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CONTENTS.

THE programme of the fifth annual meeting of the American Society of Mechanical Engineers has just been announced. There will be sessions on Wednesday evening, November 5th, on Thursday morning and afternoon, and on Friday evening. Thursday evening is set aside for a visit to the American Institute Fair, and Friday morning for an excursion to Paterson, where the rolling-mill, the Rogers, Grant, and Cook locomotive-works, and a silk mill will be visited. During the afternoon, the Society is invited to inspect the laboratories and workshops of the Stevens Institute of Technology at Hoboken. Among the papers to be presented at this meeting are the following: W. F. DURFEE, "The Experimental Steel-Works at Wyandotte;" R. W. HUNT, "The Original Bessemer Steel Plant at Troy;" A. C. HOBBS, "Locks and their Failings;" WILLIAM HEWITT, "A Novel Form of Hammer Die;" F. A. SCHEFFLER, "New Method of Constructing a Horizontal Tubular Boiler;" T. D. WEST, "Sound Castings;" C. J. H. WOODBURY, "Measurements of Friction;" R. H. THURSTON, "On the Sliding Friction of Rotation;" F. W. HALSEY, "A New Rock-Drill;" WILLIAM KENT, "Factors of Evaporation for Use in Tests of Steam-Boilers;" J. M. ORDWAY, "Experiments on Non-Conducting Coverings for Steam-Pipes."

WE print in another column a manly and straightforward letter from a member of the highest class in the Columbia College School of Mines, with reference to the severe strictures which we expressed last week. Mr. DWIGHT is quite correct in his recognition of the intention of our article; and the spirit in which he replies, together with the statements of fact which he makes, and which we accept as more trustworthy than those upon which we previously relied, lead us to believe that the case as represented to us was overdrawn, and that the truth did not call for the exceptional severity of our denunciation. To that extent we modify our sweeping censure. Our views on the subjects of "rushing" and "cribbing" and class feeling in American colleges are not withdrawn; nor is our conviction that these evils are still less justifiable in technical schools. If other technical schools than Columbia have been doing the same thing, or worse, then the remark applies to them. The reason we did not attack them is simply that we did not happen to hear of their doings. In the case of the New York school, we were favored with highly-colored accounts in the daily press, in some of which, as we are now informed, the School of Mines was confounded with the College. Under ordinary circumstances, we should have sought information from members of the school. But in this case, we preferred to express our censure without previous communication of that sort, so that no one in the school could be deemed directly or indirectly the source of our knowledge or opinion.

LAST week, we gave the imports of merchandise into this country, but could only present from the report then issued the values of the exports of American raw materials and manufactures to foreign countries. The Bureau of Statistics has since then issued its usual quarterly report, covering the fourth quarter of the fiscal year 1884, ended June 30th. To complete the figures given, we present the following table:

EXPORTS OF PRODUCTS OF MINING.

	Quantities.	Values.
Anthracite coal, tons	649,040	$3,053,550
Bituminous coal, tons	646,265	1,977,959
Copper ore, tons	19,307	2,930,895
Copper ingots, bars, and old, pounds	16,939,080	2,505,279
Copper sheets	105,680	22,550
All other manufactures of copper		137,135
Iron ore, tons	3,030	12,081
Marble and stone		188,245
Roofing slate		79,464
Manufactures of marble and stone		335,551
Crude mineral oil, gallons	67,186,329	5,302,974
Naphthas, gallons	15,045,411	1,072,651
Illuminating oil, gallons	415,615,693	38,195,349
Lubricating oil and heavy paraffine, gallons	10,515,535	2,179,595
Residuum, barrels	126,122	352,679
Gold and silver-bearing ore		1,052,341
Quicksilver, pounds	1,242,080	427,219
Zinc ore or oxide, tons	239	16,865
Pigs, bars, plates, and sheets, pounds	126,043	9,576
All other manufactures of zinc		4,666

The most interesting, because the most recent, feature of our exports, are the exports of copper and copper ore. We give, therefore, the different quarters of the fiscal year in succession:

EXPORTS OF COPPER ORE AND INGOT.

	Copper ore. Tons.	Copper ore. Value.	Ingot copper. Lbs.	Ingot copper. Value.
First quarter, ended Sept. 30, 1883	3,601	$565,379	7,263,705	$1,113,134
Second " " Dec. 31, 1883	4,411	588,346	4,555,559	698,470
Third " " March 31, 1884	3,172	456,426	1,308,160	175,967
Fourth " " June 30, 1884	8,123	1,320,744	3,811,656	517,708
Total	19,307	$2,930,895	16,939,080	$2,505,270

The following are the leading exports of manufactures of interest to our readers:

EXPORTS OF PRODUCE OF AMERICAN MANUFACTURE.

Iron and steel:		
Pig-iron, tons	3,765	$96,255
Bar-iron, net tons	1,354	73,942
Band, hoop, and scroll, net tons	108	9,101
Car wheels, number	14,335	135,133
Castings, n. e. s.		371,693
Cutlery		103,127
Fire-arms		1,266,831
Steel ingots, bars, etc., net tons	108	22,798
Locks, hinges, and builders' hardware		920,283
Machinery		5,256,431
Nails and spikes, net tons	4,583	306,625
Iron and steel plates, net tons	309	30,627
Printing-presses		208,465
Iron rails, tons	553	31,545
Steel rails, tons	2,801	119,284
Saws and tools		1,290,448
Scales and balances		384,865
Sewing-machines		3,552,814
Fire-engines, number	2	15,235
Locomotives, "	282	2,819,946
Stationary engines, number	135	171,040
Boilers and parts of engines		361,907
Stoves and ranges		207,120
Wire, net tons	2,787	358,366
All other manufactures of steel and iron		3,796,000

So far as the more highly developed manufactures of iron and steel are concerned, this exhibit is not unsatisfactory. Machinery, hardware, engines, and locomotives figure in it for pretty heavy amounts; but our exports of crude materials, compared with our imports, are exceedingly small.

LEADVILLE mining interests and the smelting interests of Colorado generally are undergoing changes that it will require the highest professional skill to meet. It is a fact pretty generally understood that the oxidized lead ores of the camp are declining in quantity, and that therefore the demand for that class of ores on the part of both the Leadville smelters and of some of the valley smelters is growing keener every day. The result is, that there is a tendency toward making the price paid for lead in oxidized heavy ores more and more independent of the fluctuations in the price of the metal in the markets. The smelters, who are charging only $6 a ton for working such ores, when it costs them probably nearer from $8.50 to $9, must of course look to some other quarter to recoup. They will be forced to demand more and more for smelting the "dry" ores offered to them in greater abundance. There is, however, another factor that complicates the situation, to which we have already alluded in the past. In greater depth, some of the Leadville mines have opened out enormous bodies of ores, which, however, are mixtures of sulphurets, some of them very low in silver. The main characteristic of these ores is the heavy amount of zinc-blende that they carry. It was believed at first, and that opinion seems still to prevail largely, that simple roasting in stalls would meet the difficulty of treating these ores. It has been found, however, that stall-roasting does comparatively little good, and that reverberatory furnaces must be resorted to and the roasting operation be so conducted that oxide of zinc is formed and the sulphate be decomposed without the application of too high a heat, which would lead to excessive losses of silver. It is believed that the process adopted at the Sophie Hütte for working similar mixed ores from the famous Rammelsberg mine, near Goslar, is not practicable in this country, because it involves too much handling. The ore is there roasted in heaps, and the sulphate of zinc formed is leached out. At one of the smelting-works in Colorado, it was found that the extent to which stall-roasted ore high in zinc could be added was only 5 per cent of the total smelting charge. This quantity can probably be doubled when the ore has been treated in the reverberatory.

There is a good deal of wild talk now going on in Colorado, which is reflected by long articles in the local papers, concerning different marvelous "processes" that are to revolutionize the present methods of smelting. Prominence is particularly given to the efforts by Mr. MOFFETT, who, we presume, is trying to introduce the LEWIS method of volatilizing the lead and collecting it in the shape of an oxide—a method that is in successful use at the Lone Elm works, Joplin, Mo., with which Mr. MOFFETT was formerly or is still connected. In view of the fact that a similar process, the WETHERILL, has long been used for making zinc oxide, it may appear to be feasible to use it for the complex Leadville sulphurets. The main difficulty is, that hitherto both processes have been applied to non-argentiferous material. When treating ores containing silver, the losses of the precious metal will undoubtedly be heavy, and unless it is shown that they are not great enough to largely outweigh the possible lower cost of working, the process may be dismissed as impracticable. The "jumbo-roaster," as it is playfully called, will soon adorn the classic scrap-piles, unless it can be made to pay with that class of ores that are very low in silver, carrying only from 10 to 15 ounces per ton to from 15 to 40 per cent of lead, from 25 to 15 per cent of zinc, and from 40 to 30 per cent of sulphur.

The quantity of sulphuret and blende ore reasonably high in silver that the lead smelters may be relied upon to take will be limited, and the return for it will below. We understand that, for this class of ores, the smelting charge is $20 a ton or more, and that deductions, the basis of which varies, are made on account of the zinc contents. which, with 20 per cent of zinc, may be roughly stated to be $5. These figures, which, we repeat, are only approximate, suggest that there should be a heavy margin in favor of preliminary dressing. We are not aware of any well-directed effort having yet been made by Leadville mining companies interested in this question to test the practicability of getting rid of a large part of the zinc by mechanical means, nor are the data available for even reaching an *a priori* decision on the subject. It is, however, known that the mixture of the minerals is not as close as that that defied mechanical dressing in the case of some Sardinian, Anglesea, and American ores. It is known, furthermore, that the silver is not confined to the galena, but that the zinc-blende contains nearly as much of that precious metal. It will be a question, therefore, whether it will pay to dress out the zinc-blende, with its attendant losses in tailings and middlings, receive a higher price for the lead ore, and make an effort to market the argentiferous blende. The latter contains iron, and will probably always carry some lead, and may not be a particularly welcome raw material to the spelter maker. On the other hand, the residues from zinc distilling could be sold to lead smelters for the extraction of the silver. On the one hand, therefore, we have, by selling the ore directly to smelters, as it comes from the mine, a limited market, and necessarily high smelting charges, and deductions for zinc contents. On the other hand, we have the cost and losses of dressing, minus the higher returns for the purer lead ore and the price paid for the argentiferous blende.

This is the problem that some of the Leadville mines will have to solve. It may be convenient to shift on the smelters the work of making the best of the blende ores; but in the interest of the Leadville mines and of the smelting-works, concentration should be thoroughly tested.

CORRESPONDENCE.

[Communications will be noticed only when accompanied with the full name and address of the writer. Unless specially desired, only initials will be printed. We invite criticism and comment by the readers of the ENGINEERING AND MINING JOURNAL. Replies not intended for publication should be addressed to the Editor of the ENGINEERING AND MINING JOURNAL in blank, stamped, and sealed envelopes. We do not hold ourselves responsible for the opinions of our correspondents.]

The International Electrical Exhibition.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of this date, you have a paragraph in regard to the International Electrical Exhibition in this city that needs correction. All that can be said at present of the results in a pecuniary sense is that, after the payment of all expenses (some of which will run on for a week or so yet), there will probably be a small balance in our favor. How much, no one can yet say. Yours truly, PERSIFOR FRAZER.

PHILADELPHIA, Oct. 18.

The School of Mines.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Had the editorial in your last issue entitled "Scientific Hoodlums" appeared in almost any other journal, it would probably have been passed without comment; but, coming as it does from the leading engineering organ in this country, it can not be disregarded. Permit me as a member of the graduating class of the School of Mines, or, according to your classification, one of "the young ruffians who, in a few months will be asking to be put in charge of important interests, involving a knowledge of sciences and laws and men and the rights of person and property," to say that your attack upon the students of the School of Mines is uncalled for and unjust.

I do not deny that a silly imitation of college customs is still kept up by a few members in the two lowest classes, who have come to the School of Mines with no very definite purpose, perhaps thinking it, as you say, "a place for class-sprees:" but these either discover their mistake to their sorrow in the first difficult examination they have to undergo, or have the nonsense knocked out of them by the rigid course of study and training in the succeeding years. Occasionally, during the first two or three weeks of the year, before the routine of hard study has begun, these ambitious spirits work up their enthusiasm and have what is called a "rush." No man enters but from choice. A few pairs of overhauls are torn perhaps, but no striking is allowed, and nobody's temper is lost.

I do not wish to defend the practice of "rushing." It is childish and silly, and the sooner this feeble reflection of college customs dies out in the School of Mines the better. It may save many young men the disappointment and sorrow of finding out from the results of the annual examinations, after they have spent the year in play, that the School of Mines is no kindergarten. That the custom *is* dying out rapidly is very evident to any one who has had the chance to observe the successive classes for the past four years. Aside from the "rushing," there is not the slightest trace of "hazing." The first year students and the students of other classes are alike treated courteously.

That this slight remnant of "class feeling" in the School of Mines should have been made the object of such scathing rebuke by a prominent technical journal is certainly surprising. The article, it seems, is "called for by the recent events and the present situation of affairs at the School of Mines, where the undergraduates are indulging in tearing one another's clothes, punching one another's ribs, hooting and catcalling," etc. Thus far, I have heard of only two "rushes" in the School of Mines this year, and they were very insignificant affairs compared with the average college "rush," or indeed with the average School of Mines "rush" of three or four years ago. Why, then, should we have been made the subject of special criticism, when the students of another technical school may carry their foolhardiness to the extent of having a "rush" on the roof, thereby absolutely endangering life and limb, without any such rebuke from you?

With regard to the matter of "cribbing," I admit its existence to some extent in the School of Mines, and the justice of your criticism. In justice to the faculty, let me say that measures have been taken to suppress the evil, but the *students* are the only ones who can ever stop this pernicious practice entirely; and it seems to be not generally known that last year, the then third year class, now the graduating class, took the matter up as a body, and did their utmost to drive out the abuse, and with considerable success. If the lower classes would continue the work from where we left it, more sweeping results would follow.

I do not for a moment suppose that the article was written in any other spirit than an earnest desire to see that the reputation of the School of Mines is not injured in any way, and I admit the grain of truth; but I think that the whole body of undergraduates have not deserved such epithets as "scientific hoodlums," "young ruffians," "cubs," etc., merely on account of the animal spirits and thoughtlessness of a few of the lower class men, nor have we deserved to be compared to a "mob from the slums." At least, the class that graduates next June does not consider that it has given any cause for the remark that "half of them ought to be spanked and put to bed and the other half clapped into the Tombs."

Yours respectfully, ARTHUR S. DWIGHT.

COLUMBIA COLLEGE, SCHOOL OF MINES, Oct. 23, 1884.

NAPHTHA FOR FUEL.—The Russian government has projected an experiment to ascertain whether naphtha residuum can be advantageously used as fuel for the engines of steamers. If the experiment is successful, the adoption of this substance instead of coal as fuel for the Russian fleet is contemplated.

THE TREASURY DEPARTMENT ON THE DUTY ON "SILVER ORE ADVANCED IN VALUE OR CONDITION BY REFINING OR GRINDING."

The following correspondence will be instructive as relating to the question of the duty on "silver ore advanced in value or condition by refining or grinding."

A reader of the ENGINEERING AND MINING JOURNAL wrote as follows to the Secretary of the Treasury:

"I see, in the issue of the ENGINEERING AND MINING JOURNAL of October 11th, that you have rendered a decision on the importation of ores.

"I inclose the article for your consideration, and beg to state that, if your decision does refer to 'concentrates,' the article gives the true situation.

"Many smelting-works in the United States have lately experienced much difficulty in getting sufficient quantities of the proper kind of ores for fluxing the ores obtained in the United States, and those smelting-works have gone to much expense in sending machinery to Mexico to 'dress' that ore so as to lessen the cost of transportation.

"We and many others understood that the law allowed the free entry of 'natural ores' when the precious metals were of greater value than the base metals; and we had no idea that the knocking away of the rock by machinery transformed the actual mineral from its 'natural' state, any more than if a man went into a mine and merely knocked out the mineral by hand with a pick and hammer.

"In extracting ore from a mine, an experienced miner really does concentrate in lesser degree just what the machinery accomplishes.

"If your decision does apply to 'concentrates,' particularly of galena ores, it could be evaded in the manner indicated, but the great cost of it would render it impracticable.

"I beg to submit to your consideration that the merchants and manufacturers of the United States are looking to Mexico as an outlet for their goods, and about the only article Mexico at present can send us in exchange is its ores.

"The railroads entering Mexico counted heavily on the ores of Mexico for return freight; and if you rule that these concentrates are liable to a duty, it tends to disturb very seriously the calculations of railroads and merchants and manufactures.

"Would you kindly send me an extract of the law on importations of ores, and a copy of your decision?"

This letter promptly elicited the following reply:

"The department is in receipt of your letter of the 15th inst., relative to a recent decision of this department in regard to duties upon silver ore which has advanced in value or condition by grinding or other process of manufacture. You will see by paragraph 95 of the pamphlet herewith inclosed that all non-dutiable crude minerals which have been advanced in value or condition by refining or grinding or by other process of manufacture not specially enumerated or provided for in that act, are dutiable at 10 per cent *ad valorem*. Silver ore is a non-dutiable crude mineral, as provided for in paragraph 752.

"The only question that would seem to arise, therefore, in the case you mention is, whether practically, the merchandise to be imported from Mexico, to which you refer, and which you style 'concentrates,' has been advanced in value or condition by grinding or other process of manufacture. Any change in condition of the ore, through machinery over that effected by hand process would not affect the question of the rate of duty.

"The law is, that if the merchandise is advanced in value or condition by any process of manufacture, it is subject to a duty of 10 per cent *ad valorem*.

"I may add that under existing rulings when base bullion has been subjected to a process of melting or refining whereby its character has been changed from ore to that of metal, it is classified according to the weight and quantity of the respective metals therein contained. (See copy of letter to Messrs. Ketelsen & Degetan, at El Paso, Texas, dated May 22d, 1884.) Any further statements which you may desire to present to the department upon the subject will receive due consideration.

(Signed) "CHARLES E. COON,
"Assistant-Secretary."

The wording of the two paragraphs referred to is:

"95. All non-dutiable crude minerals, but which have been advanced in value or condition by refining or grinding, or by other process of manufacture, not specially enumerated or provided for in this act, ten per centum *ad valorem*."

"752. Ores of gold and silver (free)."

The letter to Messrs. Ketelsen & Degetan referred to reads:

"This department is in receipt of your letter of the 10th instant (May), stating that several mining companies in Mexico intend to import into the United States bullion containing silver and lead in which the value of the former greatly preponderates.

"In reply to your request for information whether the bullion is free of duty, I have to state that where base bullion has been subject to a process of smelting or refining whereby its character has been changed from ore to that of metal, it is classified according to the weight and quantity of the respective metals therein contained. Your statement not specifying the weight or quantity of the metals in the bullion to which you refer, the department is unable to definitely decide what rate of duty, if any, would be assessed on the merchandise.

"It is presumed, however, that the rule above mentioned, together with the information you will obtain from the inclosed copy of the tariff act of March 3d, 1883, will enable you to ascertain whether the merchandise is dutiable, and if so, what rate. Very respectfully,

(Signed) "C. E. COON,
"Assistant-Secretary."

A perusal of this correspondence will probably leave the reader, as it did the gentleman who was the recipient, in doubt as to what the Treasury Department really did decide. The ideas of the officials seem to be somewhat clouded by their ignorance. It is distressing to see the Assistant-Secretary of the Treasury Department write, "where base bullion has been subject to a process of smelting or refining," when it is, as we beg to inform him, the product of a smelting process. The Assistant-Secretary does not appear to know what merchandise "concentrates" are.

