

## ENGINEERING and MINING JOURNAL.

VOL. XXXI. No. 21.

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SUBSCRIPTION PRICES, including postage, for the United States and Canada, \$4 per annum; \$2.25 for six months; all other countries, including postage, \$5.00 = 20s. = 25 francs = 20 marks. All payments must be made in advance.  
REMITTANCES should always be made by Post-Office Orders or Bank Drafts on New York, made payable to THE SCIENTIFIC PUBLISHING COMPANY.

THE SCIENTIFIC PUBLISHING CO., PUBLISHERS,  
27 Park Place, New York.

## CONTENTS.

EDITORIALS :	PAGE.		PAGE.
Messrs. Nathan & Dreyfus.....	347	Strike at the Dennisville Zinc-Works.....	354
Canada and Newfoundland Mines.....	347	Fatal Sulphur Explosion.....	354
Prof. Henry W. Adams, Master of Arts.....	347	Mining Suit.....	354
Oxide.....	348	Strike on the Delaware & Hudson Canal.....	354
President Morton's Gift.....	348	A Deadwood Railroad.....	254
Statement of Anthracite Coal Ton- nage for Month of April, 1881, Com- pared with Same Period Last Year.....	348	A Quick Steamer Passage.....	354
New Publications.....	349	Sale of a Land-Grant.....	354
The Antimony Deposits in Sonora.....	350	Colorado Mining and Industrial Ex- position.....	354
Central Arizona.....	350	New Atlantic Cable.....	354
Taxing Corporations.....	350	GENERAL MINING NEWS :	
The Manufacture of Charcoal in Kilns.....	351	Arizona.....	355
Technical Education.....	352	California.....	355
Chicago Coal Receipts and Shipments, Jan. 1 to May 17, 1881.....	353	Colorado.....	355
PROGRESS IN SCIENCE AND THE ARTS :		Montana.....	355
The Monetary Conference.....	354	Nevada.....	355
The "Cry of Tin".....	354	Utah.....	355
Fossil Plants and Animal Forms in Meteorites.....	354	PROPOSALS AND SALES.....	356
Iridium in Oregon.....	354	FINANCIAL :	
The New Electric Railroad.....	354	Gold and Silver Stocks.....	356
The Saint-Gothard Railroad.....	354	Philadelphia Mining Stocks.....	359
Transforming Old Rails into New.....	354	Copper and Silver Stocks.....	359
The Distribution of British Pig-Iron.....	354	Coal Stocks.....	359
NOTES :		BULLION MARKET.....	360
Mining Troubles in Ohio.....	350	METALS.....	360
The Mont Ceniz Tunnel Railroad.....	353	IRON MARKET REVIEW.....	361
		COAL TRADE REVIEW.....	361
		STATISTICS OF COAL PRODUCTION.....	362
		FREIGHTS.....	362
		ASSAY DEPARTMENT.....	356

THE mines in Canada and Newfoundland are at last receiving considerable attention. They are drawing to their aid a large amount of capital, as well as the very necessary adjunct, practical mining experience, for the development of their vast mineral resources, both from England and the United States. The constant transfer of mining estates, noticed in our columns of late, many of which have for years been but monuments of past folly, clearly shows the activity which prevails. Nova Scotia seems to be taking the lead with her numerous rich gold-quartz districts, and the alluvial district of the Chaudière, in the Province of Quebec, is not far behind in the attention it is receiving. Copper-mining in the Eastern Townships, principally in the neighborhood of Sherbrooke, Province of Quebec, is an accomplished fact, and is showing satisfactory results.

Considerable attention is also being paid to the phosphate of lime properties on either side of the Ottawa River, as well as to asbestos and plumbago. The rich iron-deposits of the Laurentian system, stretching from Hull, Province of Quebec, to Madoc, Ontario, and the west, are much sought after and are being practically worked, the ores being shipped to the United States in considerable quantities. North of Belleville, Ontario, gold again comes to the front in the Marmora and Madoc districts, where is situated the Canada Consolidated Gold Mining Company's property as well as other smaller concerns. The building of the Canada Pacific Railroad will, no doubt, in due time have its effect on the mineral wealth of the north shores of Lakes Huron and Superior, and eventually British Columbia. Already one large new company has been organized in England to work the native copper deposits on Michipicoten Island.

We shall shortly publish in the ENGINEERING AND MINING JOURNAL an account, compiled from official sources, of the active mining operations which have been carried on in Canada for the past two years. We heartily wish our northern cousins success in their ventures; and if they only keep well in view the follies of the past, which put back mining in Canada nearly twenty years, we have no doubt they will meet with a fair measure of success.

PROFESSOR HENRY W. ADAMS, Master of Arts, Doctor of Medicine, Doctor of Laws, Superintendent of Public Schools in two States, author of many scientific books, patentee of more than one hundred inventions (including a compound steam-engine "now in use on all the sea-going

vessels of the world, doubling the steam-power and saving half the fuel"), builder of forty-four complete sets of the finest and most successful works in the United States, discoverer of many valuable fluxes, constructor and manager of large iron blast-furnaces in Pennsylvania, and President and Superintendent of the Adams Mining and Reduction Company, of Charlotte, N. C., was the subject of our comment in the ENGINEERING AND MINING JOURNAL of April 30th. Our text was an account published in the *Charlotte Observer*, calling attention to the advertisement of the company, describing its works, and enumerating the claims to confidence of Professor ADAMS. Both the advertisement and the article recommended the stock for purchase; and the article in particular recommended it to poor men, because of its low price. We treated this publication with deserved ridicule; and we warned the public that, whatever might be the facts not set forth in the statement, the statement itself contained many things calculated to raise suspicions that Professor ADAMS is not a competent metallurgist, and that his scheme has no prospects of success. At the same time, we offered to publish any proofs that he might offer to the contrary.

He has chosen another course, and has published in the *Observer* a reply four columns long, in the form of a personal letter. It is intended to be scathing; and if red-hot rhetoric could take the place of arguments and facts, it would be conclusive. We are accused of "lending ourselves to the agents of SATAN;" of entertaining a "cordial hatred of the South, its public men, and all efforts to develop" its mineral wealth; of not understanding orthography or grammar; of "writing in a dungeon of ignorance," and "bound to strike with any concealed weapon we could employ" (though what harm a man in a dungeon could do to a man out of it by striking him with a concealed weapon, it would take a "Superintendent of Public Schools in two States" to discover); of sarcastic sulks and vindictive venom; of cowardice, scurrility, distempered soul, and other things too numerous to mention; and, after being informed that "an inflexible will, guided by wisdom and aided by JEHOVAH," is on the side of the Adams Mining and Reduction Company, we are left "to the judgment of mankind." We venture to observe that we seem, then, to be left about where we were before.

The Professor is angry; but that will not prevent us from doing him justice. Ignoring his frenzied epithets of personal abuse, we shall answer the two main questions which he asks, to wit, What made us write the article which he denounces? and, What grounds had we for suspecting him or his enterprise?

The Professor is entirely mistaken in supposing that we were instigated by "base allies," or SATAN, or personal malignity, to criticize the statement by which he and his company were apparently trying to sell stock to poor men. That statement was addressed to the public; it was a legitimate subject of comment for a technical journal; and it was of itself instigation enough. Professor ADAMS now explains that no stock has really been sold in North Carolina; that he owns the majority of the stock himself; and that if there is a share in the United States for sale, he is ready to "buy it and pay cash for it, at double the price it cost the owner." But he does not say that no stock was offered for sale in the statements upon which we commented.

Now as to our suspicions, based upon those statements. In the first place, the ridiculous description of Professor ADAMS's qualifications, which he now adopts as his own, was suspicious. We did not pronounce it false, though we did consider it highly-colored. Those numerous scientific books which he has published, and that compound engine "used on all the sea-going vessels of the world," and quadrupling their economy, aroused some incredulous astonishment; the forty-four most successful smelting-works we couldn't quite accept; and other items in the list were a trifle strong. It did seem that if ADAMS had done all that, we, who try to keep the run of scientific publications and engines and smelting-works, ought to have come across some traces of him. But apart from the last particular, the category is not one to inspire confidence in him as a metallurgist. Great performances in law, medicine, literature, and education take time; and two years' travel in Mexico and the West do not constitute an entire training in metallurgy; nor is a knowledge of the steam-engine, or a practical experience in iron blast-furnaces, a sufficient preparation for a different branch of engineering and metallurgy. Moreover, a professional inventor is apt to be too ready to use his own inventions, and to introduce experimental methods and machines into an enterprise of which he has charge.

These "suspicions" are strengthened by the nature of the process which this company proposes to adopt. It is based on the patents of Professor ADAMS, concerning the details of which we offer no criticism. But we notice that he proposes first to roast, then pulverize to flour, then concentrate to one fourth, then ball with fluxes, and then smelt with copper or lead-ores. Now, whatever his apparatus for concentration, it doubtless acts through the specific gravity of the materials concentrated. To roast iron-sulphurets, having high specific gravity, is to transform them more or less completely into oxides, having a lower gravity; and to reduce the roasted material to flour before concentrating, is to put it in the shape in which concentration is most expensive and involves the

highest losses. That is to say, experience has shown that a combination of jigs and slime-tables, with suitable arrangements for sizing, is a much better way to concentrate ores than the reduction of all the ores at once to the finest grain. Professor ADAMS roasts before pulverizing to reduce the cost of the latter operation. We think the system will occasion far more loss in other ways than it can offset by gain in this particular.

As regards his smelting-furnace, judging only by what he and his organ have said about it, we find it to resemble an iron blast-furnace, only that it is provided with an arrangement for introducing a powerful hot blast two feet above the tuyeres. This is the peculiarity which we think a blunder. The absurdity of having the blast either powerful or hot for smelting mixtures of lead ore will appear at once to any metallurgist; and the introduction of blast above the tuyeres, except as a desperate remedy in case of scaffold, is condemned by general experience even in iron metallurgy. Moreover, the claim of Professor ADAMS that this furnace is so constructed that it can smelt successfully "iron ores, copper ores, or gold-bearing sulphurets, mixed with argentiferous galena or other base metals," is suspicious. The art of metallurgy does not present such panaceas, good for every thing. The best furnace for a given operation and material is not the best for others; and when it is claimed for an apparatus that it will do every thing, experts are tempted to think it will more probably do nothing.

Professor ADAMS proposes to smelt his roasted and concentrated iron sulphurets in mixture with other ores containing base metals, especially argentiferous galena. He says this is the process that HILL and BALBACH and Swansea employ, and every assayer on the planet adopts. As a matter of fact, HILL's works do not smelt with galena, nor do they smelt in shaft-furnaces at all. But there is no doubt that with a sufficient supply of galena, in properly-constructed furnaces and under the direction of a competent metallurgist, this process might be technically successful in North Carolina, as it has been elsewhere. We have expressed some doubt as to the supply of galena available in North Carolina at present. A good many smelting-works have been started in this country, on the faith of sanguine expectations of abundant galena-supply, to fail partially or wholly when these expectations have been disappointed. Professor ADAMS's apparent intention to run his patent furnace on something else, if he can't get galena, is not an encouraging symptom.

Professor ADAMS has a good deal to say about chlorination, concerning which we need only remark, first, that there never has been an instance in history of the abandonment of that process by reason of its unhealthiness. We have never heard of a death occasioned by the gas from chlorinating-vats. The objection is trivial and futile. Secondly, the process can be executed in the South to-day, for less than \$15 per ton, including roasting, on crushed and concentrated sulphurets. Whether Professor ADAMS can do as well with his more complicated system, remains to be seen. The difficulty heretofore has been to get a sufficient supply of auriferous sulphurets at any one point. When that point is provided for, chlorination is quite likely to compete successfully with smelting.

We might go on to present other considerations suggested by the fragmentary information which we can pick out of the Professor's flood of personal denunciation. But the data are too meager for thorough discussion. Notwithstanding the Professor's assertion to the contrary, we have no animosity toward him. He may be more practical and less pretentious than his self-laudations indicate. Many men are respectably efficient in business, who make fools of themselves when they lose their temper and rush into print. We give him the benefit of this feeble doubt; and when by reason of, or in spite of, his patents and accomplishments, the Adams Company shall prove successful, we will make haste to chronicle the fact, and give the credit where it is due.

Meanwhile, we advise the Professor to save his heat for his furnace, to study the distinction between controversy and fury, and in particular to suppress the zeal of a friend of his, who has been foolishly writing to parties in New York for "confidential" information to be used in attacking the character of the Editor of this paper. A letter now in our possession would furnish amusing matter for comment; but, as it bears internal evidence that it can not have been revised by the "Superintendent of Public Schools in two States," we forbear to make him responsible for it. He has generously shouldered the *Charlotte Observer*, and indorsed its syntax; who knows what his chivalry might not lead him to adopt and defend, in the letter of his friend? No, we will reserve that for the present; though indeed, in the words which Professor ADAMS pronounces perfect English, it is "the richest of any."

**Oxide.**—Professor ADAMS says: "As to WEBSTER, the recognized authority of the English language. . . . Your spelling would be very much improved by sitting down at WEBSTER's feet and learning how to spell *oxyd*. This word is derived from the Greek, and should be spelled with a *y* instead of an *i* without an *e*. A classical scholar may be known by his spelling." "An *i* without an *e*" seems to be a good enough vowel in its place, and has served writers of grammatical English for a long time, whatever difficulties it may now have for "classical scholars." Perhaps

Professor ADAMS meant to say, *oxyd* without a final *e*; or *d* without a final *e*; or something else without something else. Perhaps—but let us see what advantage Professor ADAMS has derived from "sitting down at WEBSTER's feet." After a fearful amount of leaf-turning, we have found the place. Mark how "the recognized authority of the English language" confounds Dr. RAYMOND and the poor proof-reader:

"**Oxide**, *n.* [Fr. *oxide*, *oxyde*. . . . The French word was correctly spelt with *i* instead of *y* in the second syllable, till about the year 1840, when, in ignorance or forgetfulness of the true history and composition of the term, the orthography was changed to make it represent the *v* of the Greek word  $\delta\acute{\xi}\nu\varsigma$ , from which it was supposed to be directly derived.] . . .

