.

BOSTON, THURSDAY EVENING, May 17, 1877.

The market closes very dull and no disposition to trade whatever. Prices are off on the whole list—a natural consequence of a dull market. Calumet has fallen from 179 to 173. best bid. Central is steady at 37 bid, with a sale during the week at 38. Copper Falls is weaker at 1⅝ bid. Duncan silver has tumbled from 3 to 2¼, and closing 2 1-16 to 2⅛. Franklin is flat, 10 being the best bid. Osceola is lower at 21 bid although no sales of the stock have been made under $22. Quincy is very quiet, not a sale being made for the week, and closes steady at 37½ bid; the last sale was 11 shares this at 40, May 8. In small copper nothing doing.

April Copper Products are reported as under:

		tons.	lb.
Calumet & Hecla		1,159	960
Osceola		141	
Franklin, 120 tons	48 lbs.	155	1,911
Pewabic, 35 "	1,863 "		
Quincy*		11	1,830

The Calumet & Hecla for the first four months of the year 1877, produced over 4,500 tons of copper-mineral.

* This small product is owing to the fact that the stamp mill has been idle for several weeks. The copper returned was "mass."

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, May 18, 1877.

The business of the American Mining Board for the week has only amounted to 41,335 shares, and has been without any feature of note. It is said that the Polar Star and the Moose Mines will be put on the board next week. The Comstock stocks continue to take a very important part in the business doing. The following from the San Francisco *Commercial Herald* of the 10th inst. very clearly reflects the depressed condition of that market. We give elsewhere a very interesting statement showing the inflated condition of the stocks of the Comstock lode.

"We can not give our readers any hope of a speedy revival of the mining stock market. The past week shows as much depression as at any time during the long period of despondency that has prevailed in ur midst. It has had a most ruinous effect. Thousands in walks of life that no one would at all suppose dreamed of having ventured not only a portion but all the funds they could command, and the result is, they are beggars. A correcting point has undoubtedly been reached, at least the lesson has been the severest ever taught this community, still the speculative spirit of our people is so strong—has been for so many years the ruling element of their being—that, as we have repeatedly said, new and satisfactory developments would reproduce the old feeling, and the usual excitement would follow. One good result is already beginning to show itself—and that is a more economical management in every department. Unless this is rigidly carried out and better results given to the public, outside capital will fight more shy of investment than ever."

We condense the following from the *Gold Hill News* of the 9th inst. The California Mine still maintains its regular ore product, averaging 3,000 tons per week, everything in and about the mine working very satisfactorily. The April bullion yield was $1,558,721.44, of which over one-half or $817,046.56 was gold, and $741,674.88 was silver. The Consolidated Virginia Mine is yielding on an average about 2400 tons per week. The ore stopes on the 1550 and 1650 feet levels are looking well. The 1750 feet station of the C. & C. shaft is opened, and drifting west towards the bonanza has started. A strong flow of water has been encountered on the 1400 feet level of the Overman, forcing a total suspension of work for 36 hours.

At the south end, or Gold Hill section of the great lode, the chances for new and good ore developments continue encouraging in the Yellow Jacket, Crown Point, Belcher and neighboring mines. The deep workings have been carried so far east that it is plainly to be seen that none of the shafts are located far enough in that direction, and should a strong body of water be encountered in either of the mines mentioned, it could not be easily managed with their present works and appliances. For this reason, the deep explorations to the eastward, although in very encouraging ore indications, are being very cautiously conducted.

The daily yield of Chollar-Potosi is 100 tons. This ore is taken from the old stopes above the level of the old Potos tunnel, and assays on an average about $26 per ton. Sinking the Combination shaft is going forward at the rate of three feet per day, which, considering the immense size of the shaft, is as good work as has ever been done in any mine on the Comstock.

The face in the south drift in the 1,800 feet level of the Julia mine is showing fine quartz and ore that assays from $20 to $25 per ton. The Justice mine continues its daily output of 400 tons. The regular annual meeting of this company was held on the 7th inst. The President stated that "at the first of the year they found the mine heavily in debt and with its credit impaired by reason of misrepresentations by persons hostile to the management. In six months' time, and with the aid of the stockholders, they had paid the indebtedness and made the Justice an ore-producing mine third in rank on the Comstock." The Superintendent in his report states "that during the year there were extracted 90,563 tons, of which 78,388 tons were crushed, yielding $1,755,411.37, or an average of a trifle over $22.50 per ton. The Superintendent speaks flatteringly of the present conditions of the ore levels and stopes, and expresses the belief that the ore bodies will attain a greater richness as depth is attained." The showing is not a satisfactory one to the stockholders. According to the Secretary's report, of the $1,755,411 produced in bullion, more than one-half —$925,000—was paid to the mills alone. In other words, $12 per ton was paid to mills for crushing ore that has not averaged, discount off, more than $20 per ton. For the first six months the Secretary reports that the mine had actually been worked at a loss, and that the last six months work has only resulted in a profit of $35,000. The mine is now in debt some $90,000, and there appears to be only $3,000 in the treasury. This company collected an assessment of $525,000 during the year.