As we understand it, the matter is thus, interpreting the law as it stands: Base bullion, or argentiferous lead, if it contains more silver in weight than it contains lead, is free. If it contains a preponderating quantity of lead, it is subject to the duty on lead. The value of the two metals has nothing to do with it. The same holds good with lead ores, whether they be concentrates or not. Silver ores are free, but an ore is classed as such only if it contains more in weight of the precious than of the base metal. Silver ores that have been advanced in value or in condition by grinding or by other process of manufacture pay 10 per cent *ad valorem* according to the letter of the law, as laid down by paragraph 95. The spirit of the tariff act is, however, evidently to allow silver ore to come in free, as is shown by paragraph 752. Technically, concentrates are decidedly ore that has been ground, and has thus been advanced in value. If we correctly understand the opinion of the Assistant-Secretary, a simple *change* in the condition of the ore through machinery over that effected by hand process would not affect the question of the rate of duty; but if the ore is *advanced* in value or condition, it is subject to a duty of ten per cent. That is, ore may be ground and so shipped and come in free provided it is not advanced in value thereby.

If this interpretation is correct, any quantity of rich silver ore may be brought into this country free of duty; but as soon as poor ore has been crushed abroad, and, to lighten the cost of shipment, is advanced in value by concentration by machinery, a benevolent government steps in to protect our struggling mines by levying a duty of ten per cent. The rich ore and the concentrates may come from the same mine—in fact, the case may happen that a company may bring in free of duty lumps of silver taken from a stamp battery because they could not grind them—and be compelled to pay ten per cent on the tailings from the same ore which did pass through the screens.

Technically an ore carrying 300 ounces of silver and two per cent of lead would be dutiable as a lead ore, because the lead preponderates in weight.

Whether our interpretation of the above correspondence and of the law is correct or not, it is evident that the latter needs such amendment as will make it clearer, will clearly and unmistakably draw the line where an ore ceases to be a silver ore and becomes a lead ore, and will allow concentrates of gold and silver ores, pure and simple, to enter without imposing a tax on them.

NOTES ON THE RHODE ISLAND AND MASSACHUSETTS COALS.*

By Arthur B. Emmons, Ph.D., LL.B., Newport, R. I.

Having been in the management of a company that has been exploring with a diamond drill during the past year in Rhode Island and Massachusetts, with the view of finding workable anthracite coal of a better quality than has been hitherto found, I have collected a certain amount of material that seems to have some scientific interest (though in this respect it is unfortunately incomplete), as well as a possible value to any one who may be tempted to follow out a similar line of investigation.

The following are the analyses of the coal from the Portsmouth mine, Portsmouth, R. I., made by Dr. F. A. Gooch and Mr. B. T. Putnam:†

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.
Water	5·12	0·52	3·18	2·25	7 62	7·96	8·76	10 27	10·47
Volatile combustible	6·49	6·31	4·43	6 46	5·42	4·95	7·23	5·99	5·83
Carbon	71·04	76·23	75·97	79·59	74·40	76·22	70 24	67·50	66·95
Ash	17·35	16·94	16·4	11·70	12·56	10·87	13·77	16·24	17·05
	100·00	100·00	100 00	100·60	100 00	100·00	100·00	100 00	100·00
Sulphur	0·216	0·224	0·258	0·643	0·28	.....	....	... ..	.....
Ash	Red	Red	Red	Red	.....	Red	Red	.....	. ....
Fuel ratio $\left(\frac{\text{Carb.}}{\text{Vol. Comb.}}\right)$	10·94	12·08	17·14	12·32	13·72	15·39	9 71	11 26	11·48

I. Bottom of shaft, north side, thickness of seam 3 feet 11 inches. II. Bottom of shaft, south side, thickness of seam 2 feet 7 inches. III. South side, 50 feet from bottom, thickness of seam 6 feet. IV. South gallery, 370 feet from bottom, upper ⅔ of 6 foot seam. (Analyses I., II., III., and IV. are from samples taken across the width of the seam.) V. The average of seven analyses made from samples taken at intervals along the length of a 6-foot drill core, cut out of what is known as the "Back Seam," at about 90 feet below the mouth of the Portsmouth mine. VI. and VII. The single analyses of this series showing the maximum and minimum percentages of carbon and ash. VIII. and IX. Samples taken from two lots, of several tons each, of freshly mined coal used in other experiments.

The ash of the above sample No. 1 contained:

SiO_2	49·49
Fe_2O_3	8·40
Al_2O_3	19·00
CaO	15·21
MgO	4·82
MnO	0·32
SO_3	2·72
	99·96

The Portsmouth coal possesses the striking peculiarity (hitherto unnoticed in anthracite coals, or, I believe, in any coals) of quickly taking up a large percentage of water under a moist condition of the atmosphere, and as readily parting with it under a drier condition of the atmosphere. This is shown by interesting experiments conducted by Dr. Gooch.

The surprising fact that the percentage of water in the Portsmouth anthracite may vary from ten to fifteen per cent, according to the hygrometric condition of the atmosphere, not only suggests an interesting line for future investigation, but also raises a feeling of distrust of the coal

* Abstract from a communication to the Secretary, at the Philadelphia Meeting of the American Institute of Mining Engineers, September, 1884.

† It should be stated here that Analyses I., II., III., and IV. were made during the prevalence of a northwest wind, or dry condition of the atmosphere, though the conditions were not specially noted; and that Analyses VI., VII., VIII., and IX. were made during a damp period, or a southwest wind, which, in Newport, is frequently accompanied by fog.

analyses hitherto published, and makes the desirability more than ever apparent of having some standard method in coal analyses, as for example that adopted by Dr. Gooch, of drying the sample for analysis at 115 degrees Centigrade or that adopted by the Pennsylvania Geological Survey of drying at 225 degrees Fahrenheit, so that different analyses can be understandingly compared—besides making a special test of the coal as to its hygroscopic properties. That the method in almost universal use in coal analyses, of exposing the sample in the laboratory for twenty-four hours before analyzing, may lead to untrustworthy results, is shown by the foregoing analyses Nos. I., II., III., IV., compared with VIII. and IX. All these analyses were made before the hygroscopic properties of the Portsmouth coal were suspected; and all the precautions hitherto supposed to be necessary to obtain accurate results were observed. The samples from which analyses VIII. and IX. were made were taken from the same seam, and within a hundred feet or so from the point where the samples were taken from which analyses I., II., III. and IV. were made; and there is no reason for assuming that there can be any particular difference in the coal from the several points. The striking difference between these two sets of analyses of practically the same coal is due to the fact that analyses I., II., III., and IV. were, by chance, made during a period of dry atmosphere, while analyses VIII. and IX. were made during a period of damp atmosphere.

The Mouse River lignite, from Dakota, shows that the Portsmouth coal is not an isolated instance of this hygroscopic property; and the fact that the lignite had been analyzed in regular course with numerous other specimens, without this peculiarity having been noticed, renders it, to say the least, not improbable that this peculiarity will be found where it is not now suspected, among coals the analyses of which are already known.

The two following analyses by Mr. Putnam were made from drill-cores, cut from what was assumed to be the same seam of coal at different depths, at West Mansfield, Mass., in the neighborhood of the old Hardon mine. The first was cut at a depth of about 90 feet, and the second at a depth of about 850 feet:

	I.	II.
Water	1·02	3·08
Volatile combustible	3·76	6·22
Carbon	74·24	79·68
Ash	20·97	11·02
	99·99	100·00
Sulphur	0·56	
Ash	Red to light reddish-brown	Purplish-red
Fuel ratio $\left(\frac{\text{Carb.}}{\text{Vol. Comb.}}\right)$	19·74	12·81

Analysis I. is the average of five analyses, made from samples taken at intervals along the length of the core. After drying at 115 degrees Centigrade, this coal took up 2·69 per cent of water, after twenty-four hours' exposure in a saturated atmosphere, that is, over water.

Of the following two analyses, No. I. is that of the ash of No. II. above; and No. II. is of a sample taken near the above coal-sample No. I., but not the same sample:

	I.	II.
SiO_2	49·18	75·11
Fe_2O	11·25	13·05
Al_2O_3	11·41	7·46
CaO	19·48	2·22
MgO	3·39	0·98
MnO	0·55	0·19
SO_3	5 06	1·11
	100·32	100·12

A sample of coal from the bottom of the shaft of the old Cranston mine, southwest of Providence, analyzed by Dr. Gooch, gave the following results:

Water	0·24
Volatile combustible	4·49
Carbon	82·20
Ash	13·07
	100·00
Sulphur	0·34
Ash	Brown
Specific gravity at 15 degrees C.	2·209

The sample used in the above analysis was dried over sulphuric acid. As received, the sample contained 0·67 per cent of water, reckoned upon the weight of the coal dried at 115 degrees C. After exposure during forty-eight hours over water, it contained 3·52 per cent of water.

An elaborate comparative test of the Cranston coal with Lackawanna coal was made at the Providence Water-Works about the year 1874. Some of the records of this test are still preserved at the office of the City Engineers at Providence. From these it appears that the evaporative power of the Cranston coal was found to be 72 per cent of that of the Lackawanna.

In 1875, a diamond drill-hole was sunk in Seekonk, Bristol County, Mass., by the Seekonk Coal Mining Company, to the depth of 705 feet. At 691 feet, a seam of anthracite, 8 feet 11 inches thick, was alleged to have been cut. This coal is referred to by A. L. Holley in his paper on the Iron Ore and Anthracite Coal of Rhode Island and Massachusetts.* The drill-hole is genuine, and the geological record of the core is probably correct in every respect except the coal (the core is still extant); but no coal-core was ever cut in the hole, and the coal-core exhibited as having been so cut was cut at the top of the hole from a piece of coal brought on to the ground for that purpose. The fraud was very skillfully perpetrated, and was known to only three persons, the manager (since deceased), and two employés, who at the time supposed that the core was cut for an innocent purpose; and to this day, most of the stockholders still have firm faith in the suppositious coal-seam at the bottom of the Seekonk bore. I feel called upon to publish these facts, as this same coal-core has been made the basis of at least one swindling operation since that time, and is still in existence.

Although not strictly related to the foregoing, I would add that, in boring through seams of coal with the diamond drill, we found great assistance in overcoming the tendency to crumble, and thus in preserving the coal-core, by reversing the flow of the water from the pump. That is, instead of causing the water from the pump to pass down through the drill-rods, as is usual, and returning through the drill-hole and casing outside the rods, we forced it down outside the rods, and let it return through the rods. This was accomplished by attaching a stuffing-box to the end of the casing, turning a length of the drill-rod true, so that with the stuffing-box it would make a water-tight joint, and then introducing the water from the pump into the casing below the stuffing-box. In this way, the pressure from the pump on the top of the core was relieved, and all the fine material from the core was more easily preserved.

* *Transactions*, vol. vi., p. 225.

WHAT THE PRODUCERS OF RAW COPPER WANT IS ALLIES.

We submit to the producers of raw copper in this country, now engaged in looking for a cause for the great depression in their business, the fact that the inactivity can be traced to the absence of active allies—assistants who are prompted in their motions by a realizing sense that copper stands foremost among the base metals, and with proper efforts its uses can be multiplied, with the understanding that if it once gets a general foothold in the world of mechanics and arts, its cost must be greatly enhanced before it can be dislodged.

There is no line of business involving the same monetary volume and importance that stands to-day so "naked and alone" as the copper trade. Employing the minimum figure that copper is selling for as a basis, the output of raw metal alone in the United States this year will represent a money value of over $16,000,000; and yet but little is known, outside of a few persons, of this vast section or portion of industry, including its second or manufacturing stage, in the commercial world, for the simple reason that no concerted attempt has ever been made to advertise it in the sense that the other kindred legitimate branches of trade of the country are brought prominently before the public.

If a person to-day desired to obtain accurate information touching the economic and other advantages copper possesses for roofing purposes, tubes, fire-boxes, wire, etc., etc., where can he go to procure it? Copper has no newspaper devoted to spreading items with regard to its commercial standing and the uses it can be put to; no "bureau of information," where intelligence can be secured concerning its mechanical and statistical status, etc., etc.

What condition would the copper interest of this country be in to-day if it had received during the past ten or fifteen years the intelligent fostering care that has been bestowed upon the tin and iron and steel business? Home consumption, instead of representing yearly the small figure it does, would be in the neighborhood of one hundred thousand tons annually. This is no extravagant statement.

If those interested in the copper trade of the United States are anxious for "pointers" in the direction of increasing their business, let them visit, for instance, the rooms of the Iron and Steel Association of Philadelphia, Pa., and become familiar with the mission of that society, and find out what it has done to benefit the iron ore miner and the general iron and steel interest of this country.

The above, which we quote from the *Mining Gazette*, is suggestive, but does not, we believe, touch the true cause of the errors of the past. Now that they are a matter of history, probably even those who were then convinced that they were acting wisely will concede that their policy was not a far-sighted one. No bureau of information—which, by the way, the Iron and Steel Association is not, so far as the uses of iron and steel are concerned—could have contributed much to the consumption of copper. So long as the Lake mines wielded an unquestioned power, that metal was held artificially high in this country, and the price of its manufactures was controlled in even a more despotic way.

The policy systematically followed was that of supplying the home market at the best figures obtainable, and of marketing any surplus abroad at a sacrifice. While an output limited practically to one district made such a course possible, high prices at home remained the rule, and consumption was restricted within the bounds of what was absolutely necessary. Now that all this is changed, it will not do to attribute the small home consumption to an alleged lack of enterprise in "advertising it in the sense that the other kindred legitimate branches of trade of the country are brought prominently before the public." The past policy of the copper miners and manufacturers has undoubtedly paid them best while the conditions dictating it lasted, and they have no right to complain of the results. The growth of consumption of any article is necessarily a slow one, and its principal basis must be the conviction impressed upon buyers that the low price of the metal is not one which may at any time give way to higher values, and nothing would be so disastrous to its development as the spread of the idea that "if it ever gets a general foothold in the world of mechanics and arts, its cost must be greatly enhanced before it can be dislodged." On the contrary, we believe it to be the duty of those who wish to see the consumption of copper in this country spread to emphatically and repeatedly assure consumers that the metal can and never will be artificially held up in this country above the price regulated by the broad laws of supply and demand in the markets of the world. That assurance can and should be freely given them. Our output is now so far beyond our present or even our prospective demands, and comes from so many different quarters, that the time has irretrievably passed when our consumers should be made to pay more for their raw material by pushing off a surplus abroad and holding up the candle high here.

Electric Light at Hell Gate.—The electric lights in the iron tower at Hell Gate were put in operation October 20th. The night was somewhat hazy, and all the lights on shore, except those in the tower, showed dimly. The tower, a skeleton structure, was not visible, and the first impression one got as he caught sight of the light was, that the moon had risen. The light was more diffused and less glaring than the electric lights at Madison and Union squares. Buildings on Flood Rock and on the Long Island side of the Gate could be seen distinctly, but all their angles cast shadows of the most intense blackness. The water, whirling and surging through the Gate as the flood-tide swept up, could be seen as on a bright moonlight night with all the eddies visible.

THE INQUIRY INTO SAFETY-LAMPS.

The recently published pamphlet of the committee of the Midland Institute of Great Britain for inquiry into the relative merits of the various safety-lamps contains much interesting information. The results of the experiments upon twenty different types of lamp proved that in cases of an explosive mixture with a velocity per second of from 6 to 14 feet, the ordinary Mueseler, the Clanny, the Davy, the Stephenson, the Thomson, and the Bainbridge lamps were all unsafe, and were soon eliminated from the category of further experiment. The next group included lamps of the Smethurst type, as well as those of the improved and protector Mueseler, Routledge, Purdy, and Johnson, which were all efficacious until the velocity reached 19 feet a second, when it was found that the two Mueselers could be exploded by a current impinging upon the lamps up-hill and obliquely. Under other conditions, however, they all stood the test until the velocity reached 31 feet a second, when Purdy's lamp fired the gas externally. At 35 feet velocity, the Marsaut lamp fired, thus leaving in the competition the Smethurst type (lamps fitted with a bonnet), the improved and protector Mueselers, the Routledge, and Johnson lamps. Though the two Mueselers did not fire externally, except as before stated in an oblique direction, the gas burnt inside until the glass cracked and gave way, and this was felt to be a considerable source of danger by the committee, who recommended that they should not be used, except they were provided with a bonnet. When thus fitted, both lamps burnt steadily and unaffected by the current, in addition to which the bonnet is most advantageous in keeping the gauze of the lamp free from dirt and dust. As to lighting qualities, the two Mueselers and the Marsaut appear to be the best, the light from the Routledge and Johnson being too feeble. The protector Mueseler seems to fulfill the conditions of safety the best of all, as, from the size and position of its chimney, it stood the tests without any bonnet or shield. In these experiments, the highest velocity obtained was 35 feet a second, but further researches have now been made at still higher velocities, subjecting the lamps to a longer duration in the test. At Aldwarke Main Colliery, the apparatus, which consists of a wooden piping connecting two small gas-holders and a steam-jet, was enlarged so as to obtain 51 feet a second, at which speed the trials have lasted for three quarters of a minute and for a longer period at a lower rate; but the committee proposes to carry the experiments still farther, so as to ascertain what would be the results of a velocity of 51 feet a second for two minutes together. The lamps that stood the velocity for the lesser time were those of the Mueseler class fitted with a bonnet or shield, the Marsaut lamp being so far successful as not firing the gas outside, but having its three gauzes heated and red-hot, which was only a question of time in causing the explosion at this velocity. The Wolf lamp, which is an adaptation of the Marsaut, stood the test well when fitted with a bonnet, but not without, and there can be no doubt but that this addition is of unmistakable importance to the safety and efficacy of all the lamps. The final object of the committee will be to ascertain whether those lamps that have hitherto resisted can be made to explode under any circumstances, which will be satisfactorily demonstrated if they fail to make them fire the gas outside, this being the only condition of absolute explosive safety to the mining class.

THE POCAHONTAS MINE EXPLOSION.

After a long delay, the report of Messrs. J. H. Bramwell, of Roanoke, Va.; Stuart M. Buck, of Coalburg, West Va.; and Edward H. Williams, Jr., of Bethlehem, Pa., a committee appointed by the President of the American Institute of Mining Engineers, at the request of the South Virginia Improvement Company, has been published:

The conditions leading to the explosion were the following:

1. The unusual dryness of the mine.
2. The large quantity of dust in an extremely fine state of division.
3. The constant working of the mine day and night, allowing no time for clearing the air.
4. The use of excessive quantities of powder, largely increasing the amount of dust.
5. The probable existence of small quantities of fire-damp slowly given off from the coal.
6. The employment of incompetent and inexperienced men.
7. The almost complete stagnation of the air on the east side of the main entry, owing to the fact that the main doors were untended and fastened open, allowing the air to pass up the main entry directly to the fan.
8. The failure to recognize and appreciate the previous warnings of danger given by occasional flashings of unusual extent when shots were fired, indicating the need of special precautions.

The existence of fire-damp in the Pocahontas mine is the disputed point. This committee is not satisfied on the subject, and meanwhile submits the following evidence bearing on the case:

The superintendent and the mine-boss unite in declaring that they had seen no evidence of gas, and that no complaint of gas had been made to them previous to the explosion. The same is true of the timber-man and of the man employed to keep the rooms on their true course. In this connection may be stated the explanation given by the superintendent regarding the mention of gas and blowers in the mine regulations. The rules were copied from a set used in Eastern Pennsylvania, and the intention was to omit all references to gas, but one paragraph was inadvertently retained.

On opening the mine after the explosion and flooding, no trace of fire-damp was discovered.

On visiting and thoroughly inspecting the mine, the committee found no traces of fire-damp, although ventilation had been only partially restored, especially in the workings to the rise.

On the other hand, there is testimony, although from men generally inexperienced with gas, leading to the belief that, when the mine was strongly worked, there was a slight but general escape of fire-damp, too slight to admit of detection except in rare cases, and probably in all cases too slight to occasion danger if unmixed with coal-dust and if diluted by proper ventilation. We would mention:

1st. The burning of the Ray brothers by a powder explosion, their powder-keg being fired, as was supposed, by a blown-out shot from a distance of 120 feet, and not in direct line, being at the time protected by the angle of a break-through.

2d. The burning of George Britten, described by himself as having been done by a flash following a shot fired in the face of his room, he being about 35 feet distant and protected by an angle of the coal.

3d. One instance related of a flickering blue flame seen in the undercut near a miner's lamp, and attributed by him to fire-damp issuing from the shaly slate left in the floor and overlying the lower bench of coal remaining unworked.