"This word has been variously written *oxide*, *oxyd*, *oxyde*, and *oxid*. It was introduced into the present system of chemical nomenclature by Guyton de Morveau in 1787, and was by him and his associates of the French Academy spelled *oxide*, the first syllable of Fr. *origène*, or *oxygène*, being prefixed to the last syllable of *acide*. . . . The same termination, as indicative of combination, is added to the first syllable or syllables of the names of other elements. Thus, from *chlorine*, . . . we have . . . *chloride*. . . . These words, and others formed on the same analogy, are often spelled without the final *e*, and some writers have therefore omitted the *e* from *oxide* also; but this form of the word (*oxid*) is very unusual. From an oversight of the history and true composition of the term, many have been led to write a *y* instead of an *i* in the last syllable, *oxyd* or *oxyde*, as if the *y* were necessary to represent the *v* of the Greek  $\delta\acute{\xi}\nu\varsigma$ ; whereas, in the original formation of this word, no immediate reference was had to the Greek, as has already been shown. Besides," etc. "The orthography *oxide*, or *oxid*, is, therefore, both historically and etymologically, to be preferred; and not only so, but it is better supported by usage than *oxyd* or *oxyde*, being the form of spelling adopted by the great majority of chemists and scientific writers both in England and America."

If Professor ADAMS is satisfied with the citation from the authority to which he appealed, let us continue to 'sit down at WEBSTER's feet.'—THE PROOF-READER.

#### PRESIDENT MORTON'S GIFT.

We publish this week an account of the proceedings last Saturday, at the Stevens Institute of Technology, when the new workshop of the Institute, fitted up at the private expense of President MORTON, was by him formally presented to the Trustees. The shop has in fact been for some time in use, convenience having dictated a postponement of the inaugural ceremonies. Its real dedication, therefore, took place as soon as it could be occupied—the best kind of a dedication, we should say, for any human institution. As a consequence, the guests of President MORTON were able to see last Saturday not only a beautiful, complete, and well-arranged shop, but in connection with every machine and tool the proofs of its successful application to practical instruction, in the form of work already done with it, by the students of the Institute. President MORTON's gift, though not so large, measured in money, as many endowments and bequests of which we hear from time to time, is most liberal as coming from a professional man of modest means; and the wisdom which he has shown in the expenditure of the money has made it go a good deal farther than a greater sum, less intelligently applied. Under the enthusiastic and skillful direction of Professor DENTON, we look to see the new workshop accomplish important results. In the five years that have elapsed since the memorable Philadelphia debate on Technical Education, the advocates of simultaneous training in shop and school have done much to show that method a good one. With its present equipment, the Stevens Institute takes a front rank among them. \*

#### STATEMENT OF ANTHRACITE COAL TONNAGE FOR MONTH OF APRIL 1881, COMPARED WITH SAME PERIOD LAST YEAR.

	April, 1881.	April, 1880.	Difference.	For Year 1881.	For Year 1880.	Increase.
Ph. & Reading RR. . .	480,601 02	539,709 05	D. 59,108 03	1,805,010 05	1,698,228 05	106,782 00
Lehigh Valley RR. . .	403,682 03	387,101 19	I. 16,580 04	1,598,317 15	1,236,272 17	362,044 18
Cen. RR. of N. J. . . . .	274,112 10	307,940 02	D. 33,829 12	1,171,889 14	1,018,044 08	153,845 06
Del., L. & W. RR. . . . .	286,483 13	279,439 09	I. 7,044 04	1,278,836 02	1,082,108 11	196,727 11
Del. & Hud. Can. Co. . . . .	197,192 18	228,481 07	D. 31,288 09	961,473 10	898,118 16	63,354 14
Pennsylvania RR. . . . .	187,674 10	136,549 00	I. 51,125 10	628,753 10	444,524 14	184,228 16
Penn. Coal Co. . . . .	87,952 09	100,279 07	D. 12,326 18	374,384 10	326,176 10	48,208 00
N. Y., L. E. & W. RR. . . . .	28,156 00	37,139 17	D. 8,983 17	143,850 19	120,924 11	22,926 08
Total. . . . .	1,945,855 05	2,016,640 06	D. 70,785 01	7,962,516 05	6,824,398 12	1,138,117 13

The stock of coal on hand at tide-water shipping points, April 30th, 1881, was 528,198 tons; on March 31st, 1881, 563,063 tons; decrease, 34,865 tons.

The above statement has been furnished by Mr. JOHN H. JONES, accountant. It shows that there was a little smaller production in April this year than during the same month in 1880. The Pennsylvania Railroad shows an increase of 51,125 tons over April of last year, which is an evidence that it is doing quite a large business, and paying no attention to the combination curtailment. It is, however, only following the policy which it pursued all of last year.

The production for the first four months of this year shows an improvement over last year of 1,138,118 tons, and aggregates 7,962,516 tons, or at the rate of nearly 24,000,000 per annum. This is a very large production to occur in the earlier months of the year, especially with so favorable an exhibit as but 528,198 tons of coal on hand at the end of the month. The stock of coal actually reduced 34,865 tons during April must be to most of the trade a very agreeable surprise.

## NEW PUBLICATIONS.

UNITED STATES MINERAL LANDS; *Laws Governing their Occupancy and Disposal; Decisions of Federal and State Courts in Cases arising thereunder, and Regulations and Rulings of the Land Department in Connection therewith; with Forms, Glossary, and Rules of Practice.* By HENRY N. COPP. Washington. 1881. 8vo, 560 pages. (Index.)

Mr. COPP is already well known as the editor of the *Land Owner* and compiler of several valuable works of reference on U. S. mining law. The present volume, after a brief prefatory account of the federal legislation on this subject prior to the famous Act of July, 1866, is devoted to that and subsequent statutes and decisions, affecting the legal status of the mineral lands of the public domain and of their occupants, tenants and purchasers, down to the date of its going to press. In Part I., the separate Acts and the corresponding sections of the Revised Statutes are given in full; Part II. presents the Land Office Regulations; Part III., the rulings of the Land Department, which, although they do not carry full judicial force, are nevertheless binding in some respects upon the government and the citizen; and are necessary to be known by the latter; Part IV. cites leading judicial decisions; and Part V. contains a considerable amount of valuable miscellaneous information, including the code proposed by the late Public Land Commission, a series of excellent rules for the examination of titles, and a glossary of mining terms by R. W. RAYMOND, which is the same as that recently published by the Institute of Mining Engineers, with the exception of the metallurgical terms in the latter, which are here omitted.

Under the title *Judicial Decisions*, the Flagstaff decision of the U. S. Supreme Court; the Eureka decision of the Circuit Court of Nevada (just affirmed by the Supreme Court); the Supreme Court decision in *CAMPBELL vs. RANKIN* (a Montana case, involving the effect of mining district records); two of Judge HALLETT's Colorado opinions (bearing upon the application of the Revised Statutes to the Leadville formations); the decision of Judge SAWYER in the *420 vs. Bullion* case (covering, among other things, some of the relations of location to patent); the important Gold Hill Quartz case, in the Oregon Supreme Court (settling several questions of agricultural and mining titles in conflict); the U. S. Supreme Court decision in the *Ivanhoe-Keystone* case (school-sections, and their mineral deposits); the same in the *HEYDENFELDT-DANEY* case; Judge HALLETT's charge in one of the Leadville town-lot cases; the U. S. Supreme Court decision in *FORBES vs. GRACEY et al.* (as to the taxable nature of extracted ore as personal property); the same in *TITCOMB vs. KIRK* (water-rights) and in *MORTON vs. NEBRASKA* (salines) are given at length, and a larger number of others in digest. We are sorry not to find among the former the excellent charge of Judge HALLETT in the second trial of the *Iron-Luella* case at Denver, or the charge of Justice MILLER in the *Grand View* case. But we must not expect every thing; and what we have before us here is certainly valuable enough to arouse gratitude and almost to silence criticism. Having on a former occasion denounced Mr. COPP for publishing a book without an index, we take special pleasure in acknowledging the completeness of the index to the present volume, which is thereby rendered as convenient as it is indispensable to those concerned in mining titles. Things indispensable are not always convenient. On the contrary, the thought that the public *must* buy a book sometimes renders the maker of the book indifferent to those laborious finishing touches which would perfect and recommend it. When a book is so well done as to be attractive to those who do not need it, those who do need it may well give thanks. \*

STATIONARY ENGINE DRIVING: *A Practical Manual for Engineers in Charge of Stationary Engines.* By MICHAEL REYNOLDS, Member of the Society of Engineers. With Numerous Illustrations. London: Crosby Lockwood & Co. 1881. 12mo, 267 pages. (Index.)

Mr. REYNOLDS is known as the author of two other works of similar character, devoted to locomotive-engines and engine-driving. Having served as apprentice in the shop, and enjoyed a long and varied practical experience, he knows what is needed in the way of plain and useful instruction for workmen; and he supplies this need in a manner creditable to his literary skill. After two introductory chapters, giving account of the history and classification of steam-engines and boilers, and of the properties of the materials out of which they are made, he proceeds to describe, as the most complete example of the stationary type, the condensing beam-engine, explaining its details in a clear and simple way. Similar discussions of the Cornish pumping-engine, the horizontal engine, compound engines, and Cornish, Lancashire, and Galloway boilers follow; after which, the multifarious duties of the engine-driver are admirably set forth. Inspecting, oiling, starting; the management of the fire and the feed-water; the prevention of failures and explosions; the use of the indicator and the meaning and discussion of indicator-diagrams, are treated with abundant fullness, and in a manner which, while it is calculated to suit the unlettered workman, can scarcely fail to interest also the skilled engineer.

We quote, as a sample of the more familiar style, the following paragraphs from the chapter on "Failures of Engines:"

"An engine-man broke in halves the beam of an engine of 80 horse-power by

allowing the injection-water in the condenser to augment until it entered the cylinder. The water, being incompressible, resisted the 'down' stroke of the piston; the momentum of the fly-wheel resisted the 'up' tendency of the water; consequently, the weakest point between the crank-shaft and the condenser was found in the center of the beam, where it parted, and it came down with a great crash to the floor. This accident was caused soon after starting, by not so regulating the supply of water to the condenser that the air-pump could discharge it into the hot-well.

"An engine-man broke a beam in halves, not noticing that the foot-valve of the condenser was out of order, which disabled the pump.

"An engine-man broke a beam by allowing blocks of wood to lie about the engine-house, until they were accidentally knocked into the pit of the fly-wheel, where they glided between the rim of the wheel and the masonry, forming a kind of break-lock against the steam on the piston.

"An engine-man blew an excessive quantity of steam through the cylinder-jacket, and so heated the water in the condenser that it caused the air-pump bucket to expand, and created sufficient friction to bend the pump-rod.

"An engine-man, by not blowing sufficient steam through the jacket, split the cylinder by admitting steam into it before its temperature had been sufficiently raised.

"An engine-man started his engine without examining it properly, causing some waste to be the means of breaking a pair of geared wheels which incurred an enormous amount of delay and expense to the proprietor.

"An engine-man, getting the chill off a slide-bar and slide-block, caused them to expand and attempt to grip. The slide-bar seized down upon the block, and the block seized up to the slide-bar. After he had oiled it, it did not appear to improve, the two faces fitting so closely as to exclude even a film of oil; and the engine was compelled to run at half-speed for a time. This mishap was caused through the refuse in the oil blocking up the pores in the worsted trimming, and thus preventing the oil from lubricating the bearing.

"An engine-man allowed the lid of an oil-box to fit air-tight, and consequently the trimming would not act properly. He retrimmed it, and still the bearing would get hot; he altered the trimmings several times, but his efforts were of no avail. The mill, however, had to be kept going to finish some important work; and by the end of the week, the journal and the brass were considerably cut. The engine was, of course, delivered over to the engine-maker for repairs. It may be asked how it was that the lid became tight so suddenly. We have simply to refer to the fall of the lid of the box on to the edge every day, by which the inequalities on the two faces were smoothed away, in time making a perfect air-tight joint, excluding the air from forcing the oil down the worsted pores; and therefore, if a box was full of oil and the lid was air-tight, the journal would run without obtaining any oil. Scores of journals run hot through the boxes being air-tight; and the remedy is seen too frequently applied in the wrong place, namely, by filing a notch in the box edge. Sometimes this is made sufficiently deep to make it impossible for the fall of the lid to obliterate it; but even then, there is danger of its becoming air-tight, especially when tallow is mixed with oil. The proper way is to admit the air through the center of the cover by a hole, in which a small piece of sponge should be placed to prevent the dust of the engine-house entering the box and clogging up the siphon-  
cup.

"An engine-man took his feed-water from a brook, and allowed some chips to enter the engine-well, which were drawn up the suction-pipe into the pump, and, getting under the clack, disabled it. Time was lost in attempting to get the clacks to fall by pouring cold water upon the pump, to condense the steam under the valve. Sometimes valves are held up by the steam in this manner, when they are seated too high and require lowering. The boiler becoming short of water, the engine had to stop; and the top clack being up, the second clack could not be examined, so that the steam had to be blown off from the boiler and the works stopped, by the absence of a strainer in front of the well, and by want of a head that could see the chips floating in the brook and the same chips underneath the clacks.

"An engine-man was short of steam, and was not able to pump a sufficient supply of water into a large tank. Complaints were made, and he had the affair in his own hands. But the pumping did not improve, and the man stated it was all the fault of the boiler; and when the boiler was inspected, it was found that the brick-work all around the front was broken, and therefore it was drawing air there. So soon as this was mortared up and made air-tight, the draught in the chimney was restored. The fire depends upon the chimney-draught, and not upon air that can steal into the flues through dilapidated mortar and masonry.

"An engine-man became short of steam through allowing the flues to be choked up with soot.

"In consequence of an engine-man not looking after the cleaning of his boiler, it was made up with stone deposit.

"In consequence of an engine-man not making examination before making a fire under a boiler, he burned it, by its being short of water. The boiler had been filled up overnight, but it had sprung a leak, no doubt through the sudden contraction of the plates at the time, or after the fire had been drawn, and through the fire-door being open and the damper up.

"An engine-man washed a boiler out, and filled it with water again, and the next morning he made the fire up in the usual way. After a little while, when he began to think the steam should appear, he perceived something smoking on the top of the boiler, which he found to be an old bag, and directly afterward he found the flue red-hot. Where could the water have gone? It went out through the blow-off cock, which was not shut close. All blow-off cocks should be carefully watched, because they may sell a man at any time when he least expects it, through ordinary wear and tear.

"An engine-man was blowing steam out of two boilers into a third, in order to have the third in working order quickly. When he considered that there was sufficient in the third boiler, he shut the communicating stop-valve suddenly, and burst the other two. When steam is stopped in its motion, it will of course rebound like any thing else—like a stone, if you will, or a shot.