The Sutro Tunnel is now in 16,713 feet. The material in the face of the header has been very hard, being composed of a very close-grained species of porphyry, with streaks of quartz and clay, the whole blasting and working disadvantageously. The rock is, however, becoming more even in character, as well as softer, working to much better advantage. This shows progress for the past month of 225 feet, and it has 3,000 feet yet to go; it will take at least a year at that rate to complete it. As the *News* has heretofore stated, and fully believes it will then be of great benefit and importance in the deep working of the Comstock lode, the more especially as its old claim to "royalty" or tribute from the ores of the Comstock is forfeited and annulled. In fact, the recent decision of the United States Supreme Court in the bonanza bullion tax suits, says that "ores, after they are extracted are absolutely the property of the miners, and the United States has no interest in them," consequently those ores cannot be legislated away from the miner or mining companies for the benefit of the Sutro Tunnel Company or anybody else.

We glean the following from our exchanges published near the respective mines:

The Jennie A. Silver Mine located on White Pine Mountain, Hamilton County, Nev., is being rapidly developed, preparatory to the extraction of ore, the main incline has reached a depth of 119 feet, and the mine promises well in every part.

The Empire Gold Mine of Grass Valley, Cal., is reducing 220 tons of ore per week.

The Leeds Silver Mining Company of Nevada, has shipped from the opening of the mine, February 14th, until May 2d, bullion amounting to $96,412.72, of which $27,412.72 was on April account.

The Hite Gold Mine of Mariposa County, Cal., shipped $22,669 in bullion on April account.

The New Coso Silver Mine of Inyo County, Cal., shipped $78,300 in bullion, to the 25th ult., on the April account.

The Idaho Gold Mine of Grass Valley, Cal., paid its 93d dividend on the 7th inst., from the April bullion product. This makes $2,146,820 which this company has paid to its stockholders.

The Alaska Gold Mine of Grass Valley, Cal., is now down with its main incline 300 feet, and will be continued down 75 feet further, when levels No. 3 and 4 will be opened. No. 2 level is opened 150 feet each way from the shaft. No. 1 is opened 140 feet south of the shaft. The bottom of shaft is in hard blasting ground. The ledge averages from 12 to 15 inches, and produces a fine quality of ore. The mine is looking well throughout. A crushing of 170 tons averaged $30 per ton. Another crushing of 100 tons is now being put through the Allison Franklin mill.

The Pancake Coal Company of Nevada has called an assessment of 50 cents per share. There are 50,000 shares in the company, and this assessment will realize $25,000 with which it is proposed to prosecute the work of development.

Raymond & Ely Silver Mine.—The recent developments in this mine have been of considerable value, on the tenth level a good body of ore, strongly impregnated with copper has been struck.

The Alps Silver Mining Company of Nevada, is making regular shipments of ore of good quality, which is being crushed in the company's mill in Condor Canyon, which is running night and day.

The Champion Gold Mine is located in Calaveras County, California. A recent crushing of 85 tons of Champion ore just completed, yielded in the neighborhood of $9,000!—an average of over $100 per ton.

NEW YORK MINING STOCK EXCHANGE.

The sales for the week amount to 12,882 shares, a falling off of nearly 5,000 shares as compared with our last.

In copper stocks there have been a considerable decline in both sale s and prices.

Sales.

Atlantic	750 shares	@$7⅝@7½
Central	50 "	@ $40
National	600 "	@ 25c.
Pewabic	1,100 "	@1½@2½

Closing Quotations.

	Bid.	Asked.		Bid.	Asked.
Allouez	3	7	Mesnard	....	1 00
Atlantic	7 50	8 00	National	25	50
Cal't Hecla	175 00	....	Osceola	20 00	25 00
Central	38 50	41 00	Pewabic	1 50	2 50
Franklin	9 00	11 00	Quincy	37 00	40 00
Madison	20	25	Ridge	3 00	5 00

Gas Stocks.

NEW YORK, FRIDAY EVENING, May 18, 1877.

Gas stocks are very dull and unchanged. We hear of no transactions worth mentioning.

Boston (Mass.) Gas Company.—We are reported recent transactions in the stock of this company at $820 per share.

The Kingston (N. Y.) Gas Difficulty Settled.—A resolution was passed in the Kingston Common Council on the 11th inst. to the effect that the city will pay $23 per year for each street-lamp burning five hours per night, this to include the cost of lighting.

The Cumberland (Md.) Gas Difficulty.—The naptha lamps recently erected in Cumberland are giving very poor satisfaction. It is stated that they go out from unexplained causes, and give a very poor and uncertain light.

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

Owing to the crowded state of our columns, we are compelled to omit our usual publications under this heading.

ADVERTISERS' INDEX.