4th. The general practice of flashing the powder-smoke after a standing shot by holding the lamp at the face of the coal in the hot smoke, and occasional instances when a similar effect has been produced by the shot itself.

The flashing of the smoke seems to have been almost wholly unknown to the management, and, while not unusual in other mines, the practice seems to have been so general here and the flame so persistent as to lead to the supposition that the products of imperfect combustion of the powder may have been reinforced and quickened by a small amount of fire-damp.

5th. Two instances in which a body of flame has been described as flashing back from 60 to 100 feet from the head of an entry, following the firing of a shot, without injury to the men.

In conclusion: We believe that the explosion was due mainly to dust, and that it originated either in the east headings at *D*, or very possibly in one of the rooms south of *D*, the evidence of a short northward current being obliterated in the latter case by the stronger reaction from the close headings. We can not determine the initial cause, whether a blast or the accidental ignition of a small accumulation of fire-damp; but we have obtained no direct proof of any past occurrence of fire-damp sufficient of itself to account for even a slight explosion, and are forced to believe that the explosion was due either to dust alone or to dust quickened by an admixture of fire-damp too slight for detection by ordinary means.

At the time of our examination, the mine was in no condition for determining these points, and we were not prepared to conduct such experiments; but as soon as the mine is again in full working order, a course of experiments should be undertaken, both in the interest of science and for the better preservation of life and property. Repeated tests should be made on the spot, of air from different parts of the mine, and trials made with suitable apparatus to explode the dust alone, especially where the finely divided mineral charcoal or mother-coal abounds.

POSTSCRIPT.—The necessity for free tests and systematic experiments, as above mentioned, is emphasized by the occurrence of a slight and harmless explosion that has taken place since the resumption of work, notwithstanding the employment of experienced men, the cleaning and wetting down of the mine, and the improved condition of ventilation.

POWER REGENERATORS FOR PUMPING-ENGINES.

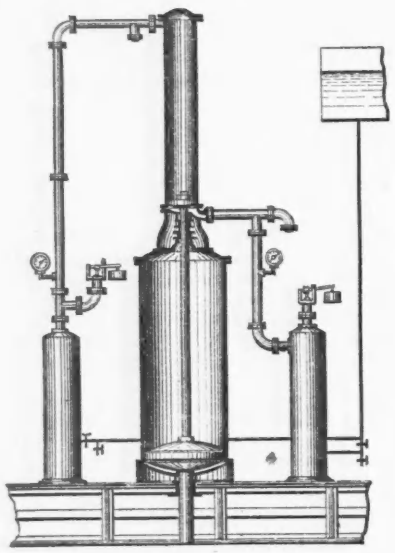
In 1869, August Bockholtz, then connected with the Austrian railroad service, brought forward an invention based on the idea of utilizing the excess of weight of the rods of Cornish mine pumps necessary to lift the pump-valves by accumulating the excess of power during the stroke, and using it in the next stroke for lifting the valves. With this object in view, Bockholtz constructed an air-compressor in which the air is compressed during the stroke, thus accumulating power that during the next stroke aids the steam in its work. He gave the apparatus the name of "power regenerator." Bockholtz's arrangement will be readily understood by reference to Fig. 1. The regenerator cylinder was placed above the steam-cylinder of the pumping-engine. In it moves the regenerator piston connected with the steam-cylinder piston by a piston-rod. It alternately compresses the air above and below the regenerator piston. By automatic valves, the upper and the lower parts of the regenerator cylinder are connected both with the atmosphere and with an air-receiver, partly filled with water, in order to regulate the pressure of the air. A gauge and a safety-valve are also attached to each receiver. When the regenerator piston has reached its lowest position, the air below it and in the air-receiver is compressed, while the air above it and in the other receiver has only atmospheric pressure. When the piston moves upward, the pressure below it will decrease until it has fallen to the atmospheric pressure when the piston has completed its stroke. Meanwhile the air above the piston is compressed. With every change of the stroke, the engine is aided by a power dependent upon the pressure of the compressed air and the area of the piston. The highest compression admissible is from 65 to 72 pounds, because otherwise the cylinder and the pipes heat too much.

In spite of many advantages claimed, Bockholtz did not succeed in introducing his regenerator, and it was only in 1878 that, by the advice of Böttcher, of Herne, Messrs. Haniel & Lueg, of Duesseldorf, Germany, put in the first regenerator in connection with the pumping-engine for the Clerget shaft of the Herne-Bochum Company. The engine was single direct-acting, with two-meter cylinder and three-meter stroke. The arrangement was similar to that shown in Fig. 1, which represents the apparatus at the Friedrich der Grosse Colliery, near Herne, where it was put in a year later, attached to a direct double-acting engine with 1·62-meter cylinder and 3·77-meter stroke. The first striking advantage obtained by the introduction of the regenerator was, that the engines could immediately be run at a considerably greater speed, without any danger of their racing. At the Friedrich der Grosse Colliery, the number of strokes of the engine could at once be increased from 5 to 7 per minute. This increased the pumping capacity by 40 per cent, a point of incalculable importance at a time when the colliery was fighting the water.

These favorable results led to the application of the regenerator to a number of pumping-engines, until the difficulties of keeping the piston air-tight led to the idea of replacing the piston by a plunger. The regenerator, thus modified by Messrs. Haniel & Lueg, is shown in Figs. 2 and 3. The plunger *b*, which moves up and down with the main pump-rod *a*, works in the stationary air-receivers *c* and *d*, which are mounted in the shaft on the girders *e*. At the end of the up-stroke of the pump-rod, the plunger *b* has compressed the air in the receiver *c* to the maximum pres-

sure of from 4 5 to 5 atmospheres. In the down-stroke, the pressure in this receiver declines gradually, while that in the receiver d is compressed. In order to make this pressure variable, the receivers c and d are filled to a certain hight with water introduced by means of a pipe, while the safety-valves f prevent the pressure from going above a given limit. The plunger-pipe h in the receiver d keeps the compressed air from escaping through the stuffing-box. Any escape of air taking place notwithstanding this precaution is compensated for by the air that is allowed to enter through the air-valve k at every full stroke. The first plunger regenerator was put in in 1881 at the Dechen shaft No. III., at Heinitz, near Saarbruecken, in connection with an Ehrhardt double-acting single-

Fig. 1



cylinder pumping-engine. Elaborate tests were made to ascertain how much the increase in efficiency resulted from the addition of the regenerator. Designating:

P' Average steam pressure on the down-stroke of piston.
P'' " " " " up-stroke of piston.
P''' Power required to work the double-acting air-pump.
G Weight of pump-rod with plungers, weights, etc.
C Weight balanced by counter-balance and engine-beam.
$G' = G - C$ = Effective weight of pump-rod.
Ws Weight of columns of water in suction-pipes.
Wd Weight of columns of water in force-pipes.
W Total weight of columns of water, equal therefore $W = Ws + Wd$.
R Friction in engine and pumps during up-stroke and down-stroke.

Since the stroke of the steam-piston and of the pump-rod is equal in this case, we have:

(1.) $P' = G' + Ws + R + P'''$.
(2.) $P'' = -G' + Wd + R + P'''$.
(3.) $R = \frac{1}{2}(P' + P'' - W) - P'''$ (by adding Nos. 1 and 2).
(4.) $G' = \frac{1}{2}(P' - P'' + Wd - Ws)$ (by subtracting Nos. 1 and 2).

If the engine is well balanced, the pressure at both ends of the piston must be equal; therefore

$P' = P'' = \frac{1}{2}(P' + P'')$, and the effective weight of the rods is then:

(5.) $G' = \frac{1}{2}(Wd - Ws)$.

The engine in question has a diameter of cylinder of 1·177 meter and 3·14-meter stroke, driving three sets of force-pumps, one above the other, with 600-millimeter plungers, their total lift being 197 meters. The engine was designed for five sets and a lift of 300 meters.

From diagrams taken during the trial, it was ascertained that the average steam pressure above the piston was 3·413 and below it 2·938 kilograms per square centimeter when the regenerator was not used. When the regenerator was employed, the pressure was 3·212 kilograms above and 2·832 kilograms below the piston. The net area of the cylinder above the piston was 10 667 square centimeters, and below it 10,880 square centimeters. Therefore, we have:

	Without regenerator.	With regenerator.
P'	$= 10{,}667 \times 3{\cdot}413 = 36{,}406$ kil.	$10{,}667 \times 3{\cdot}212 = 34{,}262$ kil.
P''	$= 10{,}880 \times 2{\cdot}938 = 31{,}965$ "	$10{,}880 \times 2{\cdot}832 = 30{,}812$ "
P'''	$= 1{,}348$ k.	

The weights of the columns of water are, for the 15 meters of suction-column and the 182 meters of force column, $Ws = 4240$ kilograms, and $Wd = 51{,}450$ kilograms, making the total $W = 55{,}690$ kilograms. The weight of the entire pump-rod, with plungers, weights, etc., or G, is stated to be 76,225 kilograms. Of this, 5045 kilograms are balanced by the engine-beam, and 42,000 kilograms by the counterbalance, leaving the effective pump-rod weight $G' = 29{,}180$ kilograms. Introducing these values, we have: $R = \frac{1}{2}(36{,}406 + 31{,}965 - 55{,}690) - 1348 = 49{,}925$. The friction therefore amounts to 17·93 per cent of the effective weight for the double stroke. Introducing values into formula No. 4, the effective weight of rod is computed at 25,825 kilograms. This, it will be seen, does not agree with the figure given above, 29,180 kilograms, and it is probable, therefore, that the weights that were taken from the books were not quite correct. The effective pressure of the engine is, from the data given above:

Without regenerator, $\dfrac{55690 \times 100}{68371} = 81{\cdot}4$ per cent.

With the regenerator, $\dfrac{55690 \times 100}{65075} = 85{\cdot}5$ per cent.

The efficiency of the engine without the regenerator is therefore exceptionally good, due probably to the cutting off at from three eighths to one half of the stroke. In spite of this fact, the introduction of the regenerator has improved it by 4·1 per cent. Besides this, as we shall see, the speed of the engine could be so much increased by the employment of the regenerator that its duty was in that way enhanced by 17·2 per cent.

In order to ascertain what effect the regenerator had on the uniformity of the speed of engine and pumps, accurate measurements of the velocity of the pump-rod during the stroke were made, with an apparatus specially designed by Siemens & Halske, of Berlin. Diagrams thus obtained are shown in Figs. 4 to 10, both inclusive. Diagrams 4 and 5 show the velocity curves from the Dechen shaft engine, Fig. 4 being the curve obtained when the regenerator was used, while Fig. 5 illustrates it without the regenerator. All the rest are curves from pumping-engines not running with regenerators. No. 6 is from a direct double-acting engine with Davey gear, 1·664-meter diameter of cylinder, and 3·140-meter stroke; No. 7, from a single-acting beam-engine, with 2·2-meter cylinder; No. 8 from a similar engine with 2·09-meter cylinder; No. 9 from a 1·57-meter single direct-acting; and No. 10 from a double-acting rotating Woolf engine with 1·62-meter by 3·77-meter low-pressure cylinder, and 1·2 by 2·79-meter high-pressure cylinder. The following table gives the principal results of these trials:

	Fig. 4. Regenerator.	Fig. 5.	Fig. 6.	Fig. 7.	Fig. 8.	Fig. 9.	Fig. 10.
Up-stroke of pump rod, seconds....	2·60	3·20	4·20	4·20	3·40	3·80	7·60
Down-stroke of " " "	2·80	3·40	4·00	8·00	3·20	5·60	5·60
Two pauses, "	1·60	1·60	2·40	5·80	1·60	5·60	....
Time of double-stroke, " ...	7·00	8·20	10·60	18·00	8·20	15·00	13·20
Number of strokes per minute	8·57	7·31	5·66	3·33	7 30	4·00	4·54
Maximum velocity, up-stroke, millimeters.....	1670	1550	1170	1080	1140	1030	595
Average velocity, up-stroke, millimeters.	1177	1050	712	700	764	679	367
Maximum velocity, down-stroke, millimeters	1650	1500	1160	600	1140	720	825
Average vel city, down-stroke, millimeters....	1093	894	748	368	812	460	498

A comparison of the velocity diagrams, Figs. 4 and 5, shows that, when the regenerator is used, there is an almost uniform increase and decrease in the velocity, while without it there are considerable variations. Figs. 6 to 10 show this very clearly, the last being the most favorable.

Two regenerators like the one at the Dechen shaft have been in operation for several months in connection with the pumping-engines at the Urbanus Colliery, near Langendreer, and at the Otto shaft, at Kloster, Oesede, near Osnabrueck. The former is a single-acting beam-engine, with 1·5-meter cylinder and 3·45-meter stroke, working three sets of force-pumps with 530-millimeter plungers and 2·825-meter stroke, the total lift being 247 meters. Without regenerator, the pumping-engine makes 5 strokes, and with it 7·5 strokes. The Otto shaft pumping-engine is of the single-acting beam type. It has a 1·6-meter cylinder and 3·5-meter stroke, the stroke of the pumps being 3 meters. There is one 870-millimeter pump with 65-meter lift and one 650 millimeter pump with a 73-meter lift. Without the regenerator, the engine makes 5 strokes; with it, from 8 to 8·5 strokes.

The chief-engineer of the Société John Cockerill, of Seraing, M. Kraft de la Saulx, when the power regenerators came under his notice, suggested to Messrs. Haniel & Lueg to so arrange the regenerator that it could be put in single acting at the lower end of the pump-rod, with the object of replacing by its action the large weight required for acceleration in rotary pumping-engines. This led to dividing the double-acting regenerator into two parts, one to be attached to the upper part of the pump-rod, and the other to its lower end, near the pump (Figs. 11 and 12.)

The Utilization of Phosphoric Slag.—In an article in *Dingler's Journal* on Utilization of Slag, Mr. A. Frank recommends the application of magnesium chloride for the decomposition of slags containing sulphur and phosphorus. The fluid slag is run into a solution of about 1·06 specific gravity and agitated; the sulphides are decomposed with the evolution of hydrogen sulphide; so in basic slags, uncombined lime produces calcium chloride and magnesia, which indirectly induces a concentration and more easy solubility of phosphates present. The magnesia thus produced can be removed by washing and settling. On heating in an oxidizing flame the slag powder obtained with the still adhering magnesium chloride, or with a further addition of chloride, a partial higher oxidation of the ferrous oxide and similar compounds results, the new compounds formed being less prejudicial to the manure obtained. Instead of beginning with fluid slag, solid slag finely ground can be heated with the magnesium chloride solution under high pressure. In place of magnesium and ammonium chlorides, the sulphates can be used along with free hydrochloric acid. By a modification of Rocour's process for working up phosphorized slags, described in *Dingler's Polytechnisches Journal*, the slag is melted in a cupola, whereby a matte is obtained containing from 20 to 25 per cent of phosphorus. It is then mixed with powered anhydrous SO_4Na_2, and heated to redness. Most of the phosphorus is changed into sodium phosphate, whereas a portion of Fe and Mn is converted into phosphates, sulphides, and oxides. The mass is treated with water, to recover sodium phosphate by crystallization. The insoluble residue is mixed with Na_2SO_4 and charcoal, and heated in a reducing flame. The Na_2SO_4 is first converted into Na_2S, and then by double decomposition sodium phosphate and FeS and MnS are formed. The mass thus yields another crop of sodium phosphate crystals. The residue, after roasting to destroy the sulphides, can be used as an iron ore rich in Mn. The sodium phosphate is employed for artificial manure. Another method to work the phosphorized matte is to fuse it in a Bessemer converter with dolomite or lime. Alkali can be added to promote the fusing of the metal slag that is formed. Before the complete dephosphorization, the slag is decanted, and a fresh portion of lime added to obtain the dephosphorization according to the basic process. The slag contains P_2O_5 and only little Fe and Mn. It is powdered and used either directly as manure or after treating with S_4OH_2 as superphosphate. The second method yields the P as a product of less marketable value; but as the metal has been converted into steel, its value is said to make up the difference.

Fig. 4

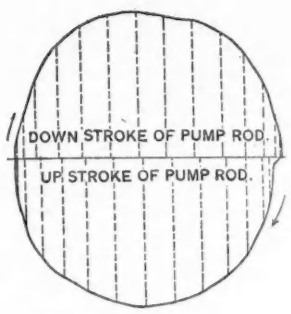


Fig. 5

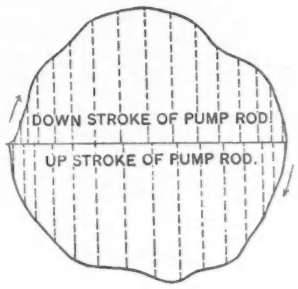


Fig. 6

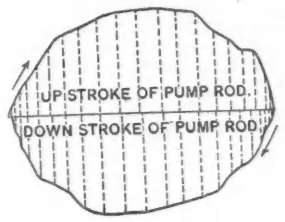


Fig. 7

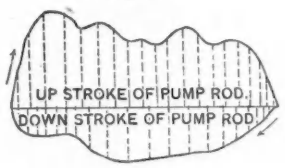


Fig. 8

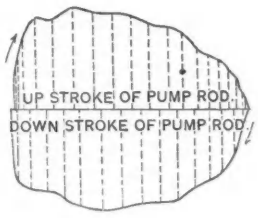


Fig. 9

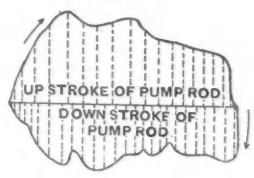


Fig. 10

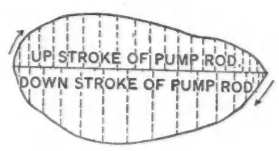


Fig. 2

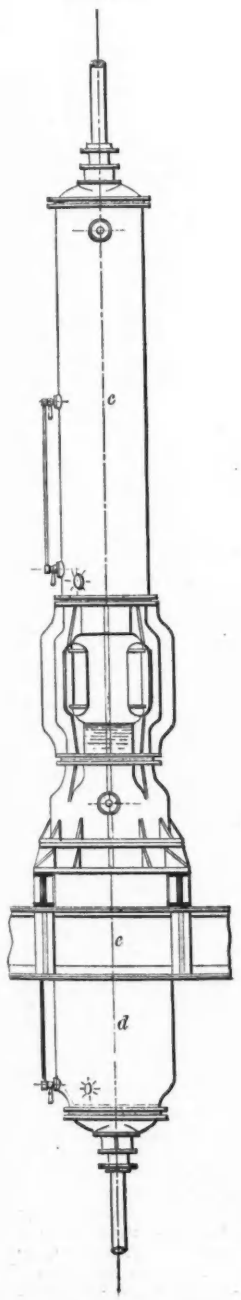


Fig. 3

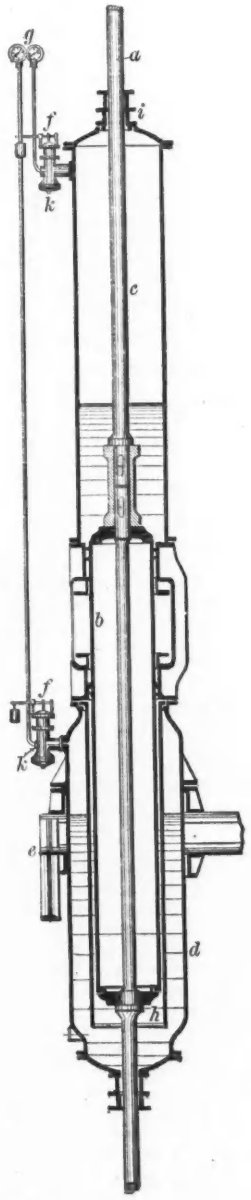


Fig. 11

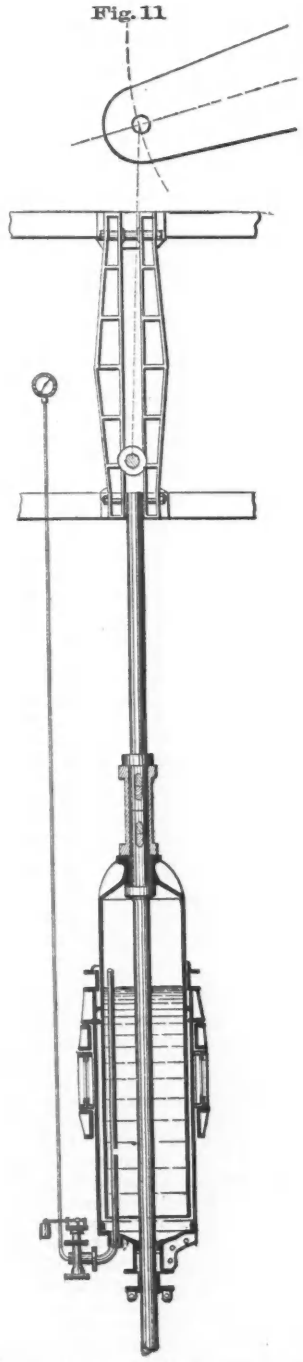
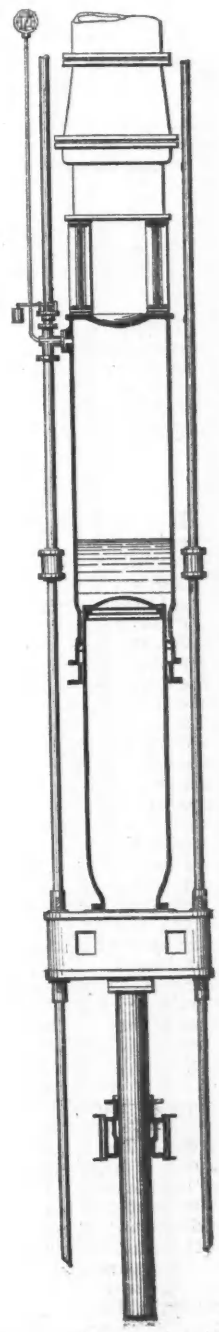


Fig. 12



POWER REGENERATOR FOR PUMPING-ENGINES.