"The force of elasticity produces motion in the steam, and it has a tendency to continue that motion until acted upon by some extraneous force. As soon as the stop-valve was shut in the instance referred to, the current of steam toward the valve was momentarily accumulated upon the valve, and the pressure correspondingly increased. The result was, that the current of steam reacted into the boiler, bringing to bear sufficient power and pressure upon the water to burst the boiler.

"An engine-man, by opening a stop-valve suddenly, split a large steam-pipe, and consequently disabled the engine for two days, there being no spare elbow, and there was nothing else to do but to wait for one from the foundry."

A handsome steel portrait of JAMES WATT constitutes the frontispiece of the volume, which is, moreover, in point of paper and type, and, so far as we have observed, in proof-reading also, highly to be commended. The index might have been more detailed with advantage. It is now little more than an alphabetic rearrangement of the table of contents.

Although a good many common American forms of engine and boiler are not mentioned in this book, the principles which it enforces are applicable to them all in so great a degree as to make it a thoroughly useful and welcome manual in this country as well as Great Britain. \*

## THE ANTIMONY DEPOSITS IN SONORA.

Written for the Engineering and Mining Journal by James Douglas, Jr.

A short range of mountains, the Sierra del Alamo Muerto, skirts the eastern shore of the Gulf of California at about thirty miles from the Gulf and fifty miles from El Altar. In its recesses are several silver ledges, which have been worked from time immemorial by the Mexicans, and have recently passed into American hands. The most notable is the San Felix, which has been burrowed into to a depth of 700 feet on the incline.

On the northern flank of the range, an area of considerable extent is strewn with quartz and a heavy yellow mineral. This is said to have been long ago amalgamated for silver, but to have yielded so base an amalgam (perhaps from the presence of a little native antimony) as to have been rejected as a silver ore; and its true character seems to have been either overlooked or mistaken until recently. Samples were sent to England and the value of the mineral as an ore of pure ore oxide of antimony was at once recognized there. Shortly after that, Professor Cox, late of the Indiana Survey, made arrangements with the owners to ship the ore for treatment to works he has since erected in Oakland, Cal.

There appear to be three systems of veins within an area of about four square miles.

First. The most northerly group, the San José, was (when I was there last winter) the most productive in antimony; but it carried no silver. Bodies four feet wide, of almost pure oxide of antimony, were exposed. A schooner-load had already been shipped, and large quantities of ore awaited transport.

Second. The Santa Margarita group lies between the preceding and

Third. The Argentine group.

Both the second and third are silver-bearing; but the first was, where opened, during my visit, richer in antimony than the latter; but later developments make the outlook for antimony in the Argentine as good as in the Santa Margarita.

A shallow shaft—20 feet deep—was sinking on the Margarita, which in the bottom exposed a mass of pure oxide of antimony, four feet wide. The ore is of a light yellowish-green color, irregularly jointed, and breaks with a rough conchoidal fracture. The silver appears to coat the joints only, and not to permeate the mass of the ore; and seems to exist as chloride and iodide. The silver contents are said to be \$125 per ton. I should consider that a very moderate estimate, as on the pile at the mouth of the Santa Margarita shaft it was difficult to find a lump whose joints were not more or less stained with silver; while many were thickly covered. Since then, work has gone on actively on all three groups of lodes. On the first, the ore-bodies have been developed to a depth of 72 feet; on the second, to a depth of 70 feet; and on the third, to a depth of 118 feet; with no signs as yet of change in the character of the ore or average size of the ore-bodies, which, however, have never exhibited great uniformity in width.

Two schooner-loads have, I believe, been shipped since my visit; and it is estimated that 5000 tons of ore have been exposed by the superficial explorations recently made.

## CENTRAL ARIZONA.

## EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The absence of maps on a large scale of the mining districts of this section makes it difficult to outline the geology; and the only way to acquire a knowledge of how the various belts run is by becoming thoroughly familiar by frequent rides across the country. This is not so very easy to do, as the hills are so many, high, and steep and many of them are covered with forest. With good topographical maps, we could soon become acquainted with the relations between the mineral belts in passing from one district to another. From Prescott southward for some miles, we have a granitic country in which many quartzose veins have been discovered, mostly carrying gold, free at the outcrops, but soon changing to base ores in depth. Many of the veins are said to be rich; but the want of sufficient means for the erection of proper reduction-works has left them comparatively undeveloped. Two gold-mills were put up some years since, but were burned down after a comparatively short run. All the streams crossing these granitic rocks have been placed more or less, and ore got, where there is sufficient water for that purpose.

There is an abundance of wood, and there are many never-failing springs, so that no doubt the time will come when the veins will be extensively wrought. This section is comparatively level, rising gradually southward to the mountain range in which are situated the Lynx Creek and Hassayampa mining districts. Some have tried to separate these mountains into ranges or chains; but as yet I fail to see any order or regularity in them. To me, it looks like a perfect net-work of hills, mountains, and peaks, from the granite district of Prescott southward to the deserts of the Gila, and between the Aqua Frio and Hassayampa rivers. The coursing of the rocks is somewhat east of north and west of south; but the ridges run every which way. For this reason, I say it is difficult without a map to connect the various districts geologically or mineralogically. We know something of the relation between the Lynx Creek and Hassayampa, because the great Senator lode has been traced from one to the other, a distance of over six miles; but further than that we can say but little. We know that we have rich and poor belts succeeding each other; but as all roads, trails, or streams are so very crooked, it would take a good deal of examination and measuring to give the width of each. Few if any of the belts can be said to be really barren of mineral, but are sufficiently so to offer no inducement to the prospector. The good belts are sufficiently distinct in the character of the ores to be recognized by the experienced explorer. For example, in some the gold and silver are in intimate connection with sulphurets of iron, copper, zinc, and lead, with more than a sufficiency of arsenic and antimony; in another, gold-bearing sulphurets of iron predominate; another, rich argentiferous galena ores, with some gold; another, sulphurets of silver, with some chlorides; and still another, containing a much larger proportion of chlorides. The difficulties on account of the topography of the country are so many that I fear it will take a long time before we have a thorough understanding of the whole district. This is all very interesting to the scientific man, but I think is little thought of by the practical miner or explorer.

He goes for the vein where he finds it, on the same principle as the one who, when told he had found no walls to his lode, said he was "not looking for walls, but for mineral." It will, however, have to do with the question of the erection of reduction-works for a neighborhood, and is therefore of great value and interest, as these are what are wanted. This brings me to the closing sentence of my last letter.

The first mills erected were for the working of free gold ores. Sulphurets that were encountered went to waste, until they so largely predominated as to make it no longer profitable. In many cases, small Mexican furnaces were resorted to; but they have met with the same fate, with one exception, the Silver Belt mine, which has done very well for the owners. What percentage of the precious metals is lost in this case, I am unable to say; but enough is gained to apparently satisfy the owners.

A water-jacket furnace, of 15 tons capacity, is now in course of erection in the Lyons Creek District, for the purpose of smelting gold and silver-bearing iron and lead sulphurets. It is expected to be in blast next month.

In the Bradshaw Mountains, three silver mills have been built and successfully run: the Peck, Tiger, and Bradshaw Basin. Of these, the latter is the only one at present in operation, working the ores of the Silver Prince and Black Warrior mines. The Peck has been idle for about two years, on account of lawsuits; and the Tiger is expected to start again shortly. The ores treated are the chlorides and sulphurets of silver. Another mill is in course of erection for the Tuscumbia mine. The ores are similar to the last mentioned. Still farther south, is the Tip-Top mill, at Gillette, of the same character as the above mentioned.

At each of these mills, the ores are roasted and chloridized in a White & Howell rotary furnace. There are a few small gold-mills scattered through the district, and a great number of arrastras driven by steam or mule-power. To this last might be added a number of unsuccessful attempts to introduce *short-cut* methods; but it will not be necessary to refer to them. They are monuments which the stranger interprets to mean that the *mines* are worthless, and have therefore done much harm to the country. It is to be hoped that they will belong only to the past, and that in the future we shall profit by the experience of the other territories for the treatment of similar ores. YAVAPAI.

PRESCOTT, May 9.

## TAXING CORPORATIONS.

The *Tribune's* correspondent, writing from Albany under date of May 11th, says:

"The chief bill of the Governor's Tax Commission and the Joint Committee on Taxation passed the Assembly to-day. This was the bill for the taxation of the franchises and business of all kinds of corporations. It is in effect a bundle of amendments of the corporation tax law of last year. They will also extend the range of that law over several other corporations. No kind of corporation is excepted from the provisions of the bill except life insurance companies and mutual benefit societies, which are reached in a different manner. The franchises are taxed on a sliding-scale, proportionate to the business of the corporations owning them. For instance, if the yearly dividend of any corporation amounts to 6 per cent on the par value of its capital stock, the tax is to be at the rate of one quarter of a mill upon the capital stock for each 1 per centum of the dividends so declared; or if no dividend is made or declared, or if the dividend does not amount to 6 per cent upon the par value of the capital stock, then the tax is to be at the rate of  $1\frac{1}{2}$  mills upon each dollar of a valuation of the capital stock. Each insurance company, except life insurance companies, is to pay a tax on its corporate franchise at the rate of  $\frac{3}{8}$  of 1 per centum upon the gross amount of its premiums.

"Provisions are made for the enforcement of the law. The eighth section declares that the corporations mentioned in the act are hereafter to be exempt from assessment and taxation for State purposes, 'except upon their real estate,' and as provided in the act.

"The eleventh section of the bill met with a violent reception to-day. It was inserted because of the persistent lobbying of the president of one of the New York City street railroads, who had happened to pay for his franchise. He desired to have his road exempt from taxation to the amount paid for the franchise. To do this, he fairly turned the tax bill topsy-turvy, involving the taxation of millions of property. So strangely also was this eleventh section drawn that other matters mentioned in the bill were touched by it.

"Mr. Andrews, who has earnestly favored the eleventh section, proffered a substitute, which he said would clearly exempt from taxation to the amount paid for its franchise any street railroad company that secured a franchise in that way. This substitute was rejected by a large vote. Mr. Alvord then moved that the eleventh section should be struck out. The motion was adopted by a vote of 83 to 14. The fourteen negative votes were given by Messrs. Brogan, Cleary, Gallup, McDonough, Patterson, Potter, Reitz, Spinola, Thilemann, Trimble, and Tully. The bill was then passed by a vote of 89 to 2. The negative votes were given by Messrs. Spinola and Brogan. Mr. Spinola in his speech bewailed the undue taxation of corporations."

MINING TROUBLES IN OHIO.—COLUMBUS, May 15.—The recent troubles in the Hocking Valley coal region promise to culminate to-morrow, either by the miners returning to work or in a protracted strike. Yesterday, 300 miners took out a number of men who were running the coal-cutting machines, ordering them not only to leave the county but the State within 12 hours. The sheriff has been called upon to protect the threatened men, and to arrest and prosecute the miners who assume to dictate and insist upon driving people from the State. It is well known that the sheriff will be supported by the civil and military forces if necessary. The events of to-morrow in the Hocking Valley are looked forward to with interest. The miners in the Sunday Creek Valley, on the Ohio Central Railroad, are peaceably disposed, and nearly all are at work at the rate of 70 cents per ton for mining, although the Hocking Valley miners have endeavored by all means to bring about a strike.

THE MANUFACTURE OF CHARCOAL IN KILNS.\*

By Thomas Egleston, Ph.D., School of Mines, New York City.

(Continued from page 336.)

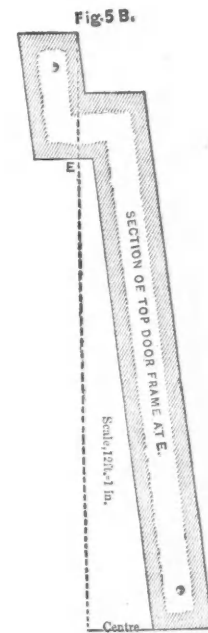
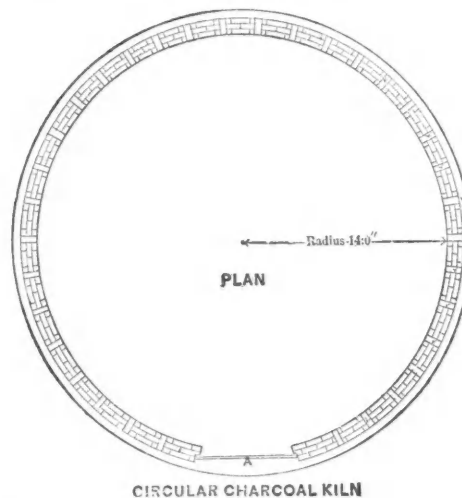
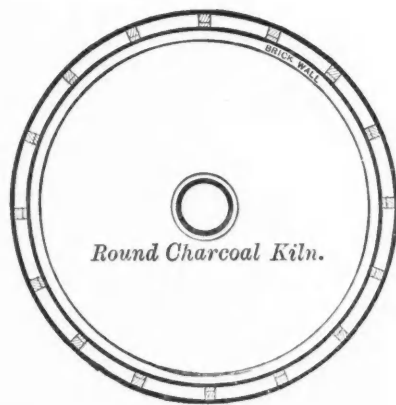
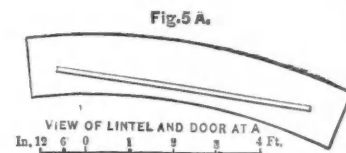
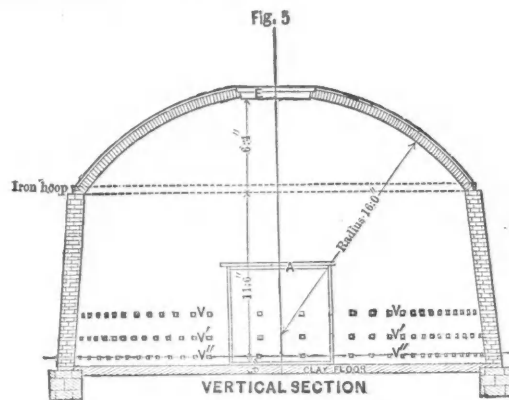
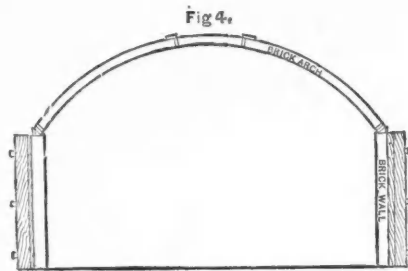
The wood is usually cut to a length of four feet, and laid flat, piled as closely as possible, so as to leave very few interstices. Stronger charcoal would probably be produced if it were placed on end; but the extra cost of labor to pile it in this way would more than compensate in expense for the extra quality. Four men, working one day, are required to fill a 45-cord kiln. The sticks are laid on the floor as closely as possible, putting the logs in the direction of the length of the kiln, and piling them in successive steps, so as to fill it up close to the arch. When the kiln is to be lighted from the top, a chimney is left directly under the roof in the center of the kiln, in which, as it is piled, dry wood and chips are placed for lighting the charge. When it is to be fired from the lower doors, a channel is made from one end of the kiln to the other, which is filled at once. The wood is piled in this way, as far as the lower door will allow, from the inside. When that is no longer possible, these doors are closed, and the space that remains unfilled is filled from the outside through the upper door. When the fire is kindled, the doors and the opening in the roof are carefully luted with lime-mortar. If the clay used in coating the walls was used, it would crack and admit air. Lime-mortar must

closed, as the whole kiln is then lighted. This method is called the *center burn*. In both these last methods, as the fire is generated in the wood, the heat does not affect the walls of the kiln. The time required for these methods is not more than half that of the first method. A sixty-five-cord kiln can be easily turned twice in four weeks, which is ample time. As twenty-four turns can be made in a year, the capacity of the kiln is doubled.