THE COST OF COAL IN ST. LOUIS.

The reorganization of the St. Louis railroad coal pool has at length been accomplished, to the sorrow, we may say, of the bituminous coal consumers hereabouts. Last April and May, it will be remembered, the coal-carrying railroads got to fighting among themselves, the Wabash being the most loudly denounced for its real or supposed underhand practices, and the pool dissolved in thin air. Simultaneously with its disappearance, the rates for carrying coal from the mines to East St. Louis were popped down to the lowest notch—to half a cent a bushel against two cents previously. The railroads all felt that the fight was a serious mistake, but the disposition to see it out to the bitter end was strong and kept the roads apart. While the fight lasted, large consumers of coal availed themselves of the opportunity to contract for their yearly supplies at remarkably low figures. So the restoration of the carrying rate on the 14th to two cents, and a corresponding advance in the price of coal, will not affect manufacturers and other large consumers to an appreciable extent; on the contrary, only those small buyers who, through neglect or by force of habit, never supply themselves ahead.

The cost of mining coal and hauling it to this market varies considerably, but we think we can fairly approximate it. In the Belleville District, embracing Madison and St. Clair counties, the more general price is one and a half cents a bushel for mining, though some operators claim to pay as high as two cents. The miner can get out about 80 bushels a day, making his earnings $1.20, from which is to be deducted the cost of powder, etc. A fair estimate of his daily earnings will not, therefore, be wide of $1. This is, of course, not sufficient compensation; and we are not surprised that meetings are held by the miners to discuss the propriety of asking an advance. The cost of hoisting and loading the coal on the cars is three quarters of a cent a bushel, if the work is economically done; otherwise, about one cent. The transportation to East St. Louis is two cents, which is the minimum rate agreed upon by the railroads for hauling from the mines to the east bank of the river. The bridge charges are one and a third cents a bushel, or $4 for a car of 300 bushels; and by the car, at least 300 bushels must be paid for by the shipper or consumer. To the members of the Manufacturers' Association, a rebate of 12½ per cent has been allowed by the bridge and ferry companies since June 1st, but the concession is strictly limited to that organization. On this side the river, the switching charges of the railroads are $1, $2, or $3, depending on the distance as measured by blocks or business squares.

From the above items relating to the cost of mining and transporting coal from the Belleville District to this market, it appears that the actual cost for both is from 6 to 7¼ cents. For convenience' sake, we tabulate the items and show the highest and lowest cost in parallel columns:

	Highest.	Lowest.
Mining	2	1⅛
Hoisting, etc	1	¾
Transportation in Illinois	2	2
Bridge charges	1⅓	1⅓
St. Louis switching charges	1	⅛
Totals	7⅛	5¼

In the above table, it will be noticed reference is had only to the minimum rate of two cents charged by the railroads east of the river; some coal coming into this market is taxed a shade higher on account of its long haul. It will also be observed that the 12½ per cent rebate allowed manufacturers is not taken into account. But these omissions are not important so far as the general result is concerned.—*Age of Steel.*

MINING IN CUBA.

In a report by Mr. E. G. Spilsbury, recently transmitted to the Department of State, the writer states that he has visited the mines of Manicaragua, on the island of Cuba, and has collected some information in reference to them. The mining concessions belonging to the Manicaragua Company are at present six in number, two being under the name of the Santa Rosa mine, two as the San Fernando, one as the Santa Isabella, and one as the San José. These concessions are all situated in the province of Santa Clara (which is about the most central province on the island), and distant from Santa Clara, the capital of the province, about twenty-seven miles in a southerly direction. All four of the mines now belonging to the company were worked to a very considerable extent in olden times, and from appearances, large quantities of ore have been taken away; but the revolutionary wars that have devastated this whole section of the island for the last ten or twelve years have not spared these properties, and all the improvements have been either burned down or destroyed, as also, most unfortunately, all the records appertaining to them. According to the Cuban mining laws, all the minerals belong, *de facto*, to the crown, and not to the owner of the land where they may exist, and are open to location by any prospector who may discover them. The land-owner is indemnified only for the actual damages to the surface, and for the land taken by the concession. The amount of damage is determined by the chief-engineer of mines on the island. Every thing in the law tends to promote, as much as possible, the extension of mining on the island, and therefore the miner is facilitated in his operations in every respect, to the disadvantage of the land-owner. The concessions are all of uniform size, being 300 meters (975 feet) long by 200 meters (650 feet) wide, the mining right only extending down between these vertical lines; several of these concessions may be taken up together by the same discoverer, and if a company is formed to work them, it is allowed to hold as many as twenty-two of these concessions in one group. The mineral deposits of this section are situated in the metamorphic magnesian rocks, which cover the greatest portion of this part of the country. The exact age of the formation is difficult to get at, but is evidently subsequent to the Cretaceous, which seems to be the earliest sedimentary formation on the island. The immense overflow of eruptive serpentinic and dioritic rocks now forming the long ranges of mountains in this part, and in fact nearly all over the island, broke through the limestones and slates of the Cretaceous epoch, which are still visible in places, and cover the plains. At a period still later than this first eruption, there seems to have taken place a second one of somewhat less magnitude, and the masses of magnesian rocks were displaced and upheaved by the intrusion of large dikes or bodies of a siliceous feldspathic porphyry, which broke through the serpentine rocks in a northwest and southeast direction. The serpentine, being probably still in a more or less plastic condition, yielded but slowly to this intrusion, and was bent and folded into shapes that give almost the appearance of regular stratification. It is worthy of remark that these dikes, although of great magnitude, come but comparatively seldom through to the surface; but where they do, they show out boldly, forming the crests of several of the highest mountains of the range. The primary mineral deposits, consisting principally of sulphuret of iron, copper, and zinc, invariably occur at the contact of these porphyry dikes with the magnesian rocks; but a secondary series of mineral deposits occurs in the dikes themselves. These last deposits, although of great dimensions, are chiefly of oxidized ores, such as hematites, oxides of manganese, carbonates, silicates, and oxides of copper. They are probably produced by the action of waters passing through the crevices containing the sulphurized minerals, and partly decomposing these latter; finding no egress possible through the beds of serpentine, these waters have percolated through the dikes; and as a large percentage of carbonates of lime and magnesia enters into the composition of these latter, the waters have decomposed them, carrying off the lime as a soluble sulphate, and depositing the mineral oxides they formerly held in solution. A very curious example of this process is still taking place at the mines of San Fernando, where the dike, having pushed its way through to the surface, has furnished an easy mode of egress to the waters along the line of contact. Here we find several large springs, containing very considerable amounts of sulphates of copper and iron in solution, flowing from the mountain side. These springs, which flow at a minimum of 10 gallons a minute all the year around, hold in solution from 2 to 3 pounds of metallic copper per 100 gallons of water, and from 7 to 8 pounds of metallic iron to the same volume. As long as these streams flow over the serpentine rocks, but a very little deposition takes place, and that principally of the iron; but about a quarter of a mile below, the stream crosses a formation of dolomitic shale, and immediately the precipitation becomes very marked at the same place; another stream coming from the other side of the dike, and holding a large percentage of lime in solution, enters the first stream, and immediately the precipitation of the copper and iron takes place with great rapidity. This precipitation is so marked and so rapid that, a few hundred yards below, the water is entirely freed from all trace of copper and iron, and is even quite palatable. The carbonates, oxides, and silicates of copper and iron are deposited in a very fine slime in the bed of the creek during the dry season; but as they are very fine and in a flocculent condition, each rainy season causes them to be washed away down into the Arimao River, and thence seaward. At the time of his visit, Mr. Spilsbury computed the amount of copper precipitate in the creek-bed at not less than 150 tons, and during this dry season the precipitation is progressing very fast; but the first freshet will clean out the bed of the stream completely, leaving it ready to receive next year's deposit. As this action has been going on for untold ages, and as the Arimao River is in places very wide it is not at all improbable that very large deposits of these precipitates may be found at some points in the river-bed.

To return now to the mineral deposits themselves: it may be pointed out that the primary deposits, being in the form of contact-veins between two eruptive rocks, may be fairly considered as fissure-veins rather than contact-veins, and there seems to be no reason to doubt their continuity and permanence in depth. As to their superficial extent, there is no possible doubt, this being already well demonstrated. The extent of the secondary mineral deposits will probably not be very large or be extended to any great depth; their presence being evidently due to decomposition by the mineral waters of large masses of carbonates of lime and magnesia inclosed in the porphyry, which masses were probably fragments of the superincumbent rocks, detached at the time of the upheaval, and floating on or near the surface of the upheaving mass. Of course, if it should prove that the dikes in depth contain more or less lime in their composition, then the possibility of the continuance of this character of deposits in depth becomes greater. This being the case, the mining of the oxidized ores will always be more or less difficult and uncertain, as the pockets will be found to have no regular connection one with the other, but, on the other hand, near the surface they are so close and so blended together that the whole dike may in many cases be considered as one mineral bed, and be worked as such. At San Fernando, for instance, such is really the case, and the whole of the dike there was supposed to be the vein, and consequently nearly all the old workings are in the wrong position, and are running away over the top of the actual veins into the decomposed serpentine. At and near the contact, the magnesian rocks are always more or less decomposed, and certain strings and small veins of oxidized mineral run through the crevices for some distance. These are what in most cases misled the old miners, and consequently most of the old workings really run over the tops of the veins and away from them. Now, in regard to the future workings of this property at San Fernando, Mr. Spilsbury advises that, before laying out the new works, at least two of the old shafts be cleaned and the water pumped out. At the bottom of No. 1 shaft, there is evidently a very considerable vein of zinc-blende, mixed with copper pyrites, as evidenced by the piles of ore that were stowed away in the lower portion of the old workings above water-level. This ore will have to be separated before it can be marketed to advantage. He advises the erection of a small hoisting-engine at each of these shafts, and also a steam-pump. In addition to this work, he counsels running in a tunnel or adit at as low a level as can be obtained, at the spot where the chief copper springs now issue. This adit should be run in the direction of No. 1 shaft, and will cut it about 90 feet from the surface. All the ores and also the water would then be discharged through this level. It will be necessary also to erect concentration-works near this spot, to dress the ores, as there are immense bodies of low-grade ores now exposed above water-level that are too poor to use in their present condition, but which will pay well if concentrated. Then he further advises the erection of a matte furnace, as it would never pay to transport the low-grade sulphurets at the present rate of freights. With this in view, he examined closely into the question of fuel, and found that, around the mine itself there was little or no timber land available for charcoal; but

at a distance of about three miles from the property, he found a very large tract of good woodland, the refusal of which has been secured for the company on easy terms—namely, about one dollar an acre. In order to save fuel as much as possible, it will be necessary to erect a concentration-works—say of a daily capacity of 40 tons. At first, these works would be run entirely on the old dump-piles of the mines, which contain still very many thousands of tons of good copper ore disseminated through them, and which will pay for concentration. Also all the low-grade ores in the mine, of which there is an enormous quantity, would naturally be treated at these works. The next necessary improvement would be the arrangement of some method to treat the copper held in solution in the springs. The simplest method of doing this, and the one that would require the least outlay at first, would be an enlargement of the present arrangement of precipitating the copper by means of scrap-iron; but a great objection arises to the use of this method, which is the cost of the iron. It could not be bought and delivered on the property for less than $55 a ton; and as the precipitate would, when procured, be not worth much over $200 a ton, this tax would be too much. With this in view, Mr. Spilsbury has made several experiments to find other cheap precipitants, and has decided that the best and cheapest plan in the long run will be an arrangement by which lime will be used as a precipitant.

NEW STEEL-WORKS IN BELGIUM.

Out of a product of nearly 727,000 tons of pig and 503,000 tons of finished iron in 1882, Belgium only turned out 182,627 tons of steel ingots. Last year, only four works produced the "metal of the future," namely, those of the Société John Cockerill, the Société de la Fabrique de Fer d'Ougrée, and the Société de Thy-le-Château, all by the Bessemer process, and the Société d'Angleur by both the Bessemer and the Thomas process. At the beginning of the present year, new and extensive steel-works were started in connection with the Athus blast-furnaces; but the Société de Fabrique de Fer d'Ougrée has not yet erected a plant for working the basic process, although holding a license from the Angleur Company, the sole licensee for Belgium. At the end of July last, some new steel-works were started at La Louvière, in the district known as Le Centre, about midway between Mons and Charleroi, where there are a great many collieries and coke-ovens, five blast-furnaces, of which, however, only one is at present in blast, and a few rolling-mills. The single furnace in blast is only separated from the new steel-works by the Belgian State Railroad, so that they are practically contiguous. It belongs to the Société Anonyme des Hauts Fourneaux et Fonderies de la Louvière, formerly Cambier et Compagnie, and is at present producing 50 tons of forge pig daily; but it is intended soon to make Bessemer pig to supply the new steel-works, either in this furnace or in the one adjoining, which is ready to be blown in as soon as the state of trade permits. The works adjoining were founded in 1850, for the manufacture of finished iron, by M. Boucqueau, who bequeathed them to his engineer, M. Boël, the present owner. This gentleman has lately added Bessemer steel-works, for an eventual production of from 80 to 100 tons of ingots per twelve hours, with a new rolling-mill, and also a wire mill in connection. There is only one pit, with two 7-ton converters, slightly converging, with the ordinary eccentric throats. An Armstrong hydraulic lift raises the pig-iron and spiegeleisen to the cupolas, of which there are two for pig and two for spiegel. Besides the central crane for casting, there are three ingot cranes, all worked by hydraulic power. A large double heating-furnace is about fifty feet from the pit. The bottom of the furnace is slightly inclined, and there is a door at each end, so that the ingots are charged in at one end and taken out at the other. The furnace is thus continuous, and is capable of holding 18 tons. This grate is stepped, and only consumes 4 tons of coal per twelve hours, or 6 per cent of the steel heated. A new three-high roll train has been put up for rails or billets, which are to be a specialty. The billets, which vary from 40 to 100 mm., or from 1½ to 4 inches, are cut to lengths by powerful shears, the bars being fed up by live rollers. A small locomotive conveys the billets to the wire mill, where they are put in a furnace, on the same principle as that above mentioned, capable of heating as much as 30 tons in twelve hours. The wire mill, provided with the latest improvements, is considered the best arranged on the continent. A compound and condensing engine of 500 horse-power, making 100 revolutions a minute, drives the roughing-rolls at 250 revolutions, and the finishing-rolls at 500, both by rope gearing. The previously existing iron-works, which will henceforth be used indifferently for steel and iron, are provided with the same system of heating-furnaces with stepped grates. The four roll trains include a new one lately erected for fish-plates and small colliery rails, this department being capable of producing 1200 tons a month, in addition to over 100 tons of bolts and rivets. There is, besides, a shop for turning out horseshoes perfectly finished, by means of a machine invented by Mr. Boël, to the extent of 100 tons monthly, and it is proposed soon to make them of mild steel, instead of iron, as also rivets. These works have been erected, not so much for rolling rails, as for producing extra mild steel that will supersede iron for ordinary purposes, and especially fine-grained iron; for turning out small steel instead of iron rails for collieries and sugar-houses; and, besides keeping the wire mill going, for supplying steel billets to Charleroi and for export. The works will probably give employment to 1000 hands when all the departments are working.

The Electrolytic Extraction of Copper.—Messrs. Siemens & Halske, of Berlin, have five machines C_1, each with twelve baths in action, at the Oker Works. Each machine is worked with a water-power of from 4 to 5 horse-power and deposits one kilo of copper per cell per hour, that is, about 300 kilos a day. At the North German Refining-Works in Hamburg, six Gramme machines (No. 1) and one Wohlwill machine are in operation, precipitating 2500 kilos of copper daily. Oescher and Mesdach have constructed a Gramme machine according to Wohlwill's instructions that yields 800 kilos of copper daily. Hilarion Roux, in Marseilles, works with a No. 1 Gramme machine connected with 40 baths, having 900 square meters anode surface; the cathodes are only 0·5 mm. thick, and are 5 cm. from the anodes. The machine makes 850 revolutions a minute, consumes 240 kilos of coal a day, and deposits, with 8 volts and 300 ampères, 250 kilos of refined copper.

NOTE ON TANTALITE AND OTHER MINERALS ACCOMPANYING THE TIN ORE IN THE BLACK HILLS.*

By Prof. Charles A. Schaeffer, Cornell University, Ithaca, N. Y.

Several months ago, some specimens of the minerals occurring at the Etta tin mine, Dakota, were received at the laboratory of the Cornell University. On examining the heavy brownish-black portion, which I presumed was the tin-stone, I was surprised to find only a faint indication of tin. Further investigation showed the mineral to be tantalite. On searching carefully all the fragments received, a considerable quantity of that mineral was found, and only a single streak of cassiterite, which was attached to a mass of spodumene.

Another lot of specimens, from the same locality, consisted of samples of the greisen, some garnets, and a quantity of "stream-tin." The latter sample weighed about 500 grams, of which about one fourth consisted of small, pinkish garnets, averaging about the size of a grain of mustard-seed. The remainder comprised a lot of rounded brown pebbles, averaging in diameter ¼ inch. These were carefully examined with the blow-pipe, and of thirty pieces six proved to be tin-stone; one, the largest of the lot, was hematite; and the rest were tantalite. No wolfram was found in any of the specimens, and I think it is a fair inference that the heavy black mineral to which Professor Blake alluded in his paper † as "apparently wolfram," is tantalite.

An analysis of the tantalite gave the following results:

Tantalic oxide	79·01 per cent.
Stannic oxide	0·39 "
Ferrous oxide	8·33 "
Manganous oxide	12·13 "
	99·86

Specific gravity, 7·72.

So far, I have been unable to find the least trace of columbic or tungstic acids, or of any of the rarer metals. The Dakota tantalite is thus much simpler in composition than the mineral from Alabama, which, according to the late J. Lawrence Smith, ‡ contains tungstic acid, as also oxides of zinc and copper in small amounts.

Pressure of other work has prevented me from analyzing additional specimens of the mineral; but I think it highly probable, from the fact that the color of the powder differs more or less in the different specimens, that they would give results varying somewhat from the above figures.

A third lot of minerals, from the same locality, received from a friend who obtained them at the office of the Harney Peak Mining Company, in New York City, presented precisely the same appearance as the specimens that I had received directly from the Etta mine, except that in the massive specimens the tin-stone was present to a very encouraging degree, although the tantalite was by no means absent.

In a report made to the above-named company, by Prof. Gilbert E. Bailey, the following passage occurs: "No titanic acid, wolfram, sulphur, arsenic, or other injurious substances were found in the ore."

So far as my knowledge goes, there may be no wolfram present, but there must be, instead, a very considerable amount of tantalite accompanying the tin ore. As to arsenic, the first lot contained two large lumps of scorodite—remarkably good specimens—with here and there kernels of leucopyrite. Further, one of the massive specimens of tantalite contained two little cavities that were filled with olivenite. From this, it seems that arsenic does occur in at least three of the minerals that accompany the tin ore. By proper concentration, however, it will be a very simple matter to remove the most of these arsenical minerals from the ore. But how to separate the apparently large amount of tantalite from the tin-stone is a matter that will, I believe, prove puzzling to the wisest metallurgist.

FURNACE, MILL, AND FACTORY.

The Salt Lake (Utah) Foundry and Machine Company, which started out ten years ago with an investment of $20,000, is said now to have a plant worth $61,000; 54 per cent has been paid in dividends since the organization.

The Block & Pollack Iron Company, at Chicago, Ill., has been incorporated with a capital stock of $100,000; incorporators, Joseph Block, Emil Pollack, and Emil Benjamin.

Articles of incorporation have been filed by the Harrington Miniature Rotary Engine Company, at Chicago, Ill.; capital stock, $100,000; incorporators, Seth Turner, Charles L. Byam, George B. Durkee, and Henry Hudson.

The Novelty Manufacturing Company, barbed wire, Sterling, Ill., has assigned. Liabilities and nominal assets are reported at $80,000. It had a paid-in capital of $100,000.

The Canton (Ohio) Cutlery Company has become financially embarrassed, and judgments for $20,000 have been entered against it. The nominal assets are about $50,000.

The Harrison Wire Company, of St. Louis, Mo., is insolvent. The liabilities are estimated at nearly $500,000 over the assets. The company is composed of Edward Harrison, Dr. Leete, and Thomas M. Fitch, who effected its organization.

The capacity of the Westinghouse Machine-Works at Pittsburg, Pa, is increasing for an output of from 90 to 100 automatic engines a month. The works will be ready for operation about November 1st.

The Coldbrook Iron and Steel Manufacturing Company has been organized. The object of the company is the manufacture and sale of iron and steel, castings and foundry, with such other things as are incident to the attainment of that object, with a capital of $100,000, to be divided into two thousand shares of $50 each. The office or principal place of business is to be at Coldbrook.

The Fishback Rolling-Mill of the Pottsville Iron and Steel Company, of Pottsville, Pa., closed down October 18th. The alleged cause is scarcity of orders. It will resume work November 1st.

A stock company is organizing in Alleghany City, Pa., to manufacture on an extensive scale the T. P. Cordrey patent rotary dumping-car and the "Eureka" coal and ballast-car.

Charles T. Dumont, proprietor of a foundry and machine-shop at Cincinnati, Ohio, made an assignment October 22d, to Charles A. Wilson. His liabilities are estimated at $25,000, and his assets at $18,000.

Mr. Arthur Macy, Superintendent of the Silver King Mining Company of

* Read at the Chicago Meeting of the American Institute of Mining Engineers, May 1884.

† Engineering and Mining Journal, New York, Vol. XXXVI., No. 11, p. 164, September 15th, 1883.

‡ See Professor Smith's analysis, *Transactions*, vol. xii., p. 161.

Arizona, writes on the 13th inst. to the Ingersoll Rock Drill Company of this city: "I have to acknowledge your esteemed favor of October 1st, making inquiry as to the results of the work accomplished in the mine by the plant of air-drills and compressor furnished us by you. In general, I can say the results are extremely satisfactory. We can break one third more ground now than at the same time last year, at a trifle over half the cost, using sometimes three, but generally two of the 2½-inch 'Eclipse' drills, and including a certain amount of necessary hand-drilling. Aside from this, I can hardly estimate the benefit derived from forcing air into the mine during the hot season. The repairs have been very light, amounting to just $6 for the past three months, and this with their use by a number of green hands. Our 18-inch by 20-inch compressor works beautifully, but as yet has had but comparatively light duty to perform, although I am well satisfied, from experimental tests we have made, that it will easily do all claimed for it. It runs easily and smoothly, and takes a surprisingly small amount of lubricants." Mr. J. K. Sandstrom, Superintendent and Manager of the American Forcite Powder Manufacturing Company, of Drakesville, New Jersey, writes as follows to the Ingersoll Rock Drill Company, of this city, under date of September 15th: "Your favor of 11th inst. is at hand, and I am very much pleased to give my opinion about the air-compressor that you have delivered us. I have before always used 'dry air-compressors' of different European constructors (Menck & Hambrock, of Hamburg; Galloway, of Manchester; Hubener, of Halle an der Saale; Beer, of Liége in Belgium), but none has so well answered the purpose of getting dry and cool air as your compressor. I find in passing compressed air (of 40 pounds) by half-inch pipe through common sulphuric acid (in quantities of 1500 pounds) during forty minutes, that the acid takes up only 0·1 per cent water. With other compressors, I never found it less than from 0·75 to 1·0 per cent. That fact is very valuable for the production of nitro-glycerine, giving about 8 per cent better yield than I ever got before, thereby during only two months making or saving greater than the entire cost of your compressor."

The Harrison Boiler Works, Germantown Junction, Philadelphia, Pa., are doing a flourishing business, reporting trade very fair. Their principal specialty is the Harrison safety boiler, though they also manufacture the Creasey ice breakers.

The iron and steel-works of Crawshay Brothers, at Merthyr Tydvil, in South Wales, are about to close. The stagnation of the Welsh iron and steel trades is causing widespread dismay. Other suspensions are probable.

The partners in the new steel nail works to be erected at Pottstown, Pa., have applied for a charter, under the name of the Ellis & Lessig Steel and Iron Company, Limited.

The receiver of the bankrupt Union Iron Company, of Portsmouth, Ohio, announces that the property of the company will be offered for sale on November 11th. The real estate consists of the Jackson Furnace property, the Washington Furnace property, and the Monroe Furnace property. The first consists of 5000 acres with improvements, and is appraised at $19,500; the second consists of 5200 acres, valued at $44,500; and the third of 8600 acres, valued at $49,000.

A sale of the personal property of the Coatsville, Pa., Iron Company took place October 23d. The property consisted of blooms, horses, and carriages. The sale is for the purpose of paying the county taxes on the property and also for paying a large number of iron-workers employed in the mill at the time of assignment.

The contract for the new iron highway bridge and viaduct at Penn street, Reading, Pa., has been awarded to Cofrode & Saylor, of Pottstown.

The works of the Southern Barbed Wire Company, St. Louis, Mo., were almost totally destroyed by fire October 22d. The loss on stock and machinery is about $50,000; insurance, $50,750. The loss on the building is $7000; insurance, $5000. Two employés of the company were badly burned.

The Morris County Machine and Iron Company, of Dover, New Jersey, shipped $7000 worth of mining machinery this week.

Mr. C. W. Colvin, Superintendent of the Howells Mining Drill Company, Plymouth, Pennsylvania, is on his way in the West, where he goes to introduce the Howells drills, which have a great reputation in Pennsylvania.

RAILROAD NEWS.

The statement of the financial condition of the Philadelphia & Reading Railroad and Coal and Iron companies, which has been in course of preparation at the instance of the receivers for some time past, has just been completed. The current liabilities of the railroad company are stated to have been, on September 30th, $11,661,885.33, being a decrease since June 2d of $7,805,271.50; less receivers' obligations on account of wages, $1,990,000, and on account of materials and supplies, $757,910.51, the net decrease of liabilities being $5,057,360.99. The current liabilities of the Coal and Iron Company on September 30th are given at $1,908,005.77, which, with $232,166.53 added for receivers' obligations, on account of materials and supplies, shows a net decrease of liabilities for the Coal and Iron Company since June 2d of $1,404,161.05, making a total decrease of the liabilities of both companies since June 2d of $6,461,522 04. The annual fixed charges of the Railroad Company are given as $15,463,613.44, and of the Coal and Iron Company, $1,121,119.23.

The Schuykill Navigation Company has begun legal proceedings against the Reading Railroad receivers, to compel payment of arrears of rental, amounting to $219,016. The Reading Company owes them $158,944 rental quarterly, and has not paid any thing of the amount due October 1st, while of the payment of July 1st $60,072 are still in arrears.

An air-line, some twelve hundred miles in length, is projected between Council Bluffs, Iowa, and Punxutawney, Jefferson County, Pa. The road is to run through the northern part of the States of Illinois, Indiana, and Ohio, and the intent is primarily to supply fuel from the Clearfield region, where large tracts of coal lands have been secured by parties interested in the project. Connections will be made by established roads with the country north and south of the line, and by the Pittsburg & Western with Pittsburg.

The stockholders of the Pittsburg & Western Railroad held a meeting October 20th at Pittsburg, and ratified the lease of the Pittsburg, Cleveland & Toledo by the Pittsburg & Western. The road has been leased for ninety-nine years, and the terms of the lease were given some time since.

The Northwest Coal and Navigation Company has awarded the contract for building 107 miles of railroad from Medicine Hat, Manitoba, to the Galt coal mine on the Belly River, to Mr. Donald Grant, of St. Paul, Minn.

LABOR AND WAGES.

The rest of the miners in the Ohio Central and Buckeye Creek regions have struck for an advance to 80 cents per ton. The strikers include the miners of W. P. Rend, the Sunday Creek Coal Company, and the Columbus & Eastern Railroad Company. The operators have refused the demand, and the miners did not resume work. This action will cut off the heavy contributions from the Ohio Central region to the strikers of Hocking Valley.

The nailers at the South Tredegar Nail-Works, of Chattanooga, Tenn., the largest nail factory in the South, have struck against a reduction of 10 per cent on all wages over $1 a day.

At the close of work in the Philadelphia & Reading Railroad shops, at Reading, Pa., October 18th, several hundred men were reduced to eight hours' work a day Forty blacksmiths were also suspended. This was done on account of the slackness of trade, and in accordance with the company's policy of retrenching in all departments.

The wages of the skilled employés of Bailey, Farrell & Co., Pittsburg machinists, were reduced from 10 to 15 per cent October 20th.

At the Pottsville Iron and Steel Company's Fishback Rolling-Mill, at Pottsville, Pa., a reduction of 10 per cent on all wages will go into effect on November 1st.

The wages of the "runners" in the Iowa barbed wire works at South Easton, Pa., have been reduced 10 and 12 per cent on the hundred pounds, or from 25 to 35 cents a day. To offset the reduction, the men are given two machines each, and thus they can about equalize their wages. A number of new machines are to be started, but the force will be smaller.

It is believed that the President will appoint a chief for the Bureau of Labor Statistics during the present month, and the names of John Fahrenback and Andrew H. Roy, both of Ohio, are mentioned in connection with the place. Another report states that Mr. Nimmo, Chief of the Bureau of Statistics, is giving special attention to the collection of information bearing on the labor question. It is said that the intention is to show Congress that the new bureau is a useless expense; that the one in existence can do all the work; and thus possibly secure the repeal of the act creating the new one before it goes into operation.

A petition is circulated among the "river" miners asking Governor Pattison, of Pennsylvania, to revoke the commission of Robert McClure, of the Coal and Iron Police. They claim that Officer McClure does not treat them fairly, and that he does more to provoke trouble than he does to maintain order. The coal operators say that Mr. McClure is a good officer, and that, if the case demands it, they will come to his rescue.

Work in H. H. Fisher's pipe mill, at Allentown, Pa., has been suspended indefinitely, throwing eighty-five men out of employment.

H. B. Scott & Co., manufacturers of barbed wire, at Pittsburg, Pa., have notified their 800 employés of a 10 per cent reduction, to take effect immediately. The reduction has been accepted.

Five of the cases of the laborers of the Bethlehem Iron Company at Allentown, Pa., were tried in court October 23d, the result being verdicts against the company. The court held that, under the act of June 29th, 1881, the company had no right to deduct store bills from the wages of its workmen, and directed a verdict for the plaintiffs. The amount involved in similar cases aggregates $20,000. The trial created much interest, as this is the first decision under the act of Assembly protecting the wages of laborers.

W. P. Rend, of Chicago, October 22d, addressed 2000 striking miners at Corning, Ohio, and "explained at length that the advance rate demanded could not be paid." The miners decided to resume.

COAL TRADE NOTES.

CANADA.

PROVINCE OF MANITOBA.

Another important discovery of coal has been made at Wapella, Northwest Territory, a few miles west of Moosomin.

ILLINOIS.

John W. Harrison, of St. Louis, has been appointed receiver of the Carbondale Coal and Coke Company. Attachments amounting to $90,000 had been taken out, and the appointment of a receiver was decided upon in order to protect the company. The statement of President Bryden on October 1st showed assets of $792,000 and liabilities $851,000.

MARYLAND.

The Cumberland Coal and Iron Company's property at Bowery Furnace, Allegheny County, was sold at public auction in Baltimore October 14th. The property consists of two tracts, situated at Bowery Furnace, the first containing 275·1 acres of big vein coal, with 11 frame-houses, blacksmith-shop, and other buildings. The second contains 25 acres of the same kind of land. The two tracts were purchased by Henry Stockbridge, Sr., for $147,500, for the bondholders of the company. A blast-engine, thirty-six mining cars, picks, scales, and other personal property used about the mines were bought by the same for $1630, the three purchases aggregating $149,130. Three Baltimore properties, owned by the same company, were also offered, but withdrawn at bids aggregating $70,000.

At the annual meeting of the Hampshire & Baltimore Coal Company, the following board of directors was elected: George H. Potts, George B. Satterlee, Henry S. Henry, James S. Merriam, Edward Oothout, E. L. Bolles, and J. George Repplier. The Board immediately afterward elected J. G. Repplier President, and E. L. Bolles Vice-President.

The Consolidation Coal Company will send to the New Orleans Exhibition several huge blocks of coal, as a part of the Maryland exhibit. One of the blocks was taken from Hoffman mine a few days ago, weighing two and a half tons. Other blocks, still larger, are mining for the same purpose.

OHIO.

A vein of excellent coal four feet thick has been struck on the Osborn farm, southeast of Youngstown. A shaft will be put down and the railroad running to the Manning shaft extended to it.

PENNSYLVANIA.

ANTHRACITE.

An explosion of gas ignited by a small feeder took place October 21st at the Dorrance shaft of the Lehigh Valley Coal Company. The wood-work in the mine, the doors, the brattice-work, and fan-house were greatly damaged. A miner was seriously burned.

The Philadelphia & Reading Coal and Iron Company's Bear Valley shaft was found to be on fire October 23d. The vein is perpendicular, and it is impossible to reach the fire. The mine will probably have to be flooded. The loss will be heavy.

The Lehigh Valley Coal Company is endeavoring to make Montana colliery, near Centralia, a paying concern. It is said that about $300,000 have been sunk around Montana in efforts to strike a paying vein. For the past twenty years, mine prospectors and surveyors have been of the belief that there is a considerable bed of coal here, but every effort made to find it has been a failure.

A small mine locomotive exploded at the Kohinoor colliery, October 20th, fatally injuring the engineer and slightly injuring several others. The breaker was set on fire by the explosion, but the flames were quickly extinguished.

John Biddle, President of the Locust Mountain Coal and Iron Company, died October 19th at his residence in Philadelphia, in the seventy-first year of his age.

Two miners were struck by a fall of coal while working at Merriam colliery October 18th, and were fatally injured.

The machinery is in course of removal from the old Coal Ridge breaker between Centralia and Mount Carmel. The machinery will probably be used at the new Packer colliery No. 5.

While sinking the air-shaft on Ross Hill for the Delaware, Lackawanna & Western Coal Company, at the Woodward colliery, the Ross vein was penetrated October 16th at a depth of about 912 feet. The vein was found to be exceptionally fine anthracite and over fourteen feet in thickness.

A new breaker is to be erected by the Kingston Coal Company at No. 4 shaft.

The boring operations that have been prosecuted for some time at the instance of the Delaware & Hudson Coal Company near Mill Creek have been discontinued. The results gained from the test-hole were highly satisfactory.

A fatal accident occurred in the old Repplier colliery mine at Newcastle, near St. Clair, October 17th, by which John Quinn, son of John F. Quinn, operator of the colliery, lost his life, and Capt. Joseph Denning was fatally injured.

BITUMINOUS.

The following is the report of the workings of the mines in District No. 4, M. & L. A. A., for the month ended September 30th :

Rochester mines, at Du Bois, worked during the month 15½ days ; 460 miners were employed and 100 day hands. Prospects, fair.

Sprague mines, near Reynoldsville, worked during the month 17 days, with 96 miners and 17 day hands. Prospects, good.

Soldier Run mines, near Reynoldsville, worked during the month 18 days with 109 miners and 35 day hands. The prospects are good.

Hamilton mines, at Reynoldsville, worked during the month 12 days, with 55 miners and 15 day hands. The prospect for the future is poor.

Pleasant Valley mines worked during the month 12 days, with 53 miners and 7 day hands. Prospects, poor.

Oak Ridge mines worked during the month 21 days, with 137 miners and 22 day hands. The prospects are good.

Beechtree mines, about six miles from Du Bois, worked during the month 13 days. One hundred and ten miners and 20 day hands are given employment. The prospect is not very encouraging.

Dagus mines, at Centerville, worked during the month half-time. Two hundred and fifty miners and 50 day hands found employment. The prospect is poor.

Eureka Slope worked during the month 7⅓ days, with 78 miners and 12 day hands. The prospects are very discouraging.

Bucktail mines worked 16 days during the month, with 65 miners and 15 day hands. The prospects are encouraging.

Clearmont mines, McKean County, worked 18 days during the month, with 103 miners and 30 day hands employed. The prospect is good.

A number of coal mines along the Monongahela River that have been closed down resumed operations October 22d at the reduced mining rates adopted by the operators of the Coal Exchange. The striking miners, who have been out all summer, will oppose the resumption.

Proposals are invited by the trustees of the city ice-boats, Philadelphia, Pa., until twelve o'clock noon, November 10th, 1884, for furnishing to the city ice-boats for the year 1885 six thousand (6000) tons (2240 pounds each)—or such quantity thereof as may be required for the boats—best quality Clearfield County bituminous coal, to be delivered free on board of either of the city ice-boats at any convenient or suitable wharf on the Delaware front of the city of Philadelphia, free of wharfage, at such times and in such quantities as the trustees may designate.

COKE.

The coke trade remains about as usual, according to the Connellsville *Courier*. Although there have been some slight changes in production as well as in consumption, the output and the demand have remained stationary. The average daily shipments are still 525 cars, and the idle ovens to-day aggregate 4413, against 4417 two weeks ago. It is expected that the idle works, which include Percy, Ferguson, Colvin, Anchor, and Fairchance, will soon resume shipments.

The Hungarians continue to leave the regions. Many of them have been taken to the Hocking Valley. Prices remain the same, and no advance is expected until trade brightens up somewhat. The story that the coke association was dissatisfied because the syndicate did not continue to advance the price of coke has no foundation in fact. The operators all appreciate the fact that the iron trade must recover a few notches before any further advance is made ; but as soon as the time comes, the price will again be advanced until $1.50, the goal of the syndicate, is reached.

The Coke Producers' Association met in Pittsburg October 20th, and decided to increase the production, as trade has improved. The ovens that have been running five days a week will now run six. The average price last month was $1.11 a ton, a slight advance on the month previous. The price will be increased as soon as the state of the iron market justifies it.

NATURAL GAS.

A big gas strike was made at a depth of 1700 feet on the farm of Howard Morton, at the head of Four-Mile Run.

The escaping gas from the old well on Boyd's Hill, Pittsburg, still burns about two feet high. The well was abandoned years ago because of the heavy flow of salt.

The borough of Tarentum, October 17th, filed a bill in equity against George Westinghouse, Jr., President, and members of the Philadelphia Natural Gas Company. The court was asked to enjoin the defendants from encroaching or laying gas-pipes in the streets of Tarentum.

Indications are, that the test gas-well which is boring for the Cambria Iron Company near the Old Lock will be a success.