In the Mexican type of furnace (No. 3, page 334), where the lighting is done from the center, the work is much more slowly done. It takes them four days to burn, six to cool, and four to empty, or twenty days in all, so that only eighteen turns a year are made.

The operation is easily and regularly conducted, providing the walls are tight. The clear blue smoke appears about the fourth, fifth, or sixth day, when the vents must be successively closed. Four to eight days are required for cooling.

That the charge is ready to be drawn, may be ascertained by taking off the cover on the top and opening a few of the vents. If, after two or three hours, there is no appearance of fire or of smoke, the kiln may be drawn. If the kiln is opened too soon, water must be pumped in at once, as the charcoal would take fire, and the men would be endangered from the carboric acid generated, and all the men about the works would have to go to the rescue at once. A very small quantity of water is sufficient to extinguish a kiln, as water above puts out the fire in contact with



also be used in closing the vents, after the charge is ready to be extinguished.

There are several methods of lighting the kiln. In Sweden, where these kilns were first used, they were always fired from a permanent structure in the center of the kiln, to which access could be had from the outside. In this country, no permanent structure is made. When first used in New England, they were lighted in one corner. The fire was then drawn along the long side, and so round the kiln on the outside of the wood, so that the heat acted directly on the walls. Such a direct exposure to the heat and pyroligneous acid rapidly destroyed the mortar in the walls, which became cracked, and after a short time the yield of the wood in charcoal was materially diminished. This method of firing was tedious and uncertain. It required from twenty to twenty-eight days to turn a sixty-five-cord kiln, the time depending on a great variety of circumstances. Twelve to fourteen turns were the most that could be expected of a kiln in a year. The lighting is sometimes done by a chimney left in the wood in the center of the kiln, from above, exactly as in the meler, the fire being drawn down by the openings in the sides: this chimney may or may not connect with a channel leading to the discharging-door. This method is used in the South and Southwest of the United States, and is practiced in Mexico, and is preferred when the kilns are very wide. It is considered by many to give the best results, both as to yield and quality of charcoal.

Sometimes the lighting is done by means of a channel built through the middle of the kiln, having an opening at each door. This is also filled with dry wood and shavings, which are lit from the back-door. The fire is then drawn through the wood to the front-door by properly manipulating the vents. When the fire has reached the front, both doors are

it, and what soaks through generates steam below, which extinguishes the fire in the interior. When a very dense coal is required, the kiln is allowed to die out, as it is generally thought that cooling with water impairs the value of the charcoal for blast-furnace use.

The whole art of the process consists in closing the vent-holes at the proper time. As soon as the kiln is well lighted, the two lower rows are closed. The vents of the upper row are closed little by little. Those of the middle in the upper row are usually closed first; then those from which the blue smoke comes, in their turn. When the vents of the first row are being closed, those of the middle are opened, and so on. One man by day and one by night can easily superintend five to six such kilns. He has little to do except to draw the fire regularly down, to watch the color of the smoke so as to close the vents at the proper time, and to fill any cracks that may form. It is always safer to allow the kiln to remain a longer than a shorter time to cool. If the kiln is properly extinguished, four men can easily empty it in one day. On the floor there will usually be found some badly-burned wood: these brands are either put back in the next charge or used for special purposes about the works. If occasion required, they might be used mixed in small quantities with the charcoal.

The rectangular kiln is going out of favor, for the reason that there is so much space heated, with such thin walls, that the number of braces has to be very large to secure a tight kiln, and that when once cracked it is almost impossible to repair it so as to make it tight. The kiln is most easily managed when large, but it has been found not to be economical to use very large kilns; and as this shape of kiln is least adapted for working on small quantities, it is rapidly going out of use. The tendency is now to use smaller ones, so constructed as to require the least amount of repairs. There are, however, many charcoal-burners who claim that

\* A paper read at the Pittsburg Meeting of the American Institute of Mining Engineers, May, 1879. From the Transactions of the Institute.

with this kiln the fire can be better controlled while burning, and that it is easier to fill and discharge, so that it is still used to some extent in the West and Northwest States. It is always better to conduct the process slowly; more is gained in the improvement in the quality of the charcoal than is lost in time. There is, of course, a limit beyond which this must not be carried.

Mr. T. F. Witherbee gives the following table as the weights of the charcoal made by him in rectangular kilns at the Fletcherville furnace:

White pine.....	9 800 lbs. per bushel.	Black-ash.....	14 475 lbs. per bushel.
Basswood.....	10 625 " " "	White-ash.....	16 325 " " "
Spruce.....	11 250 " " "	Beech.....	17 025 " " "
Poplar.....	12 275 " " "	Yellow-birch.....	18 750 " " "
Hemlock.....	12 850 " " "	Sugar-maple.....	18 950 " " "

The repairs to these furnaces are exceedingly small, if made as they occur without delay, and consist mostly in filling up any cracks which may be produced in the masonry, of renewing the posts used for braces, which, if properly prepared, will last almost as long as the furnace, and of replacing the pieces of the coating which fall. In some places, the furnace is whitewashed after every operation.

When a large quantity of charcoal is required, it is generally best to construct the kilns together, as shown in Fig. 2, and, in order to facilitate discharging, to have a lower door at each end. They should be arranged so that the level on which the wood is stored will be about on a level with the lower part of the upper door. They should be connected with the bank by a bridge, leaving a space of from twelve to fifteen feet between the kiln and the bank below. This makes an economical and convenient disposition, both for charging and discharging the kiln.

STATISTICS OF RECTANGULAR FURNACES.

CHARGING.			BURNING.			COOLING.			DISCHARGING.			Per cent of brands.
Time.	Days' work.		Time.	Days' work.		Time.	Days' work.		Time.	Days' work.		
Days of 10 hrs.	Men.	Horses.	Days of 10 hrs.	Men.	Horses.	Days of 24 hrs.	Days of 10 hrs.	Men.	Horses.			
3	3	0	8	1	0	8	2	3	0			6 to 10

	New England.	Mexico.
Length.....	40 feet.	40
Width.....	17 "	14
Height.....	23 "	18
Capacity in cords.....	90	75
Yield in bushels to the cord.....	50	50
Days for filling.....	3	4
Days for burning.....	6	6
Days for cooling and discharging.....	6	8
Number of thousand brick.....	60	50
Size of vent-holes.....	2 1/2 x 4 inches.	

	Wassate.	Barnum & Richardson.
Capacity in cords.....	70	90
Length in feet.....	40	48
Height.....	17	18
Width.....	14	17
Size of discharging-door.....	7 x 7 feet.	5 x 5 feet.
Size of charging-door.....	5 x 7 feet.	28 x 30 inches.
Number of thousand brick.....	30	26
Number of cubic feet of wood.....	312	333
Weight of iron braces.....	450 pounds.	1200 pounds.
Square feet of sheet-iron for doors.....	60	90

TIME OF BURNING.

	Side burn.	Top burn.	Center burn.
Days of filling.....	4	4	4
Days of burning.....	14	6	5
Days of cooling.....	6	6	3
Days of discharging.....	4	4	2
Total.....	28	20	14
Number of turns a year.....	13	18	24

ROUND KILNS.

The round kilns, Figures 4 and 5, differ from the rectangular ones only by their shape. Fig. 4 shows the form usually employed among the bloomery forges of Northern New York; Fig. 5 is that employed for blast-furnace fuel in Vermont; Fig. 4 is built with vertical walls and is braced with wooden posts and iron straps. Such kilns can be seen near Roger's Rock, on Lake George, and at Black Brook, Essex County, N. Y.; Fig. 5 is built with battered walls, which are 28 feet at the base and 26 feet at the spring of the arch, and has no bracing. In all other respects, the kilns are similar. The arches of both these kilns are supported by iron rings at their base. Fig. 5 A shows the lintel of the discharging-door; Fig. 5 B shows the shape of the cast-iron door E at the top of the kiln. They have three rows of vents, one at the base, with six courses of brick between each of the others. These vents are 2x4 inches and 18 inches apart. They are usually 28 to 30 feet in diameter at the base, and 26 to 28 feet at the spring of the arch. The vertical walls are 11 to 12 feet to the spring of the arch and 1 foot thick. The arch is 8 inches thick, and is laid in headers. Such a kiln will have about 300 cast-iron vents, which weigh about 8 pounds each. Thus, a capacity of from 40 to 45 cords requires more precautions in building when the walls are not battered, and, besides the usual braces, must be hooped with strong iron bands. The doors are made of No. 10 sheet-iron. The top opening is a cast-iron ring, which together with the lintel of the door weighs about 1500 pounds. The wrought-iron bands around the kiln weigh about the same. They require about 36 M brick. These kilns are usually built against a bank, so that the top can be reached from it.

The filling is commenced by placing pieces about 0.15 m. in diameter radially, leaving interstices for air-channels; above this, about 0.60 m. of dry wood and brands are placed, leaving a space in the center about 1.20 m. in diameter for a chimney, which is carried to the top of the kiln. The wood is piled horizontally, and packed as closely as possible. When no wood can be put in at the discharging-door, it is closed and the wood is thrown in from above, and piled as before. Shavings and light wood are then put in the chimney so that they will not pack. In some cases, the chimney is filled as the piling proceeds.

With ordinary facilities, it takes four to five men one day to fill a forty-five-cord kiln with wood four feet long. Where butt ends of logs are used, it takes twelve hours to fill a thirty-five-cord kiln; but these can be tumbled in, and do not require much handling.

The kiln is fired with a long torch through the door at the bottom, through the space left by the skids. At the time of firing, the vents are all open; but as soon as the lighting is finished, the two lower rows as well as all the other openings are closed with loose brick. It takes about ten to twelve days to burn a fifty-cord kiln, and about six to seven to burn a thirty-five-cord one. A thick white smoke comes from the upper vents for about four days, during which time the water is driven out of the wood as steam. It then becomes yellowish, and continues so from one to four days, varying with the size of the kiln and the weather. It then becomes blue, and is not allowed to remain so for more than twelve hours; for the blue smoke is an indication that the kiln is very hot, and that the firing is nearly finished.

It takes from five to six days after all the vents have been closed to cool a kiln of from thirty-five to fifty cords. The covers of the doors are of sheet-iron; and so long as there is any heat in the kiln, it will be felt on these doors. As soon as these are cold, the kiln is cool enough to draw. It is generally the practice to let the fire die out. It is not usual to hasten the cooling by throwing in water, as it impairs the value of the charcoal for blast-furnace use. When used for other purposes, however, from eight to ten barrels of water are sometimes thrown in at the top after the kiln has been closed for three days. It will take four men about a day to draw a kiln of fifty cords.

STATISTICS OF ROUND FURNACES.

CHARGING.			BURNING.			COOLING.			DISCHARGING.			Per cent of brands.
Time.	Days' work.		Time.	Days' work.		Time.	Days' work.		Time.	Days' work.		
Days of 10 hrs.	Men.	Horses.	Days of 10 hrs.	Men.	Horses.	Days of 24 hrs.	Days of 10 hrs.	Men.	Horses.			
7	1	0	12	1	0	6	4	3	0			10

Diameter.....	28 feet at base, 26 feet at top.
Height to spring of arch.....	12 feet.
Capacity in cords.....	50
Number of thousand brick.....	31
Number of vents.....	155
Pounds of cast-iron.....	1500
Pounds of wrought-iron.....	1500

(TO BE CONTINUED.)

TECHNICAL EDUCATION.

The Workshop of the Stevens Institute of Technology.

In response to an appropriate invitation, a number of prominent engineers, members of the scientific press, and others, assembled on the evening of May 14th, in the new workshop of the Stevens Institute of Technology, at Hoboken, N. J., to witness the formal presentation of the same to the trustees of the Institute by President Henry Morton who had fitted it up and furnished it with machine and other tools at his own expense.

The building occupied by this shop is 50 feet by 80 feet on the floor, with a high open roof, and galleries running around all four sides.

A Buckeye engine, placed near the center, drives two lines of shafting, which run along the fronts of the galleries, and from these belts pass off to the counter-shafts of the various machine tools.

A spiral stairway gives access to one of the galleries near its center, where is placed the tool-room, in which are systematically arranged all the small tools, such as drills, cutters, taps and dies, mandrels, gauges, etc., which are used with the machine tools.

Arrangements are here provided by which these tools are given out to students on presentation of brass checks, exactly as is done in all large shops.

The machine tools on the main floor consist of thirteen engine-lathes of different sizes, from one of 22-inch swing and 9-foot bed downward, all by different makers, and thus presenting a wide range of variation in style and structure; two planers, with beds 20 inches by 5 feet; two drill-presses, and one universal milling-machine. There are, besides, grind-stones and emery wheels driven by power, and a large number of vises, work-benches, sets of wood-working tools, and all other accessories.

It was in this building that the visitors assembled on the above occasion, the space being brilliantly illuminated by the combined effect of electric and gas lights.

The proceedings were opened by President Morton, who delivered the following address:

ADDRESS BY PRESIDENT HENRY MORTON.

Mr. President of the Board of Trustees, and Gentlemen who have honored us by your presence this evening:

At the present time, a brief historical review of the development of the mechanical department of the Institute will, I think, be very much in place.