Natural gas has been struck on the limits of Greensburg.

The Common Council of Pittsburg met October 20th to consider the Chambers natural gas ordinance. A strong argument was made in favor of a general law for laying gas mains, but there seemed to be a disposition to pass this particular ordinance without regard to a general law. It is to be hoped that, before final action is taken, a general law will be prepared and acted upon intelligently.

GENERAL MINING NEWS.

ARIZONA.

PIMA COUNTY—QUIJOTOA MINING DISTRICT.

PEERLESS.—A number of men are employed at the present time in grading road and foundation to erect machinery for power-drills, which will be put in operation as soon as possible. It is thought that a mill will soon be erected.

CALIFORNIA.

SIERRA COUNTY.

DE LONG.—The Lamping mill has been started up on ore from this claim. If the yield of the ore proves satisfactory, the claim will be thoroughly developed. The vein measures seven feet where it is now worked.

MARGUERITE.—Work on the new plant is progressing rapidly. The mine can be worked to a depth of 1600 feet with the machinery now going in. Mr. G. Humbert, of Boston, Mass., is at the mine personally overseeing operations, and will remain until the new works are completed and the machinery set in motion. It is expected to have the improvements completed by the first of the month. Underground, the outlook is encouraging. The ledge in the fourth level continues to develop finely. At present, it measures about six feet in width. The three-compartment shaft is completed from the surface to the third level. The mill will soon start crushing.

CANADA.

PROVINCE OF NOVA SCOTIA.

The Londonderry iron-works have contracted to take 100 tons of iron ore a day from Bridgeville, Pictou, paying a royalty of 20 cents a ton.

COLORADO.

CHAFFEE COUNTY.

GLADSTONE.—The cross-cut tunnel, which has been run over 800 feet, leaving about the same distance to be driven before cutting the lode, has been shut down. Some stoping in the winze from the upper tunnel will be done for a week or two and ore-shipments discontinued for the present. Work will be resumed on the cross-cut about January 1st.

MADONNA.—This mine, in Monarch District, is working a force of sixty-five men, and shipping ten cars of ore daily to Pueblo. The new tramway from the mine, nearly 3000 feet, to the railroad, is about completed, and will be in operation soon. It is built at an inclination of over forty-five degrees. The loaded cars bring up the empties, the tram having a double track.

SEDALIA.—Black oxide of copper is now showing in the heading of the cross-cut with considerable native copper. After running the south cross-cut 60 feet, a north cross-cut will be run 30 feet, and then the large working tunnel will be started in from the foot of the hill. A shipment of 500 pounds of ore has been made to New York, which will be used in making experiments on treatment preparatory to the construction of works near the mine.

CLEAR CREEK COUNTY.

ALBRO.—This gold and siver mining company of Philadelphia, owning the Nero, California, Arizona, Montana, and Nevada lodes and Brown tunnel, in Morris Mining District, will begin developments on the lodes named, within the next two months.

PICKWICK.—General Richardson and Louis Windholz, of Syracuse, New York, interested in this property, are at Georgetown, in the interest of the company, with the view of resuming operations soon.

DOLORES COUNTY.

GOLD KING.—The company has purchased four Triumph concentrators at Denver.

HONDURAS.—A strike has been made in this mine, about a mile from Rico. The pay-streak, measuring thirty inches, is sulphates of lead and runs 125 ounces. Ore is shipped to the Pasadena smelter.

PUZZLE EXTENSION.—Ore is hauled to the Santa Clara and Rico reduction-works.

RICO REDUCTION COMPANY.—The improvements at these works are almost completed.

SANTA CLARA.—The mill is running successfully.

GILPIN COUNTY.

COURTLAND.—This mining and milling company has filed articles of incorporation. The capital stock is placed at $500,000, which will be paid up in full by the conveyance to the company of mines and property necessary to carry on its business. The property to be operated is the Courtland and other lodes on Alps Hill. The principal office will be in Denver, and a branch office in Philadelphia.

CYCLOPS.—This mine, on Silver Hill, the most prominent property of this character, has been closed down for some time, but will soon be started up with a larger working force than ever.

GUNNISON COUNTY.

GUNNISON SMELTING COMPANY.—It is stated that this company, formed out of the Shaw & Patrick enterprise, has completed its organization, ordered additional machinery, and will blow in soon.

HINSDALE COUNTY.

CROOKE MINING AND SMELTING COMPANY.—From the receipts from the ore shipped, some of the more pressing debts assumed by the company have been paid off, and the July pay-roll on the Ulé mine discharged.

LAKE COUNTY.

ARKANSAS VALLEY VS. BELDEN.—Judge Hallett of the United States District Court, at Denver, October 16th, delivered an important decision in the case of the Arkansas Valley Smelting Company *vs.* the Belden Mining Company. The suit was brought on a contract made for the sale of 10,000 tons of ore by the mining company to Billings & Eilers. They having sold the smelter to the Arkansas Valley Smelting Company, also sold the contract made with the Belden Mining Company. In the contract, it was provided that the smelting company was not to pay for ore until after 100 tons had been delivered. The Belden Mining Company refused to comply with the terms of the contract for the reason that a contract made with Billings & Eilers on trust and personal confidence was not assignable by them in their sale of the smelter, and Judge Hallett so held.

DUNKIN.—The rumor that the property was to be leased has been denied. From forty to fifty men are now working for the company, and handsome returns are realized.

IRON SILVER.—The case of the Iron Silver Mining Company *vs.* Sullivan *et al.* was called in the United States Circuit Court at Denver, October 13th, the case having been remanded from the Supreme Court. A jury was empaneled, but no contest was made, and a verdict was returned for the plaintiff for the premises, being a part of the Wells-Moyer placer claim, which the defendants claimed as the Kit Carson mining lode.

LA PLATA COUNTY.

DURYEA SMELTER.—Theodore B. Comstock writes in the Silverton *Democrat* as follows : The Duryea smelter, at Animas City, has been announced as successful, although its trial run has not yet been made. The basis for this report is the supposed success of a decided metallurgical failure of the process at Cañon City. The furnace of this pattern at that point was examined by a newspaper reporter, supplemented by some tests by an assayer of undoubted ability, but no metallurgical report was made. F. B. Hine assayed the ore and slag, and reported that little or no metal was left in the slag. But, unfortunately, the amount of metal produced was not reported, and the necessity of several miles of dust-chambers to condemn the wasted furnaces was admitted. That the Duryea will smelt silver ores is not questioned, and it may be able to do so very cheaply, as a custom works, charging by the ton, but it will probably result in heavy losses by volatilization of metal. If this view is erroneous, the company that represents the process has not yet offered any proof to the contrary.

OURAY COUNTY.

ALLIED.—These mines remain idle pending the clearing of titles. It was reported some time ago that a company had been formed in England to work these fine properties ; but it is stated that the delay is caused by the slow process of securing satisfactory settlements with the creditors of the old outfit.

DECLARATION & AGNES.—In Imogene Basin, a syndicate of English capitalists has completed the purchase of these lodes, erected substantial buildings, and begun the building of concentrating works.

PARK COUNTY.

PALMER GROUP.—The mining ground and personal property of this company in Horseshoe District is advertised for sale under a trust deed for $5280 given to E. M. Patterson.

SAGUACHE COUNTY.

COLUMBUS.—The time given this company by Mr. Barnes on the Manitou group has expired by limitation.

REVENUE.—Work has been resumed.

SAN JUAN COUNTY.

CRESCENT.—The mine has been bonded for $25,000.

PANDORA.—An effort is making to get enough ore on hand to keep the mill in operation all winter.

DAKOTA.

FATHER DE SMET.—The report for the week ended October 15th shows: Ore extracted from first, second, and third levels, 2120 tons. Ore milled, 2100 tons.

IDAHO.

HAILEY SAMPLING-WORKS.—The ore-shipments for September aggregated 1,941,258 pounds, or 970½ tons, of the average value of $150 a ton, or a total value of about $150,000.

MINNIE MOORE.—An ore-vein from four to five feet wide has been cut into on the 310 level of this mine, which is believed to be a continuation of the Miller & Meyers ore-body that was lost on the 100-foot level.

PARKER.—The machinery for the hoisting-works has arrived at the mine.

QUIGG.—The company's difficulties have been settled and operations resumed.

VIENNA.—Operations will continue during the winter.

MEXICO.

STATE OF HIDALGO.

The Mexican *Financier* has the following notes:

Leon Mans has been granted an *amparo* for six months on the mine of argentiferous lead called El Santisimo, in Zimapan, and Felipe Ramos has been granted an *amparo* for the same period on the San Bartolo, Riqueza, Rosario, and Santa Inés of Pachuca.

Curtis R. Esterbrook and Luis M. Mans have been given possession of a piece of land east of the Tetitlan shaft for reduction-works, and also a right to use the water of the Cedros and Eco rivers.

Possession of the Laguna, in El Chico, has been granted to Cristobal Ludlow; of the Nuevo Dique to Miguel Mancera; and the Maravillas, in Zimapan, to Agustin Ramirez and partners.

Guillermo Penguilly has denounced an abandoned mine called the San Cristobal, in Real del Monte.

Prisciliano Alvarado has denounced the mine Las Ventanas in the Mineral del Chico.

Mariano Quevara and partners have denounced La Escobeta, which produces both lead and silver; and Rafael Calderon and partners, an old mine called the Cariaga, both in Zimapan.

Eduardo Lopez and partners have denounced the San Pedro mine in Pachuca.

The Angeles mine, in the district of Tenango, improves in quality of ore as the shaft is sunk, and, as the company is hurrying the work, there is a prospect of profitable results in a short time. The company also intends to put up a concentrator.

The Real del Monte Company has begun a new perpendicular shaft. It is to be sunk to the depth of 310 meters, and the work has been given to a party of Mexican and Italian miners on contract.

MICHIGAN.

COPPER MINES.

CALUMET & HECLA.—Reports dated October 15th state that there has been very little work done the past week, owing to the smoke and gas circulating through the mine. The fire, however, is kept wholly under control, and confined to the eighth level, where it originated, and as soon as the stull timber, etc., is burned out in the drift, no further trouble is anticipated. The stamp-mills are working regularly as usual, and are supplied with rock from the Black Hills vein, which is owned by the Calumet Company, and is a continuation of the Calumet & Hecla vein.

CONGLOMERATE.—It has been concluded to suspend general mining and milling operations for the winter. The probabilities are, that a limited force will be kept at work sinking the two main shafts on the Conglomerate lode, and exploring other mineral belts on the property. The dressing-works will not close down before the middle of next month, as there is available rock to last until that date.

PENINSULA.—The property of this corporation has been bonded for $100,000, which amount will pay all debts and leave a surplus. The intention is to operate the mine, which is doing better than at any other time since worked by the present organization.

WOLVERINE.—At a meeting of the creditors of this company, held at Houghton, Mich., October 16th, the books showed that the mine has liabilities of $112,000. All they have with which to pay is about $3000 worth of supplies. It is thought that, if the mine is sold at once, it will bring enough to pay twenty cents on the dollar.

GOLD MINES.

GRUMMETT GOLD AND SILVER MINING COMPANY.—This company has been formed with a capital stock of $2,500,000. The land owned by the company is situated several miles from Michigamme, consists of 267¾ acres. Five veins are located upon it. The property, which is owned in fee simple, is well wooded with timber of both hard and soft varieties. The site for the economical operation of a mill is very favorable, the water privileges being considerable.

ROPES.—Another vein of quartz carrying gold has been found. Nothing will be done at present toward further exploring this find; but as soon as the mill is running smoothly and mining work is well in hand, the company will open it up and ascertain its merits.

IRON MINES.

IRON STAR MINING COMPANY *vs.* FLORENCE FURNACE COMPANY.—This mining company, operating the Great Western mine at Crystal Falls, has brought suit against the Florence Furnace Company for $3324.57. The plaintiffs aver that they will redeem the recent sale of the furnace and take it, if they can not collect their claim in any other way. It will be remembered that James M. Turner, of Lansing, and V. K. and George W. Moore, of Detroit, recently incorporated the Iron Star Furnace Company to operate in the counties of Leelenaw and Marquette. These are the same gentlemen who constitute the Iron Star Mining Company, and control the Great Western mine. The Iron Star mine has closed down.

SLATE QUARRIES.

SILVER RIVER SLATE COMPANY.—This company, of Detroit, will manufacture slate into mantels, bureaus, and other kinds of trimmings, on an extensive scale. The slate to be used will be taken from the L'Anse quarries. These deposits are fast gaining publicity by their extent and fineness, and will soon be in active operation.

MONTANA.

JEFFERSON COUNTY.

HELENA.—Since the organization of this company, a little more than a year ago, the company has added very largely to the plant and entirely reconstructed the old works of the Alta-Montana Company, besides doing a large amount of development-work in the Alta, Comet, and North Pacific mines. A new concentrating mill, costing $85,000, has been built for the Alta mine, and additions made to the Comet concentrator at a cost of $35,000. Ten stamps have been added to the amalgamating mill, making 25 stamps in all; six Brückner cylinders, and three pans; two blast-furnaces of a capacity of 60 tons of ore daily have been erected; eight reverberatory roasting-furnaces of a capacity of 58 tons daily; six charcoal kilns; two and a half miles of elevated cable tramway; sidings about the works for delivery of supplies, loading bullion for shipment, etc.; and aid largely given in the construction of a branch of the Northern Pacific Railroad, 20 miles long, running from Helena to the works. The cost of all these has been paid from net proceeds from the mines and works.

SILVER BOW COUNTY.

ALICE.—Sinking will be resumed and prospecting begun, in order to add to the reserves of ore as soon as the new pumping machinery is in operation. In the Magna Charta, matters are looking well, and from all the levels ore is taken to supply the mills.

ANACONDA.—The smelter is in operation, having 14 furnaces with a capacity of about 250 tons a day, which, with the smelter building, which is in course of construction, will increase the capacity to 450 tons every twenty-four hours. The new building will be finished and ready for operations in about thirty days. The fuel necessary to run the works will be about 150 tons of coal and 70 cords of wood a day. The railroad will run directly through the building. It is rumored that the company proposes to erect, early in the spring, refining-works capable of reducing all the matte from the two smelters.

CLARK'S COLUSA.—The new concentrator has begun operations. At the mine, they have opened up a body of ore on the 300-foot level, its character being such as to render it of easy and much more profitable reduction than that which is taken from the levels above.

LEXINGTON.—In the 650-foot level, a vein has been encountered, and additional prospecting is going on.

OVERMAN.—A body of ore, giving great promise, has been encountered. A hoisting-plant has been ordered.

VOLUNTEER.—The ore thus far encountered is very base, but is high in silver, the assays running 35, 41, 94, and 97 ounces.

NEVADA.

EUREKA COUNTY.

GENERAL SHIELDS.—One tunnel is running on the vein in the mine and the tunnel on the tunnel right is pushed with vigor, both works being done by contract at present. Considerable ore is on the dump.

ONONDAGA.—It is probable that the company will erect leaching-works on the Humboldt River near Gerald for the reduction of its own ore, a large proportion of which could not be profitably shipped, although capable of yielding great profit at home.

LINCOLN COUNTY.

BRISTOL.—The property of this company, consisting of a 10-stamp mill, hoisting-works on Mayflower mine, boarding-houses, etc., has been sold for taxes by the sheriff.

STOREY COUNTY—COMSTOCK LODE.

The Virginia City *Chronicle*, speaking of the present profits of the Comstock mines, says: About 600 tons of low-grade ore is the average daily production from these mines and elsewhere in this county. Of this, about 500 tons are daily shipped by the Virginia & Truckee Railroad to the mills on the Carson River. The Union Mill and Mining Company does nearly all the crushing, and charges $9 a ton, giving a gross income of about $4500 a day to the mill-owners. The cost of reduction is estimated to be in the neighborhood of $5 a ton, leaving a net profit of say $2500 a day.

BEST & BELCHER.—At the Best & Belcher and Gould & Curry, they will soon be ready to begin cross-cutting on the 825 level, where there is a good deal of ground that has never been explored.

CALIFORNIA.—A search for low-grade ore will soon begin on the 1700 level, to the northward of where ore was taken out at the time of the fire in the old timbers.

HALE & NORCROSS.—Work has been temporarily suspended in the northwest drift on the 2800 level. The face of the drift is in dry ground, it having passed the wet place cut into a few days ago. The drift has already opened up ground sufficient to allow of two or three cross-cuts being started.

OPHIR.—The old works will soon be tapped with the drift now advancing on the 500 level. The diamond drill has been put in and the water is draining off. It is expected that a considerable amount of ore will be found between the 500 and the 250 level. Above the 250 level, the ground was pretty thoroughly worked some years ago by tributers, but below that level, they were unable to go on account of water. Preparations are making for explorations on the 1500 level.

SUTRO TUNNEL.—The flow of water from the tunnel is now nearly 9,000,000 gallons every twenty-four hours.

WHITE PINE COUNTY.

OSCEOLA GRAVEL MINING COMPANY.—The company has been incorporated under the laws of Utah, with a capital stock of $5,000,000. The purposes for which the corporation is formed are to conduct the business of hydraulic mining, dealing in mines, buying and selling of gold-dust, construction of ditches, sluices, and other water-ways, the purchase of water and timber rights, and all other things incidental to or in any way appertaining to placer mines and mining in the district of Osceola. The principal place of business is to be at Salt Lake City, and the corporate existence is to be fifty years. The company owns some 400 acres.

NEW MEXICO.

SAN PEDRO AND CANON DEL AGUA.—Some of the bondholders of this company are organizing to contest the plan of reorganization, as involving the sacrifice of a large and valuable part of the property covered by the mortgage.

UTAH.

MILLARD COUNTY.

A car-load of copper has been shipped from Deseret to Swansea, Wales, as an experiment. Should the prices obtained prove satisfactory, future shipments will, according to the Salt Lake *Herald*, go forward at the rate of a car-load a day.

SALT LAKE COUNTY.

BROOKLYN.—The company is erecting new hoisting-works and retimbering the shaft. It intends to double the present capacity, the showings of ore warranting this measure.

LEAD.—The force has now been increased to 100 men, and about twenty tons of ore are daily produced. A concentrating mill is in course of erection, to have a capacity of 100 tons a day. The ore, after being worked, will go 50 per cent lead, about 10 ounces of silver, and from $2 to $4 in gold.

WAHSATCH.—The mine has been bonded to the Lead Mine Company, which is taking out good quantities of ore.

TOOELE COUNTY.

HONORNIE.—It is the intention to erect a mill to work custom ores.

WASHINGTON COUNTY—SILVER REEF.

CHRISTY.—The company has apparently emerged from its difficulties. Seventy men have been put to work, and shipments are regularly made.

WISCONSIN.

NORTHERN BELLE GOLD AND SILVER MINING COMPANY.—The new vein discovered some six weeks ago has been followed to the juncture with the vein formerly worked on, the point of contact showing some rich rock.

FINANCIAL.

Gold and Silver Stocks.

New York, Friday Evening, Oct. 24.

The week under review presents few features of interest. Business has continued dull and prices firm. Robinson Consolidated has attracted considerable attention, and show sales amounting to 13,000 shares, with prices at from 21@30c. The cause of this sudden rise is not known; no sales of any account have occurred since the week ended July 5th. Among the other Colorado companies, Amie and Dunkin show the largest business.

The stockholders of the Brittle Silver Mining Company have been notified that the treasury stock, consisting of fifty thousand shares, will be sold to the highest bidder. Bids for not less than 10 cents a share will be received until to-day. The object is to raise money to continue the work at the mines. The Comstocks were almost entirely neglected. The largest sales made were in Sutro Tunnel, with steady prices. The consolidation of the California and Consolidated Virginia Mining companies was consummated at a recent meeting of the stockholders in San Francisco. The stockholders of California received 378,000 shares of the treasury stock at the rate of 2½ shares for each share held, and the Consolidated Virginia stockholders received a dividend of one sixth of one share for each share held. It is rumored that the Sierra Nevada, Union, Mexican, and Ophir mining companies will soon follow the example of the above companies. In the Tuscarora group, Navajo and Belle Isle record the largest business. It is reported that the former company has a cash balance on hand of about $90,000, and that the resumption of dividends is near at hand. The State Line companies, Nos. 1, 2, 3, and 4, will soon appear in a new phase. The latest information shows that these properties have been conveyed to W. G. Robinson, trustee, No. 66 Broadway, this city, to organize a company to work them. The capitalization will be $250,000, divided into 250,000 shares. Old stockholders have the privilege for ten days of exchanging four shares for one on payment of 30 cents for each new share. Of late, very little business has been done in these shares. There was a great "boom" in them in 1881, these stocks being listed on the Exchange in May of that year, and then State Line No. 1 opened at $4.95; State Line No. 4 at $2.90, Nos. 1 & 4 at $4, and Nos. 2 & 3 at $13.75. The sales of Consolidated Pacific, for a time the favorite stock of the Bodie group, are greatly decreasing; this week they have only amounted to 2700 shares, with little variation in prices. Some business has been done in Bodie Consolidated and Standard. The price of the former is improving, and this week went from $2.50@$3.10; the price of the latter is firm at from $1.25@$1.40. The demand for Horn-Silver continues, and sales amounting to 8970 shares are reported. The price has taken a downward course. The reason of this decline is not known. The reports from the mine continue to be of a very satisfactory nature, and it is claimed that there is no reason why the regular quarterly dividend of $300,000, now due, should not be declared. Some sales, with steady prices, were made, of Silver King, Central Arizona, Rappahannock, and others. The total sales this week amount to 59,913 shares, as against 35,229 the preceding week. The tables printed elsewhere give a complete summary of the market.

MEETINGS.

Bonanza Chief Gold Mining Company, No. 15 Broadway, New York City, meeting of stockholders for the purpose of considering the expediency of selling the property of the company, October 30th, at twelve o'clock M.

Crescent Mining Company, office of the company, Romney Block, Salt Lake City, Utah, annual meeting of stockholders and election of trustees, November 3d, at half-past ten o'clock A.M.

Idaho Consolidated Gold and Silver Mining Company, No. 104 Wall street, New York City, annual meeting of stockholders and election of trustees, October 29th, at twelve o'clock M.

DIVIDENDS.

Bullion Gold and Silver Mining Company has declared a dividend of $5000, or five cents a share, payable November 1st.

Ontario Silver Mining Company, of Utah, announces its "Centennial" dividend, payable at the company's office in San Francisco, or at the transfer-agency of Messrs. Lounsbery & Co., No. 15 Broad street, this city, on October 31st. The Ontario has now distributed to its stockholders a total of $5,900,000.

PIPE LINE CERTIFICATES.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows for the week:

The market this week has been eventful and the volume of business has been large. Last week, the sentiment was so bearish that bulls were frightened out of their oil and a large short interest was created. The Christie well by its enormous production created a panic in the market. This week, the situation has been quite different. On Monday morning, the market opened at 61c., and the room traders generally felt that lower prices would soon be reached, as bearish news from Thorn Creek wells, Baldridge, was current. But in one hour, the fact developed that some one had taken possession of the market who didn't care for "wells or rumors of wells," and before the close of that day prices touched 70⅛c. This astonished those who had been bullish and alarmed the bears, who generally, however, felt that the movement was too rapid, and that a reaction must ensue. In this they were disappointed, for the next day, Tuesday, oil sold up to 74¼c., and on Wednesday and Thursday the highest and lowest prices were respectively 75c. and 70⅜c. for Wednesday, and 73⅜c. and 71⅛c. for Thursday. To-day, the market hung about 73½@74c., with light trading, until about a quarter of an hour before three, when it took a sudden jump to 78¾c. in Oil City, and 77⅛c. in New York, closing 78c. bid in the former market and 77c. here. This shows a net advance from Monday morning to Friday night of 16 cents a barrel. This, of course, is not due to any corresponding change in the situation in the field; but is to be attributed to a bull campaign against the short interest, which is and has been very large during the past few weeks, and to the concentration of oil in the hands of a few holders. The latest news last night that excited the trade, however, was the report that the Armstrong No. 2 not far from the Phillips gusher, was dry. This is not confirmed at this writing, but is probably true, and if so, it is important, as it would show the spotted and unreliable character of the Thorn Creek pool. The production there is perhaps 9000 barrels a day. It looks as if crude would go much higher. Refined, 7⅛. The short interest is large, and carrying rates have been flat for several days.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Oct. 18....	$0.61½	$0.62	$0.59⅞	$ 0.62	6,854,000
20....	.61	.70⅛	.60¼	.68⅞	12,344,000
21....	.70	.74¼	.68⅜	.71¼	8,397,000
22....	.71	.75	.70⅛	.72¾	7,997,000
23....	.72½	.73⅞	.71⅞	.72½	5,643,000
24....	.72	.77½	.72	.77	5,885,000
Total sales.....					47,120.000

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

Boston, Oct. 23.

The transactions the past week in copper stocks have been confined exclusively to Calumet & Hecla, and have aggregated over seven hundred shares, ranging from $127@$124, with the market quite steady at $125. The firmness in price is largely due, we think, to covering of short sales made during the last three months, although there may be some purchases for investment account by parties who have faith in the future of the mine and in its ability to resume payment of dividends in the near future. The outlook at the mine is not very encouraging; the damage by fire and the stopping of underground work will materially reduce the production this month, which may in the end prove beneficial to the company. The Calumet *News* of the 18th says: "The miners and others are beginning to look blue over the probable smallness of the amount they will receive at the November pay-day, the mine having now been closed two weeks, and likely from all appearances to be closed some days longer." "No material damage is expected to accrue to the mine from the fire further than the delay and loss of time; owing to the impossibility of breaking the rock, which is done by hand, from the South Hecla as small as if it went through the breakers, and hence is harder to treat, the product is likely to be materially lessened this month." The rest of the list seems to have been entirely neglected, and, although there is a good demand for Quincy, there is no stock for sale at less than $32. To-day, $29½ was bid for it, without bringing out any stock. The stock is undoubtedly cheap at $30 a share, and will pay well as an investment at that price. There is some inquiry for Franklin, and at one time $6 was bid, $6¾ asked.

In silver stocks, the only feature is the growing inquiry for Bowman Silver, which has advanced from 4@8c. bid within the past two weeks. We do not hear any thing favorable from the mine to cause the advance; on the contrary, another assessment is probable in the near future, in order to make contemplated developments. Dunkin is dull at 20c. bid, 22c. asked. Catalpa sold at 26c.; 23c. is bid, 26c. asked. Consolidated Pacific is very steady at 75@80c.

3 P.M.—There was no feature to the market this afternoon. One share only of Calumet & Hecla sold at $125½, but the stock was offered at $125 and no bids. Quincy, $29½ bid, $32 asked. Pewabic, $1½ bid, $2 asked. The rest, unchanged.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

Name of Company.	Closing Quotations. Oct. 17.	Oct. 18.	Oct. 20.	Oct. 21.	Oct. 22.	Oct. 23.
Albion	...	...	...	...	...	...
Alpha	...	...	...	...	...	...
Alta	...	...	1.75	1.75	1.62½	...
Argenta	...	...	...	...	...	...
Bechtel	...	...	...	...	...	...
Belcher	...	...	...	...	...	...
Belle Isle	...	...	...	...	...	...
Best & Belcher	...	...	1.50	1.62½	1.75	...
Bodie	...	...	3.00	2.87½	2.75	...
Bullion	...	...	...	...	...	...
Bulwer	...	...	...	...	...	...
California	...	...	...	...	...	...
Challar	...	...	2.37½	2.50	2.25	...
Con. Pacific	...	...	.85	.85	.85	...
Con. Virginia	...	...	...	...	...	...
Crown Point	...	...	1.37½	1.50	...	...
Day	...	...	...	...	...	...
Elko Cons	...	...	...	...	...	...
Eureka Cons	...	...	2.25	2.25	...	...
Exchequer	...	...	...	...	...	...
Gould & Curry	...	...	1.12½	1.25	1.12½	...
Grand Prize	...	...	...	...	...	...
Hale & Norcross	...	...	3.25	3.25	3.12½	...
Independence	...	...	...	...	...	...
Martin White	...	...	...	...	...	...
Mexican	...	...	.95	1.12½	1.00	...
Mono	...	...	...	...	...	...
Mount Diablo	...	...	4.00	3.87½	...	...
Navajo	...	...	3.87½	3.87½	3.87½	...
Northern Belle	...	...	...	...	...	...
North Belle Isle	...	...	...	...	...	...
Ophir	...	...	.80	.95	.80	...
Overman	...	...	...	...	...	...
Potosi	...	...	1.25	1.25	1.25	...
Savage	...	...	1.37½	1.37½	1.25	...
Scorpion	...	...	...	...	...	...
Sierra Nevada	...	...	1.00	1.12½	1.00	...
Silver King	...	...	...	...	...	...
Tip-Top	...	...	...	...	...	...
Union Cons	...	...	.90	1.12½	.95	...
Utah	...	...	.65	.90	.75	...
Wales Cons	...	...	...	...	...	...
Yellow Jacket	...	...	1.87½	1.87½	...	...

METALS.

New York, Friday Evening, Oct. 24.

Copper.—So far as Lake copper is concerned, the market continues very quiet at 13c. nominally. The idea is suggested by the fact that heavy shipments are going on to Havre and other points, that possibly additional sales have been quietly made abroad. In other brands, there has been a decline, due, it is said, to pressure to sell on the part of Montana concerns. We quote 11¾@12¼c. according to brand.

London cables Chili Bars lower, namely, £53 2s. 6d., and Best Selected steady at £59.

The following are the Board of Trade returns for the nine months of the year, showing the imports and exports of Great Britain:

	Jan. 1 to Sept. 30. 1884. Tons.	1883. Tons.	1882. Tons.
Imports—			
Pure in Pyrites	10,505	11,983	12,124
Precipitate	16,640	17,521	12,987
Ore	19,019	12,346	11,691
Regulus	8,773	7,179	6,132
Bars, cakes, etc	28,079	26,531	25,951
Tons	83,016	75,560	68,885
Exports—			
Raw (English)	13,679	12,523	9,032
Sheets	15,766	11,223	12,218
Yellow metal at 60 per cent.	8,457	8,839	8,385
Brass at 70 per cent	2,959	2,550	2,483
	4,086	35,135	32,118
Foreign	8,760	8,907	9,121
Tons	49,621	44,042	41,239

Tin.—The market for tin has been weaker, closing at about 16¾@17c. for large lines, with England cabling £74.

Lead.—During the week, about 300 tons of lead have been sold at 3·65c., and more is offered at that figure. Buyers do not appear to be very anxious.

From St. Louis, Messrs. John Wahl & Co. telegraph to us as follows to-day:

Our market continues very dull, and since the date of our last report prices have further declined. There is not much doing. Negotiations are pending, but it seems as though buyers and sellers could not agree. We quote both Hard and Refined lead nominally 3·45c. and 3·50c. respectively. Sales for the week sum up to 300 tons of Refined at 3·50c., and 150 tons of Chemical lead at 3·45c.

From Chicago, Messrs. Everett & Post send us the following dispatch to-day:

The market has ruled dull, with scarcely any fresh business since our last report. Prices are nominally 3·45@3·50c. Buyers, expecting a decline, are holding off, and buy only for immediate wants. We look for no improvement until after the election.

Spelter.—This metal is weak at 4·40@4·45c. for ordinary Domestic. London cables £14 10s. for Silesian.

Antimony.—There has been no change.

BULLION MARKET.

NEW YORK, Friday Evening, Oct. 24.

A decline in silver in London and in sterling exchange here is shown in the figures for silver in our weekly table.

DATE	N. Y	London.	DATE.	N. Y.	London.
	Cents.	Pence.		Cents.	Pence.
Oct. 18	50 11-16	110⅛	Oct. 22	50⅝	109⅞
20	50⅝	110	23	50⅝	109⅞
21	50⅝	109⅞	24	50⅝	109¾

BULLION PRODUCTION FOR 1884.

MINES.	States.	Month of September.	Year from Jan. 1st, 1884.
		$	$
*Alice, G. S.	Mont.	† 113,888	949,041
*Belmont	Mont.	17,261	33,122
*Black Bear G	Cal		19,600
Bodie, G.	Cal	3,916	404,543
*Bonanza King, G.	Cal		191,891
*Boston & Montana, G.	Mont.	33,601	343,400
*Caledonia G	Dak.		73,511
*Chrysolite, S. L	Colo.	8,329	117,637
*Consolidated Bobtail, G	Colo.		69,199
*Contention, S. G.	Ariz.		293,607
*Deadwood-Terra, G.	Dak.	38,758	386,686
*Derbec Blue Gravel, G. S.	Colo.	17,908	124,189
*Father de Smet, G.	Dak.	38,205	348,152
Grand Prize, S.	Nev.	26,000	69,000
*Head Center Cons	Ariz.	1,273	1,273
*Head Center & Tranquillity	Ariz.	11,893	11,893
*Hecla Cons., G. S. L. C.	Mont.	‡ 67,435	972,952
*Helena, G. S. L C.	Mont.	102,000	834,036
*Homestake G.	Dak.	116,853	952,559
*Hope, S	Mont		58,646
Horn-Silver, S. L.	Utah.	279,000	1,918,087
*Iron Silver, S. L.	Colo.		519,692
*Kentuck, G. S	Nev.	729	21,944
*Lexington, G. S.	Mont.	91,389	903,499
*Mammoth Bar, G.		925	1,607
*Moulton, G. S.	Mont.		516,161
*Mount Diablo, S.	Nev		24,820
*Murchie, G. S.	Cal		19,000
*Navajo, G. S.	Nev.	50,846	310,831
*North Belle Isle, S	Nev.		5,874
*Ontario, S. L.	Utah.	209,151	1,648,707
*Original, S. C.	Mont.		29,724
*Oxford, G	N. S.	3,312	30,691
*Paradise Valley, S. G	Cal.		103,950
*Plymouth Consolidated, G	Cal	78,090	780,506
*Rooks, G	Vt.	6,690	41,946
*South Yuba, G.	Cal		21,432
*Stormont, S. L.	Utah.	11,668	120,560
*Syndicate, G. S.	Cal.		90,475
*Tombstone, S. L.	Ariz.		370,756
United Gregory, G.	Colo.		7,174
Total amount of shipments to date			$13,151,909

* Official † Assay value. ‡ Not including value of lead and copper; G. Gold; S. Silver; L. Lead; C. Copper. —— No bullion produced. Silver valued by the different companies from $1.05@$1.29·29 per ounce; gold, $20.67.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 3 per cent. During the week, the bank lost £924,000 bullion; but the proportion of its reserve to its liabilities was raised from 35¼ to 36 1/16, against 43 15/16 per cent at this date last year. The weekly statement of the Bank of France shows gains of 3,350,000 francs gold and 2,650,000 francs silver.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Oct. 24.

American Pig.—There has been no improvement, nor is it to be expected that buyers should show any tendency to anticipate future wants, when political questions are engrossing the attention of the community.

We quote standard brands: No. 1 Foundry, $19.50@$21; No. 2, $18@$19; and Gray Forge, $17@$18, with outside brands from $1@$1.50 lower. Foreign Bessemer is nominally $18.50@$19. Sales of Spiegeleisen have been made at less than $26.50, for 20 per cent.

Scotch Pig.—The apathy of buyers continues undiminished.

We quote ex ship and to arrive: Langloan, $21.50; Summerlee, $20.75; Dalmellington, $20; Gartsherrie, $21; Eglinton, $19.25@$19.50; and Glengarnock, $20@$20.50.

At the Metal Exchange, the following cable quotations have been received: Coltness, 59s. 3d.; Langloan, 58s.; Summerlee, 53s. 9d.; Gartsherrie, 55s. 3d.; Glengarnock, at Ardrossan, 50s.; Dalmellington, 47s.; and Eglinton, 43s. 9d. Warrants, 42s.

Steel Rails.—There have been no transactions of any consequence, some of the mills asking from $28@$29. We quote nominally $27.50@$29. In speaking of the facilities of the Lackawanna Company for making rails cheaply, we erroneously stated that the fuel they were using for reheating, etc., was "coke." It should of course have been "culm."

Old Rails.—There have been some sales on the basis of $17@$17.50.

Philadelphia. Oct. 24.

[From our Special Correspondent.]

Pig-Iron.—Some negotiations have been in progress this week, looking to the contracting for the output of a few furnaces making the better qualities of iron. The furnace agents are anxious to close the arrangements, but the buyers insist on buying the production on terms that leave the furnace people next to nothing. A good many inquiries have been made, looking to the buying of standard and special brands. But up to-day, nothing has come out of them, and therefore the market can only be called, as it has been all along, very quiet, with pig-iron sluggish and selling in small lots at $20.50, or a little over for some special makes, and running from that down to $19, according to quality. The foundries in the city are carrying no stocks, and with very few exceptions are not willing to buy any more than necessary. No. 2 is unusually dull, and the lowest price paid this week was $17.50, but it is said that orders have been taken at less. Forge has weakened more than No. 1 Foundry, and most of the business done is between $16 and $17. The mills have not increased in orders, and are backward about buying, but nothing is reported by brokers below these figures.

Foreign Irons.—For special brands of Bessemer, $21.50 is asked and $21 offered. About 4000 tons of spiegeleisen have been sold to Western consumers. There are four or five inquiries on the market.

Muck-Bars.—There has been a little more inquiry and demand for muck-bars this week, and most of the business done has been under $30.

Blooms.—A few sales of anthracite blooms were made at old figures. Very little charcoal is wanted.

Merchant Iron.—One sale of 500 tons was made early in the week. Several small sales of from 10 to 40-ton lots are reported. The selling price is in the neighborhood of 1·80@1·90c. Common iron ranges from 1·60@1·75c. The mill-owners say things look blue. Country mill-owners have nothing new to report. They can make no better terms than they have been offering, and will be obliged to shut down in some cases, unless business improves.

Nails.—The Milton Works are experimenting with steel nails, and it is likely that one or two works will go into the business on a small scale. A number of sample lots have been received here lately, and there is a good deal of curiosity to see what steel nails are, as compared with iron. Quotations for iron nails are $2.10@$2.20, and as to business nothing can be said, excepting that the mills here are selling small lots.

Plate and Tank-Iron.—Makers of plate-iron, without exception, report no improvement in the demand, no inquiries for large lots, and but little of interest to say. Quotations are 2·10@2·20c. for Plates; Shell Iron, 2·75c.; and Flange, 3·75c. Steel Slabs, $35@$36.

Sheet-Iron.—Several inquiries for galvanized iron but in small lots, have been received by the makers here. A fair business is done, and it is likely that more will be done next month. Prices show no change, and there is no room for any fluctuations.

Wrought Pipes and Tubes.—Quotations are unchanged. Demand continues moderately active.

Structural Iron.—Structural iron quotations are 2·10c. for Angles. More business is coming to hand, but it does not sum up very much.

Steel Rails.—Steel rail makers report a little weakness in prices, and it is likely that $27.50@$27.75 would be accepted for large winter orders. Nominal quotations are $28@$28.50; small lots are $29. There is a strong disposition to take a good many rails, on buyers' terms, but in many cases terms of payment are not satisfactory to makers.

Old Rails.—There has been a good deal of inquiry this week from the West, but not much business. One sale was made of 500 tons at $19.50 delivered at Pittsburg. The local demand is light.

Scrap-Iron.—The yard men are holding firmly to $19@$19.50 for their Best Selected.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Oct. 24.

Anthracite.

The market has been quiet during the week, and the volume of business has been fair, particularly so far as domestic sizes are concerned. The position of some of the companies is good and that of others is rapidly improving. It is reported that the Delaware, Lackawanna & Western has some difficulty in keeping its trade promptly supplied, and that, so far as certain sizes are concerned, the Reading is in a similar position. The Lehigh & Wilkes-Barre Company is diminishing its stocks, besides taking care of current shipments. Stove coal may be quoted at $4, though some claim to buy better than that. Broken and chestnut are in ample supply.

Bituminous.

The bituminous coal business continues depressed, and low figures are accepted for occasional transient orders.

Philadelphia. Oct. 24.

[From our Special Correspondent.]