The policy of the trustees of the Stevens Institute of Technology, throughout, has been one which is capable of illustration by an analogy taken from the realm of nature, rather than that of art. They have endeavored to plant good seed and to judiciously foster its growth, rather than to erect an edifice whose future should be strictly limited by the conditions of its first construction. Thus, at the very outset, they selected a faculty of young men, whose reputation in the world of science to a great extent was yet to be made, and whose life-work was essentially before rather than behind them, and so placed the organization and development of the Institute in their hands that its future would of necessity be their work, and they and it could harmoniously develop together. The wisdom of the selection, and of the free scope for development offered, is seen in the fact that no similar school can show a more distinguished list of names in its several departments, or can present such a catalogue of original investigations and contributions to scientific and technical literature as have emanated from the Stevens Institute of Technology.

In the special department of mechanical engineering, the history of the Institute has been likewise a history of growth. The field was essentially a new one, and it was only by experience that it could be shown how much of practical work could be effectively carried on, together with the extended theoretical training which it was and is the chief

object of this institution to afford. Our object always has been and is, to graduate, not journeymen mechanics, but mechanical engineers, and the long list of our graduates now occupying high positions of responsibility in the various machine-shops of the country bears abundant witness to our success in the past. For the future, we have no idea of allowing our workshop course, in any way, to displace the invaluable instructions of the other departments, but on the contrary, we intend that it shall render them only more efficient, by making closer their relations to what every student sees to be the object of his course here, namely, the acquirement of the various and extensive knowledge, scientific, mathematical, and practical, which will enable him to grapple successfully with the vast and difficult problems daily presented to the mechanical engineer. To master such problems, he must not only be practically familiar with the operation of machine and other tools, the process of molding and forging metal and the like, but he must also be able to understand at a glance the ideas of others as expressed in "mechanical drawings," and express his own ideas accurately in the same way. He must also have a complete mastery of all mathematical processes available for calculating the action of forces, distribution of strains, transformations of energy, and the like. He must likewise have a large acquaintance with the vast body of recorded experience and logical deduction from the same, which constitutes the science of mechanical engineering. He must also have such a knowledge of the facts and laws of physics and chemistry as will enable him to employ the forces of nature here indicated for his purposes, and avoid their inimical influences. Yet, again, he must have such a knowledge of modern languages and of history, literature, and the other elements of social culture, as will fit him to associate on terms of equality with other educated men. Lastly, but not least, he must have such knowledge of the financial relations of his subject, the cost of labor and material, the relative economy of various processes and the like, as will enable him to choose judiciously in selecting an outfit for any mechanical establishment, and estimate accurately as to its cost.

Let me now, after this digression, return to the history of our workshop. Year by year our workshop has grown with a corresponding development of the practical side of the course of instruction. This growth received a marked acceleration, when, more than a year ago, the special charge of the shops was placed by the trustees in the hands of one of our own graduates, Mr. J. E. Denton, who had distinguished himself not less by his marked capacity than by his zeal for, and devotion to, the interests of his *alma mater*. Under his energetic and unremitting efforts, the workshop course was so developed that the accommodation which, year by year, had been becoming more straitened, was felt to be already, or sure to become in the near future, manifestly inadequate. Under these conditions, various plans were discussed, by which some provision might be made to afford such workshop accommodation as seemed to be required. The original endowment of the Institute, while sufficient to maintain its running expenses, could not be called upon for such a heavy outlay as would be demanded for the fitting up of an extensive new shop; and it was, among other plans, contemplated to secure the necessary funds by organizing a stock company for the manufacture of machinery, under such conditions as would put the shops erected by such an association at the disposal of the Institute, to such extent as was desirable for the instruction of the students.

It was while working out the details of such a plan that the idea came into my mind, that I might escape the numerous complications and possible difficulties of such an arrangement by myself fitting up such a shop as was needed and presenting it to the Institute. Such an enterprise was rendered feasible by the possible use of the large building originally designed as a lecture-hall, and which, during the early years of the Institute, was eminently useful in that capacity, and which had since been fitted up as a gymnasium. This plan having been approved by the trustees, and the large cost of erecting a new building having been avoided, I have been able, for the moderate outlay of \$9500, to fit up this workshop and stock it with machinery and tools as you see it. There are some tools and other appliances requisite for carrying out our contemplated course of instruction, which have been ordered and are in course of construction, but are not yet in our hands; but as nearly as we can estimate, the entire cost will not exceed \$10,000; and if it does, I will see that what is needed is furnished from the same source as the rest.

In conclusion, allow me to hand you this memorandum and package of vouchers, which represent the amounts already expended. These may be briefly summed up, in round numbers, as follows:

Carpenter's, mason's, plumber's, steam-fitter's, and painter's work in building galleries, opening windows, building piers, making lockers, cases, etc., about.....	\$3,100
Shafting hangers, pulleys, belting, and labor in placing the same, and in setting up the machine tools, about.....	1,100
Steam-engine and machine tools, including chucks, about.....	4,800
Small tools, gauges, cutters, etc., about.....	500
	<hr/>
	\$9,500

Allow me also to present to you at this time, on behalf of the American Steam Gauge Company, which has generously donated it, the beautiful "indicator" which you see attached to the steam-engine.

Finally, let me take this occasion to express my high appreciation of the unvarying and kind sympathy with which I have always been sustained and encouraged by yourself and the other members of the Board of Trustees, and my conviction that, whatever has been or may be accomplished in this Institution, will be primarily due to your large-minded and judicious management.

To the above address the Rev. S. B. Dod, President of the Board of Trustees, replied in appropriate language, concluding as follows:

We accept, therefore, this gift from President Morton, with our heartfelt thanks for the generous spirit that prompted the giver, with the hope and belief that it will realize for the young men who study here all the benefits that he hopes to realize, and with the assurance that we see in this only another evidence of his hearty devotion to the welfare of the Stevens Institute, to which he has ever given that which is worth more than all else, the earnest, thoughtful, intelligent purpose to make this Institute a success.

Next followed an address by Mr. Coleman Sellers, of Philadelphia (read in his absence by Professor Thurston), in which, after a warm tribute of

personal and professional esteem to President Morton, the following interesting passages occurred:

The mechanical engineer who has grown up through the shops only, without any preliminary training in the schools, has a very hard road to travel; hence many who rank high in the profession wear themselves out in the effort to educate themselves up to the requirements of the times.

When the idea first dawned on our educators that some effort must be made to teach those who would be machinists, inasmuch as there was but little chance for all who wanted to learn to get into the shops, the problem seemed easy enough of solution. We had but to add the required shops to our schools, and the thing would be done.

Adding shop practice to the regular school course *did not do it*, and for the very simple reason, that no one can make a skilled mechanic, in the sense that one is so rated in the shops, in so short a time as say 1000 or 2000 hours, and that is about all the time that can be spared from a three years' course in a general college education. The shop, too, was shown to be a very expensive adjunct to the school; if it does not produce salable material, it expends large sums of money in the process of teaching. School-shops then began to compete with the other workshops of the land as producers; but it took a very little time to convince those who first tried the experiment that raw boys can not be made to do work that will sell in competition with the work of the well-organized and well-equipped manufacturing establishments of the land. So now one can find, without searching very far, some such shops idle.

After many failures of this kind, there came a new system into vogue that has been called the Russian system, most excellent in its way, by means of which skilled workmen are trained in a shorter time than by any method with which I am familiar, but which, of itself, will not do all that is wanted.

The Russian system seeks to *instruct* without trying to *construct*. That is to say, by a well-selected series of manual exercises, the hand of the pupil is trained to do certain work, while he is not hampered by the fear of loss of material worked on; this scheme of training permits a graded marking as to proficiency, which is as readily applied as in any other school exercise. We may accept the Russian system as a step a long way in advance in the training of skilled artisans; and it is likely that the introduction of that system into our workshops, and the seeming loss of the apprentices' time during the period of instruction, may, in the end, be found to be more than compensated by the superior skill developed by systematic training, in comparison with the process of learning as best he can, now in vogue in shop training. But the young man who aims to be a master mechanic needs much more than he can get in the workshop or in the school; and to acquire all that is needed, he wants time in the drawing-room, in the shops, and in the office. The latter plays an important part in the shop economy. Let a man be ever so good a mechanic, if he be not also a merchant, he is lacking in what makes the difference between success and failure. The great question involved in all engineering work is, "Will it pay?" To make a machine work, is one thing; to make it work without costing too much, is quite another matter. Here is where I look for the great results from this effort of the Stevens Institute to still further develop its capabilities in the direction of training mechanical engineers. As I understand the intention of President Morton in the use of this shop as a means of education, it is to have the money or cost element fully developed, and in this I think it will make a long step in advance. I have carefully considered all the problems involved in this scheme of teaching, and can not but predict the happiest results.

A few remarks by Dr. R. W. Raymond, and a singularly interesting cordial off-hand talk from the venerable Horatio Allen, brought the formal proceedings to a close, and the company adjourned to the house of President Morton, whose graceful hospitality thus fitly crowned the completion of his munificent gift to science and art.

#### CHICAGO COAL RECEIPTS AND SHIPMENTS, JAN. 1 TO MAY 1, 1881.

	Tons.
Receipts by rail of anthracite coal from Jan. 1st to May 1st, 1881.....	215,457
Corresponding period, 1880.....	154,348
Increase by rail, 1881.....	61,109
Receipts by rail of bituminous coal from Jan. 1st to May 1st, 1881.....	684,834
Corresponding period, 1880.....	574,402
Increase by rail, 1881.....	110,432
Receipts by lake of anthracite coal from Jan. 1st to May 1st, 1881.....	None.
Corresponding period, 1880.....	40,456
Decrease by lake, 1881.....	40,456
Receipts by lake of bituminous coal from Jan. 1st to May 1st, 1881.....	None.
Corresponding period, 1880.....	30,141
Decrease by lake, 1881.....	30,141
Total receipts of all kinds of coal, including coke, from Jan. 1st to May 1st, 1881.....	900,291
Corresponding period, 1880.....	799,347
Increase in 1881.....	100,944
Total shipments of coal by lake and rail from Jan. 1st to May 1st, 1881.....	215,164
Corresponding period, 1880.....	205,278
Increase in 1881.....	9,886

RECEIPTS BY MONTHS.—Jan., 179,709 tons bituminous; 44,150 tons anthracite. Feb., 153,128 tons bituminous; 45,932 tons anthracite. March, 163,503 tons bituminous; 68,743 tons anthracite. April, 188,494 tons bituminous; 56,633 tons anthracite. All by rail.

SHIPMENTS BY MONTHS.—Jan., 61,126 tons. Feb., 50,377 tons. March, 51,243 tons. April, 52,418 tons.

The receipts of coke are included in the receipts of bituminous coal. It is to be noted that 50,892 tons of hard coal and 34,087 tons of soft coal were received by lake last year prior to the 8th day of May, the date of first arrival of coal from Lake Erie this year.

H. PRATT, Secretary Chicago Coal Exchange.

THE MONT CENIS TUNNEL RAILROAD.—Traffic, which was blocked by the recent land-slip, has been resumed.

### PROGRESS IN SCIENCE AND THE ARTS.

**The Monetary Conference.**—At the session on May 14th, Senator Denormandie, French delegate, urged the danger of the present monetary system. He showed, from the position of England since 1837, that gold mono-metalism did not afford a remedy. Unless wise measures were adopted, he said, a crisis would, in the end, violently force itself on the money markets.

Sir Louis Mallet asserted, at the Monetary Conference on the 17th, that India would engage not to change her system of free mintage of silver, during a period to be afterward fixed, provided a certain number of the principal states would undertake to maintain free mintage for the same period at the ratio of 15½ to 1. If the fall in silver continued, India might, on the discovery of fresh gold mines or some other opportunity, reluctantly enter into the struggle for the possession of the only metal having a firm international basis. He exhorted France and America not to be deterred from persevering in an effort which, like all great reforms, requires courage and patience. Mr. T. O. Howe's speech was devoted to proving the disinterestedness of the United States in entering the conference. America, he said, was not anxious for a market for her precious metals, but for her agricultural produce.

PARIS, May 19.—At the Monetary Conference to-day, Mr. Evarts and Signor Doda (Italy) recapitulated their arguments in favor of bi-metalism, and with their speeches the general discussion was closed. The following order of the day was then adopted:

After having heard the general discussion and examined the monetary situation from an international point of view, and having regard to the declarations made in the name of certain governments and in consideration of the fact that several delegates desire a temporary suspension of the sittings in order to refer to their governments, the Conference decides to adjourn until June 30th.

**The "Cry of Tin."**—If a piece of tin be bent, it emits a sound; this, being regarded as a property peculiar to tin, has been termed the "cry of tin." This phenomenon is explained by the peculiar crystalline structure of the metal. Reasoning that, if this explanation be the true one, then other metals obviously crystalline in structure should also exhibit the phenomenon, Mr. J. C. Douglas, who records his observations in the *Chemical News*, heated a piece of rolled zinc for a few minutes to a temperature somewhat below its melting-point, when the metal became much less tough, and its fracture decidedly crystalline. On bending a piece so treated, it emitted a sound weaker than that emitted by tin, but of the same nature. Cast-zinc can not be bent readily; but if pinched between the teeth or with pliers, it emits the sound distinctly. The conclusion, therefore, is that the cry of tin is due to crystalline structure, and may be emitted by zinc and probably by other metals when crystalline in structure. The practical application is, that by the sound a metal emits we may draw conclusions as to its texture, and hence its fitness for certain purposes, or, by the sound emitted by a beam when bent, we may draw conclusions as to its safety, the microphone or other appliance being called in to aid us where the sounds are exceedingly weak.

**Fossil Plants and Animal Forms in Meteorites.**—According to the *London Telegraph*, Dr. Otto Hahn has recently completed a series of investigations upon some of the huge meteoric stones that fell from the skies in Hungary during the summer of 1866. Thin laminae of these mysterious bodies, subjected to examination under a powerful microscope, have been found to contain coralline and spongy formations, and to reveal unmistakable traces of the lower forms of vegetation. All the organisms, animal and vegetable, discovered by Dr. Hahn in the delicate stone shavings he has thus dealt with indicate the condition of their parent world to be one of what is technically termed "primary formation." But the presence of water in that world is proved by the fact that the tiny petrified creatures revealed by the magic of the lens one and all belong to the so-called sub-aqueous classes of animals. They could not have existed in comets, at least if the assumption be correct that these are in a state of active combustion. Dr. Hahn has had sections of these meteorites photographed; and the collection of specimens has been placed, for thorough classification, in the hands of Dr. Weinland, of Tübingen (formerly of Philadelphia). *Science*, of this city, regrets its inability to indorse this interesting discovery, and says that Professor Whitfield, superintendent of the fossils and minerals in the American Museum of Natural History, has seen Dr. Hahn's drawings, and was unable to verify the presence of the organic forms referred to.