Stocks at Port Richmond are 97,626 tons to-day. While it is not definitely agreed upon that there are to be two weeks' suspension in December, the fact might as well be accepted, as advices from all quarters indicate that the same backwardness in demand will continue. Every one is ordering the least possible coal. Some say that, as soon as election is over, people will get back to business, and buy more freely, but there is not much in this opinion. Manufacturers are not forgetting to buy coal simply on account of politics, but for other reasons that seem excellent to them, namely, that there is nothing to gain by buying heavily, and that there are chances of buying to better advantage later on. The winter season is approaching, when deliveries are difficult and prices a little firmer. Freights remain at 80@90c. to Portland. There is a slight advance in freights to Boston, but not to other ports usually controlled by Boston rates. To the latter city, rates are $1.05@$1.10. Domestic sizes are in good request, but the pleasant weather tells against the trade in both domestic and manufacturing sizes. The Eastern trade is still buying from hand to mouth, and the usual fall boom will be omitted. The general trade conditions are about as they have been. The line trade is sluggish. The city yards are doing a moderate business. Big business is looked for from Chicago soon. The local agitation in regard to coal prices continues. The *Record* sales keep up, but it is announced that they will be discontinued at the end of this month. George V. Newton, who handles the coal, has a rebate and a commission as a wholesaler, and handles a good deal of Schuykill coal, which ranges from 40@60c. below pure Lehigh prices. Shipments of Clearfield coal for the week just reported are 68,985 tons, against 57,981 tons for the same week last year—an increase this week of 11,004 tons. The increase for the season is 250,555 tons. The Cumberland shipments for the same week were 44,472 tons, against 39,696 tons for the corresponding week last year—an increase of 4778 tons. The increase for the region, so far this year, has been 145,709 tons. There is a fair movement at very low

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Highest and Lowest Prices per Share at which Sales were Made.												Sales.
	Oct. 18.		Oct. 20.		Oct. 21.		Oct. 22.		Oct. 23.		Oct. 24.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.													
Amie Con., Co.	.05	.04			.04	..							1,800
Argenta													
Bassick, Co.													
Belle Isle, Ne.	.55		.57										
Bodie Cons., Ca.	2.75	2.50	3.00	2.75	3.10		3.00				3.00		1,500
Breece, Co.			.16	.15									1,300
Bulwer, Ca.													1,000
California, Ne.													
Cal. & Hecla, Mich.													
Castle Creek													
Chollar													
Carysolite, Co.									1.00				100
Cons. Va., Ne.	.19				.15		.15		.14				1,800
Copper Queen													
Dunkin, Co.	.25				.26		.27	.25	.27		.22		2,300
Eureka Cons., Ne.	3.10	3.00					2.75		2.75		3.00	2.75	1,000
Father de Smet, Dk.													
Findley, Ga.													
Gold Stripe, Ca.													
Gould & Curry, Ne.													
Grand Prize, Ne.													
Green Mountain, Ca.											1.25		100
Hale & Norcross, Ne.	2 85												100
Hall-Anderson, N. S													
Homestake, Dk.													
Horn-Silver, Ut.	5.75	5.38	5.25		5.25	5.00	5.13	5.00	5.00		5.00	4 90	8,970
Independence, Ne.													
Iron Silver, Co.			1.00		1.10						1.05		1,400
Leadville C., Co.							.35	.31					163
Little Chief, Co.	.30				.30		.30						1,300
Little Pittsburg, Co.	.22						.25						800
Martin White, Ne.													
Navajo, Ne.	4.00		4.00		4.00		4 05		4.00		4.00		1,300
Northern Belle													
North Belle Isle, Ne.	.38												300
Ontario, Ut.													
Ophir, Ne.									1.00				300
Quicksilver Pref., Ca.													
" Com., Ca.													
Robinson Cons., Co.	.25	.23	.26	.21	.28	.26	.30	.25	.26		.27	.25	13,000
Savage, Ne.			1.05										100
Sierra Nevada, Ne.	.94						1.20	1.05	.95				900
Silver King, Ar.	4.05								4.25	4.00			180
Spring Valley, Ca.													
Standard, Ca.			1.30	1.25	1.40				1.35	1.25			1,100
Stormont, Ut.													
Up Top, Ar.													
Vizina, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Highest and Lowest Prices per Share at which Sales were Made.												Sales
	Oct. 18.		Oct. 20.		Oct. 21.		Oct. 22.		Oct. 23.		Oct. 24.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Albion					.15		.10		.15		.12		450
American Flag.													
Barcelona, G.													
Bechtel Con., G.													
Belvidere													
Best & B'icher, G. S.													
Big Pittsburg, S. L.													
Bradshaw, S.													
Bull-Domingo, S.L.													
Bal., B. H., G.													
Central Ariz'na, S.					.20								
Climax, Co.									.20				500
Colorado Central.					.50				.50				300
Cons. Imperial.													
Con. Pacific	.77	.75			.79	.78	.76	.70			.82	.80	2,700
Decatur													
Durango, G.													
Eastern Oregon													
Goodshaw, G.													
Harlem M. & M. Co.	.03												100
Hortense, S.													
Lacrosse, G.													
Mariposa Pref. G.													
" Com., G.													
Mexican, G. S.					.85				1.10				450
Mono													
North Standard, G.													
N. Horn-Silv'r, S L.													
Pri'nt'l & Miller, S.	.12	.11	.10		.12	.10	.12				.12		2,700
Rappahannock, G.							.08				.08	.07	4,300
Red Elephant, S.													
Ruby, of Arizona													
Silver Cliff, S.													
Sonora Con.													
South Bodie, G.													
South Bulwer, G.													
South Hite													
South Pacific													
State Line, 1 & 4, S.													
" Nos. 2 & 3, S.	.05	.01					.04						1,300
Sutro Tunnel	.16	.15	.15		.14		.15	.14			.15	.14	6,300
Taylor Plumas													
Tuadilla, S													
Union Cons., G. S.													

Tables giving dividends and assessments will be printed the first week of each month. Dividend shares sold, 40,813 Non-dividend shares sold, 19,100.

prices. There is more or less talk on the street in regard to the Vanderbilt road and its contracts, and the reported canceling of contracts, but this fact is doubted here. The coal that has been developed on his territory is first reach coal, and may not be quite up to the market.

It was reported that Vanderbilt's contract was transferred to the Cumberland region, but none of our people know any thing of any such transaction. Vanderbilt's road will, in a month, reach some of the best mines in the Clearfield region; but the operators here differ in opinion as to what will be the outcome of this Vanderbilt development. They are very anxious to see some of the chronic evils of the coal trade removed, but have been disappointed so often that they will not take heart or indulge in any hopes of better things until it is safe to do so.

Buffalo. Oct. 23.

[From our Special Correspondent.]

The warm and fine weather has materially retarded the delivery of anthracite coal to consumers at all points in the States and Canada, Buffalo, of course, included. The trade in domestic sizes is probably two months behind ordinary seasons. Cash collections in consequence are correspondingly delayed, and the whole trade feels it, from the miners to the shippers and retailers. Considering the depression in all kinds of business, however, the anthracite coal trade has more than maintained its position, both as regards tonnage and prices. Some sizes of coal for domestic use are really scarce, while the sizes mainly used for manufacturing purposes, and which to a greater or less extent have been interfered with by the low rates at which bituminous coal has been sacrificed, continue to show a surplus.

As far as lake shipments are concerned, there is comparatively less anthracite to go forward at this time than at the corresponding period last year. But those companies that are behind with their water shipments are now preferring to send their coal to docks, for the reason more particularly that the supply of cars has been very inadequate for through shipment from the mines for some time past.

Bituminous coal is without any new features. Manufacturing of all kinds continues in a depressed condition, and demand for fuel is light in consequence. Low rates prevail as usual, and apparently are likely to continue indefinitely.

The coke trade remains in a quiet state, with no changes in price-list.

A dispatch received from Ottawa, Canada, states that Mr. John Page, the Dominion Engineer, is engaged in preparing estimates and plans for raising the banks of the Welland Canal two feet. This would allow large propellers of the Canadian and United States fleets plying on the upper lakes to pass through the canal without unloading part of their freight at Port Colborne. These vessels could then proceed as far as Kingston on the Canadian side of Lake Ontario, and to Oswego, Ogdensburg, and other ports on the American side of the same lake. When this change is completed, it will give an impetus to trade at the ports named and may affect the business of our city to a considerable extent. However, several years' labor would be required to execute the proposed improvement and enlargement, and who knows what changes may occur in that time?

The stockholders of the Lehigh Valley Railroad Company have ratified the lease by that company of the Wyoming colliery of the Wyoming Valley Coal Company, as recommended by the president. This means that the transportation of about 400,000 tons of coal a year will be transferred from the Lackawanna to the Lehigh Valley.

Several new railroads are projected at Duluth; one will be started very soon. This means the opening up of new territory, and consequently an extended demand for coal in the near future from the Northwestern settlers and manufacturers.

This time last year, sailors on the lakes were paid $3.50 a day; now, the highest wages are $2 a day, and there are many men who would engage at $1.50. It is estimated that 1000 sailors are out of employment at our lake ports. Many vessels of small tonnage are laid up already; and hundreds of others will do so November 1st, and obtain a return of insurance money, of 20 per cent of the premiums.

On October 16th, 1883, coal freights hence to Chicago and Milwaukee were $1 a ton; on the 18th, they were $1.10; on the 22d, $1.25; and from the 22d to the close of the month, the same rate.

Coal freights have been somewhat unsettled for the past few days. Most of the vessels leaving this port went away light—partly on account of the low freights offered, and partly from the lack of coal for shipment to Lake Michigan and other ports. The vessel interests are having a hard time generally.

The freight engagements for the week were at the following rates: 70@75c. to Chicago and Milwaukee; 30c. to Superior City and Saginaw; on contract to Duluth; 20@15c. to Detroit; 85c. to Racine; 80c. to Marinette; 15c. to Sandusky; 10c. to Toledo (for ballast); 70c. to Green Bay; and —— to Kincardine. Closing firm, but inquiry light.

The shipments by lake from October 16th to 22d, both days inclusive, were 42,920 tons; namely, 17,370 to Chicago, 12,640 to Milwaukee, 1810 to Duluth, 300 to Detroit, 1300 to Toledo, 450 to Green Bay, 1720 to Racine, 600 to Kincardine, 1450 to Sandusky, 1400 to Marinette, 3300 to Superior City, and 580 to East Saginaw.

Receipts by lake for the week, none.

Receipts by Lake Shore & Michigan Southern Railroad for the week, 1140 tons; 816 tons for Buffalo, and 324 tons for other points.

Receipts by canal for the week, 3939 tons; shipments for same period, not reported.

Coal charters by canal for the past week include 1 boat-load to Ilion, at 87½c. a net ton, captain to pay unloading; and 1 boat-load to Syracuse, at 75c. a gross ton, captain to pay unloading. The nominal asking rate to New York $1.40, and to Albany, $1.20 a net ton, captain to pay unloading.

The receipts of coal for the week ended Saturday last at Duluth comprised only two vessels with 2200 tons; total receipts for the season to October 18th, 255,384 tons.

Boston. Oct. 23.

[From our Special Correspondent.]

There has been a little better demand this week for anthracite coal, owing to the few days of sharp weather that we have had. The demand has been almost entirely for domestic sizes. Jobbers who have been able to guarantee quick delivery have had the most of the floating trade. The Reading steamers are said to be particularly busy. There is no desire to anticipate wants. The demand is from those dealers who are in need of coal, and is almost entirely for domestic sizes.

The stiffening in freights is having a stimulating effect. F. o. b. quotations remain unchanged. The best Stove coal can be had at $4 at New York, and at $3.90@$4 at Philadelphia. Individual coal of questionable worth is offering at $3.75@$3.90. For $3.90, it is said that very good coal may be had. Manufacturers are apparently out of the market.

We quote f. o. b. prices as follows:

At New York, Stove, $4@$4.15; Broken and Egg

$3.50@$3.65; Pea, $2.40; individual coals, $3.75@$3.90 for Stove, $3.25@$3.50 for Broken and Egg. At Philadelphia, $3.90@$4 for Stove, $2.20 for Pea, $3.30@$3.50 for Broken and Egg. Special coals, $4.85@$5 for Broken, $5.35@$5.50 for Stove.

The bituminous branch of the coal market is entirely devoid of interest. The current quotations for cargo lots range from $3.50@$3.65 delivered. The advance in provincial freights from $1.30@$1.60 has caused a corresponding advance in the delivered price of culm coal. Cargo lots have advanced from $2.15@$2.50. The small trade for this coal is not likely to be affected by this advance. The demand for the rest of the year will be light under any circumstances.

There is a little firmer feeling in freights, as might be expected from the weather. The limit is advanced about 5 cents per ton. We quote: New York, 80@90c.; Philadelphia, 95c.@$1; Baltimore, $1.10@$1.15; Newport News, $1; Richmond, $1.15; Cape Breton, $1.60; Bay of Fundy, $1.55.

There is a good retail trade, small orders being numerous, and dealers have been crowded for prompt deliveries. We quote:

White ash, furnace, and egg	$5.50
" " stove and nut	5.75
Red ash, egg	6.00
" " stove	6.25
Lorberry, egg and stove	$6.75@ 7.00
Franklin, egg and stove	7.50
Lehigh, furnace, egg, and stove	5.75
" nut	5.75

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended October 18th, and year from January 1st:

Tons of 2240 lbs.	1884. Week.	1884. Year.	1883. Week.	1883. Year.
Wyoming Region.				
D. & H. Canal Co.	117,246	3,022,624	101 906	3,225,263
D. L. & W. RR. Co.	149,708	4,000,270	113,860	3,993,061
Penna. Coal Co.	36,096	1,019,201	36,872	174,660
L. V. RR. Co.	44,901	1,104.020	40,763	1,122,659
P. & N. Y. RR. Co.	†	170,760	5,289	170,092
C. RR. of N. J.	*	*	*	1,202,078
Penn. Canal Co.	15,898	351,846	17,490	401,607
North & West Br. RR.	14,217	652,517	18,849	376,759
	378,126	10,321,238	335,029	10,666,179
Lehigh Region.				
L. V. RR. Co.	133.789	3,596,205	115.972	4,002,444
C. RR. of N. J.	*	*	*	1,126,889
S. H. & W. B. RR.		132,954		27,839
	133,789	3,729,159	115,972	5,157,172
Schuylkill Region.				
P. & R. RR. Co.	330,362	8,702,888	301,365	7,356,621
Shamokin & Lykens Val.	*	*	*	950,363
	330,362	8,702,888	301,365	8,306,984
Sullivan Region.				
St Line&Sul.RR.Co.	†	54,051	2,089	54,286
Total	842,277	22,807,336	754,455	24,184,621
Increase				
Decrease		1,377,285		

* Included in tonnage of the Philadelphia & Reading Railroad.

† Reports not received.

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

Total same time in 1879.....20,998,046 tons
" " " 1880.....18,417,650 "
" " " 1881.....22,305,590 "
" " " 1882.....23,058,933 "

The increase in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 145,709 tons, as compared with the corresponding period in 1883.

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to October 23d.

Ports.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnston, South Amboy, Hoboken, and Weehawken.
Alexandria	.70@.75		
Annapolis			
Albany			
Baltimore	.58§		
Bangor		1.10	1.00
Bath, Me	1.00@1.05	1 10	1.00
Beverly	1.00@1.10		1.00
Boston, Mass.	1.00@1.15	1.10@1.25	.90
Bristol	1.00	1.10	
Bridgeport, Conn.		1.00	.55
Brooklyn		1.00	
Buffalo, N. Y.			
Cambridge, Mass.	1.10‡		.90‡
Cambridgeport	1.10‡		.90‡
Charleston, S. C.	.75	.65@.70	
Charlestown	1.05@1.10		.90
Chelsea	1.00		.90
City Point			
Com. Pt., Mass.	1.10		.90
E. Boston	1.00@1.05		.90
East Cambridge	1.10‡		.90‡
E. Gr'nwich, R. I.	1.00		
Fall River	.90@1.00		.70
Galveston		2.00	
Gardiner, Me			
Georgetown, D.C.	.75		
Gloucester	1.05@1.10		
Hartford			
Hackensack			
Hudson			
Lynn	1.10@1.25		
Marblehead			
Medford			
Millville, N. J.			
Milton			
Newark, N. J.		1.20	
New Bedford	.90@1.00	1.00	.75
Newburyport		1.20	1.10
New Haven		1.00	.55
New London		1.00	.65@.70
New Orleans			
New-Berne			
Newport	1.00		.70
New York		.90	
Norfolk, Va.	.60		
Norwich			.65@.70
Norwalk, Conn			.55
Pawtucket		1.25	
Philadelphia			
Portland, Me.	.80*	1 10	.90
Portsmouth, Va.	.60		
Portsmouth, N.H.		1.20	1.05
Providence	.90@1.00	1.00	.70
Quincy Point			
Richmond, Va.	.75@.80		
Rockland, Me.			
Rockport			
Roxbury, Mass.	1.00‡		
Saco			
Sag Harbor			
Salem, Mass.	1.10@1.15	1.15	1.00
Saugus			
Savannah		.75@.80	
Somerset	1.00		
Staten Island		1.05	
Trenton		.90	
Troy			
Wareham		1.20	
Washington	.75		
Weymouth			
Williamsbg, N.Y.		1.00	
Wilmington, Del.			
Wilmington, N.C.		.90	
St. Thomas, W. I.			

* And discharging. † And discharging and towing. ‡ 3c. Per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. ** Below bridge.

Vessels scarce, and freights firm.

George W. Jones & Co.

Belvidere-Delaware Railroad Report for the week ended October 18th:

	Week.	Year. 1884.	Year. 1883.
Coal for shipment at Coal Port (Trenton)	4,063	85,322	98,458
Coal for shipment at South Amboy	27,562	506,517	494,393
Coal for distribution	24,025	626.943	659,476
Coal for company's use	3,880	146,162	129,848
Total	59,530	1,364,944	1,382,175
Increase			
Decrease		17,231	

Comparative Statement of the Production of Bituminous Coal for the week ended October 18th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

	1884. Week.	1884. Year.	1883. Week.	1883. Year.
Cumberland Region, Md.				
Tons of 2240 lbs	66,703	2,280,229	57,300	2,029,893
Barclay Region, Pa.				
Barclay RR., tons of 2240 lbs	†	233,125	7,825	256,052
Broad Top Region, Pa.				
Huntington & Broad Top RR., of 2240 lbs	4,004	157,042		148,012
East Broad Top			1,114	34,364
Clearfield Region, Pa.				
Snow Shoe	3,914	144,901	7,243	192,447
Karthaus (Keating)	1,682	40,926		
Tyrone & Clearfield	68,438	2,502,682	58,905	2,242,211
Alleghany Region, Pa				
Gallitzin & Mountain	9,637	314,746	12,398	347,555
Pittsburg Region, Pa.				
West Penn RR.	5,204	222,185	8,482	312,433
SouthwestPenn.RR.	2,132	100.665	4,049	92,267
Pennsylvania RR	6,075	220,830	16,388	490,266
Westmoreland Region, Pa.				
Pennsylvania RR	23,729	1,037,326	30,836	1,105,851
Monongahela Region, Pa.				
Pennsylvania RR	2,713	122,472		
Total	194,231	7,377,129	204,540	7,251,351
Increase		125,778		

Comparative Statement of the Transportation of Coke over the Pennsylvania Railroad for the week ended October 18th, and year from January 1st:

Tons of 2000 pounds.

	1884. Week.	1884. Year.	1883. Week.	1883. Year.
Gallitzin & Mountain (Alleghany Region)	2,998	108,171	708	63,363
West Penn. RR		24,865	2,693	83,069
Southwest Penn. RR.	32,133	1,716,865	40,745	1,681,163
Penn. & Westmoreland Region, Pa. RR.	4,611	154,814	3,388	175,614
Monongahela, Penn. RR	1,400	59,087		
Pittsburg Region, Pa. RR		136	2,885	9,422
Snow Shoe (Clearfield Region)	590	18,371	300	14,513
Total	41,732	2,082,309	50,719	2,027,744
Increase		54,565		

† Reports not received.