**Iridium in Oregon.**—The *Portland, Oregon, Standard* says that about two years ago, a gentleman who was examining a collection of specimens of minerals and gold quartz in the office of Mr. S. M. Lyon, an assayer, obtained permission to take away several specimens, among which was a quantity of the fine sand and "blowings" of gold which contained the black and shining particles that most miners are familiar with, and which have been regarded as particles of iron. These specimens were taken East and found to be iridium. Recently a great deal of interest has been awakened by the discovery of additional uses for which this article is especially adapted. It is used by dentists for some of their plates and for rivets, as it withstands the action of any acids taken into the mouth better than gold or platinum. Its specific gravity, it will be seen, is greater than even platinum, and is more valuable than gold or platinum. As before stated, it is found mixed with gold in Oregon, and appears as a black shining sand, in particles a little coarser than blasting-powder. There are portions of this State and the adjoining territory where this metal may be found in abundance.

**The New Electric Railroad.**—A dispatch to the *Evening Telegram*, dated London, May 13th, says that the correspondent of the *Daily News* telegraphs from Berlin that Messrs. Siemens and Halske, two well-known electricians, invited members of the municipality and press to take part in the trial of their new electric railroad, which runs between Lichterfelde and the Cadettenhaus, six miles from Berlin. The trial was an entire success. Every praise must be given to these electricians, who had not only to work out the most difficult of scientific problems, but also to contend with the most stringent rules which German officialism thinks fit to exercise on such undertakings.

The trial was made to-day in a simple tram-car, with an electric battery entirely concealed between the wheels. It was connected through the

rails on which it ran with the principal battery at the station. The rails are thirty-nine inches apart, and exactly resemble those of an ordinary railroad, the gauge being narrower. The greatest speed obtained to-day was eighteen English miles an hour. Dr. Siemens has proved that, if necessary, far greater speed could be obtained, but this was not allowed by the German police authorities. The fact is, that the officials here hardly know how to deal with this wondrous invention. They seem afraid of it, and do not know whether to place it under the tramways or railroads act. However, for the present they choose to consider it, as our Atlantic cousins would say, a simple horse-car, and for public use it will not be allowed to proceed at more than nine miles an hour. The railroad will be opened to the public on Monday next.

**The Saint-Gothard Railroad.**—A dispatch from London, May 19th, says that an official report shows that the entire line, including the tunnel, may be expected to be ready for traffic by the beginning of next winter.

**Transforming Old Rails into New.**—The following are the steps of the process, according to the *Indianapolis Journal*, as witnessed in a rolling-mill at that place: The rails are first unloaded from the car; then picked up and run on a set of rolls to the shears; cut up; when cut, piled into fagots; then loaded on to a barrow and charged into a furnace, heated to a welding heat; hauled out and placed on iron buggies; run to the weighing-rolls; handled six times, until finished to a bloom; then returned to the buggies, carried to a reheating-furnace, brought to a welding heat, and again returned to the rolls on buggies; passed through the rolls nine times; then run to saws, where both ends are put off at once and laid on the cooling-bed; when cold, placed under the straightener, which takes out all minor crooks. The burr on the end is then filed off, when the rails are inspected, taken to the punching-room and fitted for splice-bars, thence to the slotting-machine, where they are slotted for the spikes; then they go to the benches in the yards, and from the yards to the cars.

**The Distribution of British Pig-Iron.**—The annual report of the British Iron Trade Association contains the following table showing the distribution of the pig-iron production of the United Kingdom in 1871 and 1880. The enormous augmentation of the quantity used for the production of steel is especially noteworthy:

	1871. Tons.	1880. Tons.	Amount of Inc. or Dec. Tons.	Per cent of Inc. or Dec.
Exported .....	1,057,458	1,631,629	+	54
Used in the manufacture of wrought-iron .....	2,486,000	1,950,000	-	27
Converted into Bessemer steel .....	220,000	1,220,000	+	454
Converted into Siemens steel .....	35,000	295,000	+	743
Used in tin-plate manufac- ture .....	120,000	265,000	+	120
Applied to foundry and other purposes .....	1,748,721	2,379,371	+	36
	5,667,179	7,741,000	+	36.5

The *London Economist* says that in a table in the Appendix to the Report it is shown that, comparing 1869 with 1879, the pig-iron production of Great Britain increased 10 per cent, while that of the United States advanced 60 per cent, that of France 32 per cent, and that of Germany 39 per cent. The Belgian production, on the other hand, fell 16 per cent.

HARRISVILLE, N. J., May 17.—The hands in the Dennisville Zinc-Works struck to-day for an advance of 25 cents a day in their wages.

FATAL SULPHUR EXPLOSION.—POTTSVILLE, PA., May 13.—An explosion of sulphur occurred to-day in the Palmer Vein Colliery, and two miners, John O'Horn and David Dougherty, were fatally burned.

MINING SUIT.—DENVER, COLO., May 15.—The United States Marshal served papers yesterday on the Bassick Mining Company in the suit of Melrose & Betts, who claim previous location of a portion of the mine.

THE laborers on the Delaware & Hudson Canal docks at Rondout struck on Saturday afternoon for an advance of one cent per ton, making a total per ton of seven cents for loading and unloading. The officials have not replied to the demand.

A DEADWOOD RAILROAD.—DEADWOOD, May 9.—The chief stockholders in the Homestake mine have sent to Yankton articles for a hundred miles of narrow-gauge road to connect the chief cities of the Hills with the coal-fields. Material is on the way from Danville, Pa.

QUICK STEAMER PASSAGE.—A dispatch, dated London, May 19th, says: The Guion line steamer *Arizona*, Captain Murray, from New York May 10th, for Liverpool, which reached Queenstown yesterday, arrived off Crookhaven at three o'clock in the morning, having made the passage in seven days, five hours, and thirty-eight minutes.

SALE OF A LAND-GRANT.—BOSTON, May 19.—The *Transcript's* financial article announces the sale in England of the Marquette, Houghton, and Ontonagon land-grant for \$2,500,000 cash. This will enable the company to cancel two thirds of its debt and pay an 8 per cent dividend upon both its common and preferred stocks, which, in anticipation of this sale, have advanced \$50 per share during the past month.

COLORADO MINING AND INDUSTRIAL EXPOSITION.—A large and enthusiastic meeting of the citizens of Denver and the State was held at Denver, May 14th, to favor the proposed national mining and industrial exposition. An organization was effected and an executive committee appointed as follows: William D. Todd, representing the banks; V. M. Came, the railroads; Herman Silver, the press; A. H. Estes, the hotels; George Tritch, the merchants; H. R. Walcott, the manufacturers; and N. H. Meldrum, the State government.

NEW ATLANTIC CABLE.—A special dispatch to the *Herald*, dated Canso, N. S., May 19th, says: The representatives of the American Cable Construction Company arrived here this afternoon, to witness the landing of the shore end of the new American cable. The steamer *Faraday*, with 1000 miles of the new cable on board, is hourly expected, when the laying of the cable will begin. A commodious building for the accommo-



da tion of the staff of the station has been erected near the shore, and a trench seven feet deep and half a mile long has been opened. Every thing is in readiness to receive the cable. There is much excitement among the citizens of Canso and the vicinity at the prospect of having a cable station located here.

#### GENERAL MINING NEWS.

##### ARIZONA.

Late Arizona exchanges have the following :  
GLOBE DISTRICT.

**COPPER QUEEN.**—Recent reports state that, as development progresses, the prospects continue to be very favorable. The new furnace, engine, boiler, and blower have been shipped from New York, and will be put up as soon as they reach the mine.

##### PIONEER DISTRICT.

**SILVER KING.**—The main shaft is down 612 feet to the new level, all the way in ore of the usual quality.

##### WALKER DISTRICT.

The Arizona *Miner* says : Walker Mining District, nine miles south of Prescott, has an altitude of about 8000 feet ; is five miles long by two in width, and contains over 200 locations, with water and wood in great abundance. A good wagon-road running through the center of the district makes it easy of access, and its other facilities are unsurpassed by any district in Arizona. There is considerable development making on many of these claims, all of which are showing up permanent and well-defined veins.

**YAVAPAI MILL AND MINING COMPANY.**—This company is running a cross-cut tunnel on the Hidden Treasure, and expects to strike the ledge in about 40 feet.

##### CALIFORNIA.

##### THE BODIE DISTRICT.

The Bodie *Free Press* of the 10th inst. says : Goodshaw, Champion, Belvidere, Bechtel, Dudley, Double Standard, Defiance, Gipsy Queen, Glynn-Dale, South Standard, South Bodie, Spaulding, Booker, McClinton, Maryland Consolidated, University, and Queen Bee, each with steam hoisting-works, are still lying idle. The Silver Hill and Spaulding mills (each of ten stamps) are also idle. It is probable, however, that work will shortly be resumed on the Bechtel, Summit, Double Standard, Goodshaw, South Bodie, and University. The Standard is still pushing east and west on the 1000-foot level, the former cross-cut being in 225 and the latter 196 feet, with no change to note in the formation encountered in either direction. The new machinery is working splendidly, and all the stopes are looking well. Bulwer is showing a  $3\frac{1}{2}$ -foot vein of good ore, in a 43-foot uprise from the 400-foot level, Stonewall ledge. Consolidated Pacific is showing a marked and important improvement in the silver vein heretofore mentioned as having been encountered by north drift in Pacific Lode No. 2, on the 600-foot level. The Lent shaft has reached a depth a little more than 600 feet, and a bob station at the 595 is so far advanced that the work of sinking has been resumed. The shaft in Boston Consolidated has reached a depth of 82 feet below the 300-foot station, and is now in much better working ground, with strong indications that the 400-foot station will be opened out in ore. The middle vein of the Black Hawk, as opened by the north drift from east cross-cut, 800-foot level, is showing considerable improvement, and it is expected that the east vein will be tapped by the east cross-cut, same level, within a few days. The Bodie Consolidated is shipping about the usual quantity of ore, and all the stopes are looking well, those to the north and between the sixth and fourth levels being in rich ore. South Bulwer is again ready to resume sinking, the new double engines at the works having been steamed up yesterday. Sinking will first be resumed to further test the full extent and value of the  $4\frac{1}{2}$  feet of clean ore, in which a 60-foot winze was sunk from the south drift, 550-foot level, the shaft having at last drained the bottom of the winze. Oro is making rapid progress in all directions, and is accumulating a large quantity of rich ore in sacks. South Noonday struck a two-foot vein in the new shaft during the week, six inches of the vein being of fine quartz and 18 inches a mixture of quartz and clay. From this vein a considerable flow of water was encountered, but as the engine is now up and in good working order, it handles the water with ease. Syndicate is meeting with some unusually rich ore in the upper levels of the Osceola vein. Bodie Tunnel continues to find high-grade ore in vein No. 7, and some improvement in Foston vein No. 20. The Noondays are both improving as the prospecting drifts are pushed, and all the stopes are looking well. Good progress is making in the Red Cloud shaft, and the appearance of the ground in the lower levels of Oro indicates that the great sump of the south end will drain the entire group of mines in its vicinity. Tioga is getting some good ore in the north lateral drift, 982-foot level, and during the week the flow of water from the east has decreased ten tons per day.

##### COLORADO.

##### CLEAR CREEK COUNTY.

**PELICAN-DIVES.**—The Georgetown *Courier* of the 12th inst. says : The ore-veins in the Pelican-Dives mine have improved considerably in appearance within the past month, and at no time since the present company assumed control has the mine looked as well as at present. There are 56 men employed in the mine, 39 of whom are working as lessees. Work at repairing the main shaft is nearly finished, and within the next two weeks the superintendent expects to be able to commence sinking. The ore-vein in No. 2 level, which is worked by the company, is turning out well, the smelting-ore produced last month selling for \$576 per ton at the Boston & Colorado Sampling-Mill in Georgetown. The ore-veins worked by lessees are also doing much better than formerly, and the prospect is excellent for a much larger output in the future.

##### LAKE COUNTY.

Amie is shipping about 10 tons per day of iron ore running low in silver. The machinery will at once be placed in working order. The ore-shippments from the Crescent average five tons daily. At present, but one shift of 17 men is employed underground, and the grade of ore extracted is good. Catalpa had taken out, up to the 10th of this month, 100 tons of ore, and the daily shipments are from ten to fifteen tons. Chrysolite ore is running from \$90 to \$100 per ton, and the shipments average 40 tons daily. The Leadville *Democrat* says that on the first of June the Roberts shaft of the Chrysolite will be closed for five or six weeks, in order to make some needed repairs and improvements. While these improvements are under way, the hoisting of the mine will be done through the No. 5 Carboniferous shaft and Nos. 5 and 4 Chrysolite shafts. The combined hoisting capacity of these three shafts, however, will not equal that of the Roberts, and some inconvenience and delay are anticipated. No interference with the ore-product is expected, but development-work may be retarded to some extent during the time. The greater part of the machinery for the discovery-shaft of the Denver City has been received in Leadville, and is rapidly getting into position. The shipments from the Glass-Pendery average nearly twenty tons per day. About thirty tons of ore are shipped daily from the Highland Chief. The Denver *Tribune* says of this mine : The Highland Chief mine, in the Leadville District, is, and has been from its discovery, one of the puzzles of the camp. It contains one of the largest bodies of mineral ever discovered here or anywhere, but it has rarely paid much above expenses. Some of the ore is very rich, but the major part is low-grade much

too lean for profitable smelting. The grade of ore in the Miner Boy is reported to be improving, and the mine is sending out a larger quantity. Enough ore is extracted to keep the fifteen-stamp mill constantly running, in addition to frequent shipments of smelting-ore to the reduction-works. The Iron Silver properties are turning out large amounts of ore, the shipments running from 150 to 200 tons daily. La Plata is shipping about 35 tons of ore daily, and the mine is looking favorable. The Silver Cord combination is making shipments of about 60 tons daily, and development-work is pushed. The Robert E. Lee is not producing largely at present, owing to the frequent stoppages of the Little Silver pump. Some iron ore, containing a small percentage of silver, is shipping to the smelters as flux.

##### PARK COUNTY.

**DOLLY VARDEN.**—The company owning this mine has a force of men at work and is shipping ore.

**MOOSE.**—Between 35 and 40 men are employed on this mine, and it is shipping a good quantity of ore. The company is fixing up the Mount Lincoln works, at Dudley, preparatory to starting up again for the purpose of treating the low-grade ore it has on hand.

##### MONTANA.

From our Montana exchanges we condense the following :

**ALTA-MONTANA.**—Regarding the fire which recently destroyed the extensive reduction-works of this company, the *Independent* says : The fire originated in the drying-furnace behind the battery, and was discovered at 12.20 P.M., May 6th. Just how it caught could not be ascertained. The wind was blowing a gale at the time, and so terrible was the conflagration and so speedy was the work of destruction that, within an hour after the fire was discovered, the buildings were burned to the ground. The property burned was as follows : The Krom mill, amalgamating building, smelting building, reverberating building, blacksmith-shop, carpenter-shop, sleeping-house, and reading-room. All buildings belonging to the company were destroyed except the office, assay-office, and coal-house. The property destroyed cost the Alta-Montana Company about \$250,000 ; and it may be safely estimated that, after making allowance for wear and tear, cheapened labor, etc., the loss to the company is \$200,000. The property was insured for about \$75,000. No property except that belonging to the Alta-Montana Company was burned.

**ALICE.**—All the upper levels are showing remarkably well, and the lowest level is improving as each foot of development is made.

**ANSELMO.**—The main shaft has attained a depth of over 275 feet. During the week, work has been resumed in the east shaft of the mine, where the new steam hoisting-works are in successful operation. Level running to the east and west, is vigorously pushed ahead, in addition to stoping.

**BELL.**—The work at present is confined entirely to the sinking of the main shaft, and the dropping of the winze, which is at 120 feet to the west of the shaft.

**MOULTON.**—The main three-compartment shaft of this mine has reached a depth of over 318 feet. At the 300-foot level, a cross-cut to the south has just been started. The cross-cut driving from the 200-foot level to the south, to tap the veins, is in 55 feet, is making good headway daily, and is passing through compact granite. The shaft, an incline, on the new vein of the Moulton, is down over 20 feet on a well-defined vein over three feet wide. The vein dips to the north.

**MAGNA CHARTA.**—The sinking of the main shaft to the depth of another 100 feet has been resumed under a special contract.

**STEVENS.**—The work in the east level is confined to driving a cross-cut to the south, at the end of the level, 200 feet from the main shaft.

##### NEVADA.

##### THE COMSTOCK LODGE.

The Gold Hill *News* of the 11th inst. says : The usual work at the north end mines goes steadily on. The Sierra Nevada north lateral drift has been driven over a thousand feet without showing any grand results. The small bunches of ore still make their appearance occasionally. The uprise from the 2300-level in Sierra Nevada has been connected with the winze from the 2500, and the circulation of air much improved thereby. The changing of the Ophir to an upcast created considerable heat in that mine for a time ; but the connecting of the drift that was run on the 2500 level from the C. & C. to meet a similar one from the Ophir, established a good current of air and cooled the heated atmosphere considerably. This connection has also been of great benefit to the California and Consolidated Virginia mines. The fire in the California and Consolidated Virginia is under control, and, but for the stopping of the extraction of ore from the old stopes, its effect would not be noticed. The hydraulic pump at the C. N. S. shaft gives good satisfaction. The Yellow Jacket will again commence lowering the water to-morrow. The Belcher is not ready to assist materially, but expects to be in condition to do so shortly. The work at the other south end mines is much the same as heretofore reported, except at the Alta, where sinking has been temporarily stopped to allow of the cutting out of a tank station.

##### COLUMBUS DISTRICT.

**NORTHERN BELLE.**—The *True Fissure* of the 7th says : During the week, there have been no changes of note in either third or fourth levels. The first and second are looking fully as well as a week ago. About 20 feet below the eleventh or adit level, there has been quite an improvement, showing some fine chloride ore at a point farther west than any thing we have ever had on this level. In the section of the mine above the adit, the outlook is very encouraging, especially in the fifth and ninth. In fact, the mine throughout presents a very favorable appearance, and promises finely for the future. All work is progressing as usual, and the daily product of ore is 88 tons. Both mills are running on full time and doing their usual good work. The total shipments of bullion for April were \$120,618.05 ; shipments on May account up to Wednesday, \$8085.28.

##### LEWIS DISTRICT.

**STARR-GROVE.**—The *Battle Mountain Messenger* says that the track of the Battle Mountain & Lewis Railroad is laid above the Eagle mill, and the road is surveyed up to the mine. Enough material is now on hand to complete all the side-tracks and switches to the mills, and ore can soon be dumped from the cars on to the dry-kiln. Lumber for the new 40-stamp mill is arriving by the car-load, and a large force of carpenters is engaged in framing the foundation timbers. Work in the Starr-Grove mine is progressing finely. The levels and drifts have all been put in good shape, and work in the mine can now be done to the best advantage. A cross-cut was run in the upper level south where the ledge was struck on the foot-wall. In this part of the mine, it will average 65 feet in width, and is very good ore. The lower drift south is in good ore yet, which averages 6 feet in width. They are shipping about the same amount of ore to the mills, and turning out their regular amount of bullion.

##### UTAH.

**THE NORTHERN CHIEF.**—The superintendent of this company, writing from Bingham, under date of May 1st, says :

The following statement covers the operations conducted during the month of April, and the present condition of the work : The number of days' labor performed was 206 $\frac{3}{4}$  days, at \$3 per day ; 8 days at \$2.50 ; and 30 days of the foreman at \$4 a day. Of this work, 28 days were occupied in surveying the claims of the company in application for patent, and to establish boundaries ; 60 days at \$3 in running cross-cuts from the west level ; 16 days in the uprise from the west level ; 98 $\frac{3}{4}$  days in running the west level ; 12 days in pumping out the shaft ; 18 days blacksmithing and engineer. The first cross-cut is run from the west

level at a distance of 180 feet west of the tunnel, and is 26 feet in length. The second cross-cut is 200 feet west of tunnel, and is 20 feet long. The west level is now 375 feet from the tunnel, and the rise is 355 feet west of tunnel, and is 25 feet high. The developments consist of tunnel 300 feet in length and two levels—the east one from the tunnel 165 feet in length, and the west one 375 feet, aggregating along the vein 540 feet; average depth, 136 feet; depth of west end of level below the surface, 284 feet; depth of shaft above levels, 136 feet; depth of shaft below levels, 116 feet; total depth of shaft, 252 feet. There are now about 27,000 tons of ore in sight above the level of the bottom of the shaft; that is to say, the vein will yield one ton of ore for every 20 cubic feet of vein. There are 514,720 cubic feet of ore and vein-stuff developed in the present workings, the average of which is about \$65 per ton; 27,236 tons, which, at \$65, contains \$1,770,340; and with 1300 tons already on the dump, carrying \$84 per ton, and worth \$109,200, making a total value of ore \$1,879,540. The vein shows an unbroken sheet of ore through the entire length of the developments, with a good strong vein still on the face of each level. We can still drift 3347 feet west upon the vein within our own ground, and 313 feet east. We are gaining depth very rapidly now in the west level, and the ore is increasing in value. The assays made to-day give gray ore, west level, 206 ounces; quartz ore, 54 ounces; average of all west level, 43 1-10 ounces. West level rise, average 98 75-100 ounces. We are taking out 10 tons a day.

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

This department is opened for the benefit of miners, prospectors, and others interested in minerals.

Replies will be made in these columns, and without charge, to questions asked regarding the nature and commercial value of minerals, and of samples sent.

Assays determining the actual composition and value of ores will be made at the following rates. All assays are made with the utmost care by the most experienced and competent assayers:

Assay for gold.....	\$3.50	Assay for copper.....	\$3.00	Assay for iron.....	\$4.00
"    silver.....	3.00	"    lead (wet).....	3.00	"    nickel and	
"    gold and silver.....	5.00	"    zinc.....	5.00	"    cobalt.....	10.00

The amount should invariably accompany the order, and expressage or postage must always be prepaid.

Communications, samples, etc., to be addressed to

ENGINEERING AND MINING JOURNAL, 27 Park Place, New York  
(P.O. Box 4404).

PROPOSALS AND SALES.

For the benefit of many of our readers, we compile weekly such proposals and solicitations for contracts, etc., as may be of interest. The table indicates the character of proposals wanted, the full name and address of parties soliciting, and the latest date at which they will be received:

Furnishing Coals for the use of Revenue Vessels at this Port for the fiscal year ending June 30th, 1882; E. A. Merritt, Collector, Custom-House, New York City.....	May 23, 1881.
Repairing and Rebuilding Bulkhead at the Foot of Harrison Street; Department of City Works, Municipal Department Building, Brooklyn, N. Y. Furnishing 25,000 yards Concrete Pavements for the City of Washington; W. J. Twining, Major of Engineers, U. S. A., U. S. Engineer's Office, Washington, D. C.....	" 24, "
Furnishing Iron Roofs, Ceiling-Beams for Attic Floor, Cornices, Hip and Bridge-Rolls, etc., for the U. S. Custom-House at Albany; Superintendent U. S. Custom-House, Albany, N. Y.....	" 25, "
Furnishing, Delivering, and Putting in Place all the Iron Lathing and Iron Lathed Partitions required in the North Wing of the Building for State, War, and Navy Departments in Washington; Thomas Lincoln Casey, Lieut.-Col. Corps of Engineers, Office of Buildings for State, War, and Navy Departments, Washington, D. C.....	" 28, "
Improvements of Rivers and Harbors in the State of Michigan; F. Harwood, Major of Engineers, Engineer's Office, Room 57 Moffat Block, Detroit, Mich.....	June 1, "
Dredging in the Inside Harbor of Duluth, Minn.; Constructing Break-water in the Harbor of Grand Marais, Cook County, Minn., on the North Shore of Lake Superior, about 106 miles N. E. of Duluth, Minn.; Constructing Dams and Shore Protection of Brush and Stone, and some Earth Excavation for the Improvement of the Chippewa River, Wis.; Charles J. Allen, Captain of Engineers, U. S. A., U. S. Engineer's Office, No. 99 1/2 West Third street, St. Paul, Minn.....	" 1, "
Improving Milwaukee Harbor, Racine Harbor, and Kenosha Harbor; D. C. Houston, Major of Engineers, U. S. A., U. S. Engineer's Office, Milwaukee, Wis.....	" 9, "
Furnishing Material and Building a Crib Dike in the Ohio River, at Twelve Pole Bar, near Burlington, a Crib Dam in the Ohio River at Brown's Island, a Dike in the Ohio River, at Puppy Creek Bar; William E. Merrill, Major of Engineers, U. S. Engineer's Office, 82 West Third street, Cincinnati, Ohio.....	" 11, "
Dredging in Lower Thoroughfare, Deal's Island, Maryland; William P. Craighill, Lieut.-Col. of Engineers, U. S. Engineer's Office, 70 Saratoga street, Baltimore, Md.....	" 15, "
Construction of the Railroads from Bage to Cacequy, and from Cacequy to Uruquayana, in the Province of S. Pedro do Rio Grande do Sul. Particulars can be had by application to the Brazilian Consulate-General, No. 71 Broadway, Room No. 62, New York City.....	July 4, 1881

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, May 20.

There has been a small business during the week under review, and most of the stocks have been weak and somewhat neglected. The sales aggregate 899,384 shares. Although this is a smaller business than was done during some of the preceding weeks, it is nevertheless large, and there are no indications of public interest flagging. The outlook favors an active business in mining stocks during the summer; but some of the pools will endeavor to clean up before the hot days appear, that they may enjoy their profits and lay plans for the fall campaign.

The Bodie stocks nearly all appear in the dealings of the week, and almost without exception show weakness. North Standard, in a business of 3500 shares, advanced from 5@15c.

The Tuscarora stocks have been neglected and weak.

The principal Comstock shares have been stronger, especially Sierra Nevada. The old bonanza stocks have had a liberal business at irregular prices. Amie has been active and weak. Caribou advanced from \$2.05 on Monday to \$2.30 to-day under a small business. Chrysolite has been steady and very much neglected. Copper Knob figures largely in the dealings at 8@10c. Father de Smet has been strong under small transactions, advancing from \$8 1/4@9. Glass-Pendery has been quite active and strong. Green Mountain has been steady under a moderate business. Hibernia has been very active, but declined from \$1.30@1.15. Horn-Silver has been very active and strong, selling up to \$15 to-day. Iron Silver, under a very large business, has been weak, selling down to \$2 1/2 to-day. Leadville has had a moderate business, but has been weak. Little Chief has been fairly active and steady. Little Pittsburg, under a moderate business, was at times quite weak. Moose has been irregular and quiet, holding its own at the end. Robinson Consolidated has been active but a little weak, declining from \$11@10. Spring Valley makes a handsome advance, but the business (50 shares) does not indicate that 500 shares could be sold at the same figure. Starr-Grove has been quiet but weak, declining from \$8@7. Stormont has had a moderate business at \$3.20@3.65, the latter figure to-day. Alta-Montana has been active and strong, advancing from \$1.85@2.15. If well insured, there is no question but that the company can make some valuable improvements in the old plant from the money received from the insurance companies. Big Pittsburg, under a moderate business, declined

from \$3@2.70. Bull-Domingo has been quiet and weak. Bye and Bye has been both active and strong, advancing from 26c. on Saturday to 60c. to-day. Calaveras has been active but quite weak. Cherokee has been quiet and a little weak. Consolidated Pay Rock has been fairly active and quite weak, declining from \$2.05@1.55. The Mariposas have been quiet and weak. Silver Cliff has been quiet and a little weak. Silver Nugget has had a moderate business at quite an improvement in price. Sutro Tunnel has been very active, irregular, but strong. Vandewater, under a moderate business, has been weak. The Roberts stocks have been the great features of the dealings in the week, and from the high the prices have reached are likely to continue to attract attention; for there is now some margin for a decline, and it will only be a matter of the insiders getting out to start it. Oriental and Miller have been selling at \$3.65@4.50, and as these are only announced as prospects, the realizations will have to be large to enable the public to get back its money at the current rates paid for the stock. The State Line stocks record sales of over 90,000 shares, No. 4 selling up to \$3.20, Nos. 1 and 4 up to \$4, No. 1 up to \$4.85, and Nos. 2 and 3 up to \$14. The public blamed George Roberts for their losses in Chrysolite, and will probably do so in these mines, should they fail in the expectations built up; but we shall blame the public if this should occur, for never were purchases made on so little information and so much faith.

The following stocks, which do not appear in our table, were dealt in at the Mining Exchanges during the past week: State Line No. 1, 14,950 shares at \$2.35@1.85@1.70; State Line No. 4, 12,600 shares at \$2.35@3.20@2.80; State Line Nos. 1 and 4, 44,100 shares at \$2.80@4.05@3.60; State Line Nos. 2 and 3, 20,250 shares at \$10.38@14@13; Crescent, 3,300 shares at \$1.65; Malachite, 5,300 shares at \$1.15@1.35; Old Dominion Copper, 200 shares at \$8@10; Battle Creek, 300 shares at \$2.50@2.75; and San Pedro, 5,500 shares at \$4.60@4.85@4.55.

UNLISTED QUOTATIONS.

Mr. L. V. Deforest, No. 70 Broadway, under date of May 20th, 3 P.M., reports the current quotations of unlisted stocks as follows:

	Bid.	Offer'd		Bid.	Offer'd
Con. Arizona.....	.50	.75	Native Silver.....	\$.10	\$.50
Defiance.....	.25	.30	O. K. & Winne.....		1.00
Falcon.....	.40	.55	"    bago.....		8.00
Freeland.....	2.00	5.00	Old Dominion.....	8.00	9.00
Grand View.....		.50	Patagonia.....		.75
Highland Chief.....	8.00		Plata Verde.....		2.50
Hite.....		7.50	Sacramento.....		.25
Julian.....		1.25	Santa Cruz.....		.75
Lowland Chief.....		.50	Sir Rodr'k Dhu.....		.25
May Flower.....		.40			

Mr. George Roberts and associates are reported to

have made large purchases of mines in the Lake Valley District, New Mexico.

The Bradshaw and Washington mining companies, with properties about two miles from Tombstone, Arizona, will probably be listed at the New York Mining Stock Exchange.

The Empire Hoisting-Works, at Park City, Utah, were burned on the 13th inst. It is claimed, however, that they were well covered by insurance, and that the company will sustain but little loss.

The stockholders of the Robinson Consolidated Company, at a meeting held this week, voted against a reduction of the capital stock. Mr. Brayton Ives, the president of the company, is at the mines, and expresses himself very much pleased with the property and the management.

A dispatch from Deadwood, Dak., announces the caving in of the Golden Terra mine, and the killing of a number of miners. At the present time, the information is too meager to form an opinion of the immediate effect on the company's operations, or to state what the actual loss of life is.

The Leadville Democrat thinks the following mines, owned by Eastern parties, should be worked: The Adelaide, the Scooper, the Alleghany group, the Colorado Prince, Marian Mining Company, and many others, all of which have good opportunities of disclosing rich ore-bodies by doing a little more work.

The following, from the Leadville Chronicle, should be reprinted in large posters and circulated in all new and promising mining camps in the West. It is only one chapter in history, but it has been repeated from the time mines were first discovered in this country:

We are now nearly in the middle of May, but the arrivals at the Clarendon are scarcely more numerous than they were in March. There is no sign of any rush either of men or money to Leadville. There never was a time when the present output of the camp was larger, or its prospect brighter than now. But it attracts even less attention at the East now than it did at this time last year, when all Colorado was smarting under the effects of the lies told by the Little Pittsburg promoters and managers. The reason stands out in bold relief. There have been too many false representations made about the camp. Too many men have gone East and told lies about their prospects. Too many mine managers have promised dividends, well knowing that the promises could not be fulfilled. Too many men are walking around Leadville proclaiming the enormous value of prospects which might be dear at \$1, and all this wholesale lying has produced its natural fruit.

The Leadville Circular says:

Mr. O. H. Harker, a short while since, wished it to be privately understood that he would pay dividends on the Consolidated Leadville & Little Giant in about sixty days from the purchase of the latter, which would bring the time to about June 1st. To be liberal, let us say June 15th. On the strength of this, Leadville stock advanced from 50c. to \$2, dropped back to \$1.15, and has since rallied to \$1.65. Now let us see how the prediction comes out. As the owners of the Leadville are the same parties who owned the Little Pittsburg in March, 1880, any representation they may make is entitled to the utmost credit, and any one who doubts their word is prima-facie a black-mailer.

We extract the following from a circular issued by

GENERAL MINING STOCKS.

Dividend-Paying Mines.

Table with columns: NAME AND LOCATION OF COMPANY, Feet on Vein, Capital Stock, SHARES (No., Par Val, Total levied to date, Date and amount per share of last), DIVIDENDS (Total paid to date, Last Dividend), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (May 14, May 16, May 17, May 18, May 19, May 20), and SALES.

Non-Dividend-Paying Mines.

Table with columns: NAME AND LOCATION OF COMPANY, Feet on Vein, Capital Stock, SHARES (No., Par Val, Total levied to date, Date and amount per share of last), DIVIDENDS (Total paid to date, Last Dividend), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (May 14, May 16, May 17, May 18, May 19, May 20), and SALES.

g. Gold. Silver, s. L. Lead. c. Copper. \*Non-Assessable. †The Deadwood mine paid in dividends, previous to the consolidation, \$275,000. Total shares sold during the week, 890,384.



improvements. He has built an inclined car-track and put on a portable engine, connecting the hoisting-works with the ore-house of the Tough Nut mine, and with several branches, a turn-table, etc. It is estimated that this improvement alone will save the company many thousands of dollars in bringing to the surface the Goodenough ores.

All the new 200,000 shares of Argent were taken by holders of the original stock.

General James Stewart, President of the Bara Avis, received a dispatch last Wednesday, from the company's property at Central City, Colo., reading as follows: Have sunk the new ore-body fifteen feet; continues big; averaged assay values in gold and silver, \$108 per ton.

From \$50,000 to \$70,000 for labor account alone is to be spent on the Ruby King.

Table with columns: NAME OF COMPANY, Opening May 12, Highest during the week, Lowest during the week, Closing May 19, Total shares sold. Lists various companies like Amie, Argent, Big Pittsburg, etc.

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

Boston, May 19.

The market for the week under review has been dull, with a declining tendency, although in the early dealings it looked as if there might be an active movement and better prices, but the market has so far failed to come up to the expectations held out in the beginning of the year.

In silvers, Calumet & Hecla more than holds its own, and shows an advance of \$3 over last week, with sales at \$238@239, closing \$238 bid.

Copper Falls declined \$1 1/2 with sales at \$81 1/2. Franklin opened at \$12, advanced to \$14 bid, \$15 asked, and closed \$12 bid; about 1000 shares changed hands.

Pewabic declined from \$16@15, advanced to \$16 1/2 and has since been dull and heavy at \$14 bid, \$15 asked. Quincy opened at \$32 1/2, advanced to \$33 1/2, which was the highest price for the week, since declining to \$32 1/2 closing at that bid.

Oscoda maintains its firmness at \$33 1/2@35, with but little doing in it.

The rest of the market dull, with small sales of Blue Hill at \$3, Allouez at \$2 3/4, Aztec at 70c, Douglass at \$3, and Ridge at \$2 1/2. The holders of the Huron and National Copper companies were rather surprised at the announcement on Tuesday evening of an assessment of \$3 on the former and \$2 on the latter, payable on the 19th inst., the books to be closed for the transfer of stock (unless the assessment was paid) the next day.

In silver stocks, Catalpa has ruled steady but dull, at \$2 3/4@2 3/4; only about 2500 shares sold.

Boazanza Development declined from \$5 1/2@4 1/2, on sales of about 8000 shares.

COAL STOCKS.

Table with columns: NAME OF COMPANY, Capital Stock, Shares (No., Par Val., Last Dividend), Rate per Ann., Quotations (May 14, May 10, May 17, May 18, May 19, May 20), SALES. Lists companies like Am. Coal Co., Cameron Cl., Col. C. & I., etc.

\*Of the sales of this stock, 15,350 shares were sold at the Philadelphia Stock Exchange, and 23,020 shares at the New York Stock Exchange.

Total Sales..... 459,970.

Silver Islet fairly active at \$41 1/2@43, closing sale \$42. Harshaw declined to \$9 1/2, and dull at that.

At the Boston Mining Exchange, Empire is still the leading card; sales of about 100,000 shares recorded the past week at prices ranging from 85c., seller 60, to \$1.05, buyer 30.

Massachusetts & New Mexico dull, with sales 57@58c. Copperopolis has been active, and steadily advanced from \$10 1/2@11, with sales of about 10,000 shares, and higher prices are predicted.

Mendocino continues to hold its own at \$4, sales and bid. Milton, although quite active, does not show much strength, although its friends claim much higher prices for it in the near future.

3 P.M.—There was no special improvement to the market at the afternoon Boards, prices generally remaining about the same as this morning. Brunswick Antimony, however, was an exception, and after its long sleep, woke up, and after selling at \$10 1/2, jumped to \$22, closing in demand.

The following is a synopsis of the transactions in mining stocks at the Boston Stock Exchange, and at the Boston Mining Stock Exchange, for the week ending May 18th.

Table with columns: NAME OF COMPANY, Opening, High, Low, Closing, Sales. Lists companies like Allouez, Alps Silver, Arizona Queen, Aztec, Blue Hill, etc.

c. Copper. s. Silver.

Coal Stocks.

New York, Friday Evening, May 20.

The market for these stocks has ruled steady throughout the week, and a very fine business has been done. While the greater part of the business has been absorbed by the general transportation stocks, the shares of the various bituminous coal companies have been comparatively active, and have figured to a considerable extent in the dealings.

Delaware, Lackawanna & Western has had a business of 136,990 shares at prices fluctuating between \$126 1/2 and \$124 1/2. The sales of New Jersey Central amount to 88,620 shares at \$102@104 1/2.

Delaware & Hudson records sales of only 18,790 shares at \$114@113 1/2. Reading, on sales of 23,020 shares, has been a little stronger, selling to-day at \$61 1/2, as against \$57 1/2 last Saturday.

There have also been sales of 14,125 shares of Cameron Coal at \$32@33 1/2, 3500 shares of New Central Coal at \$31@32 1/2, 6050 shares of Maryland Coal at \$33 1/2@31 1/2, 25,355 shares of Chesapeake & Ohio Railroad at \$33 1/2@31 1/2, 43,096 shares of Colorado Coal and Iron at \$57@56 1/2, and 6050 shares of Consolidated Coal at \$10@8 3/4.

The stock of the Cameron Coal Company has assumed considerable activity during the past two weeks, and attracts much attention. The full capital is \$2,500,000, divided into 50,000 shares of the par value of \$50. The company reserves in its treasury 5000 shares of its own stock, to be sold, if necessary, for a working capital. It claims, however, to have all necessary improvements for the present development of its trade, and to be free of indebtedness.

The contract establishing the Jersey Central through line has been signed by the officials of the Jersey Central and Wabash roads, and sent to the Chancellor of New Jersey for approval. It has been agreed to by the Pennsylvania Company, and will probably be signed to-day.

The negotiations for the extension of the Jersey Midland road to Scranton have been renewed. The Delaware, Lackawanna & Western Railroad Company will build a branch from Rochester to Mount Morris, in Livingston County, to connect with its line from Binghamton to Buffalo.

To-day's Herald says: Philadelphia people, pending the dead season of canvasses and terrapins, solace themselves by feeding upon such scandal as the Reading imbroglio affords. Respecting at least one of the stories put in circulation, we print a communication from a correspondent, who, from his intimate acquaintance with the true inwardness of the company's condition, should know what he writes about.



METALS.

NEW YORK, Friday Evening, May 20.

The same uninteresting and featureless condition which has pervaded the whole metal market for some time past still continues, and it looks as if it had "come to stay." The redeeming feature is the often repeated fact that there is a "good jobbing trade," which should in the nature of things, in time, have its effect; but when, producers should know best. Consumers are quite content for the present with hand-to-mouth purchases.

Copper.—In our issue of April 23d, we mentioned that there were rumors of sales of Lake for shipment to Europe of from 6,000,000 to 10,000,000 lbs. for the purpose of relieving the market and maintaining prices. This is now confirmed, and the quantity turns out to be 4000 tons. Guarantees have been given that none of it shall be reshipped to this side, and the price obtained is equal to £72 10s. less 2½ per cent discount per ton, delivered at continental European ports. Few will now contend that stocks are not above the requirements of the country. The market here is nominal and flat, with expectations of large supplies now nearly due from the lake. We quote spot Lake nominal at 18¾@19c.; what futures may be, is at present an enigma. Baltimore, 18¾@18¾c. Our English advices by mail include May 6th.

May 2d. Chili Bars a trifle easier; sellers are scarce and buyers exhibit no desire to purchase. On 30th ult. and to-day, a moderate trade was done at £58½@£58¾ cash for g. o. bs.

May 3d. Chili Bars unsettled, g. o. bs. nominal at £58½ cash, without disposition to buy or sell thereat.

May 4th. Market depressed, with lower prices for Chili Bars; good named and ordinary brands selling from £58 down to £57¾, closing rather buyers lower figure.

May 5th. Market somewhat more steady, but without appreciable change in values, g. o. bs. selling at £57¾@£57¾ cash terms; closing £57¾@£58, with a good inquiry at the lowest rate, usual cash terms.

May 6th. The market opened strong at £57¾, with no sellers under £58, and subsequently £58¾ cash was paid. Closing quotations for g. o. bs. for cash were £58@£58¾.

Wallaroo remains £70; Burra Cake, \$66; English quiet but steady; Tough Cake, £63@£64½; Select Ingot, £64½@£66; India Sheets, £69@£70; Yellow Metal Sheets, 5½@6½d. per lb.

Tin.—The market is very unsettled, and there has been no business in large lines, but jobbing lots are in good demand. We quote 19¾c. for all kinds except L & F., which is 20¾c.

By cable, shipments for the first 14 days of this month were 175 tons to the United States and 100 tons to London. Yesterday, the market in London was depressed, with sellers at £85 15s. for spot stuff, without buyers, except at lower prices. Early in the week, Penang quoted \$26¾; Singapore, \$27¾, with exchange at 3s. 10d.

Our English advices by mail include May 6th.

May 2d. London imports for April were 623 tons, and deliveries 1080 tons. Stock on 1st inst., 8,421 tons. Dutch deliveries were about 800 tons. The market shows an improvement, with sales at from 87@87½s. sharp, 87½@87½s. ordinary cash, 87½@88½s. six weeks to two months, and 88½s. three months, closing with buyers at best.

May 3d. With a further improvement sellers are scarce at the advanced prices. Sales reported from 87½@87½s. cash, 88@89s. forward deliveries.

May 4th. Steady, but without much change. Transactions at 87½s. sharp, 88@88½s. ordinary cash, 89s. two and three months open. Of Banca 300 slabs sold at 87½s. sharp cash.

May 5th. No alteration to note in prices, but perhaps more inclination to sell at current rates. Cash stuff sold in moderate quantities at 87½@88s.

May 6th. Cash parcels were disposed of from 87½s. down to 87½s., from which there was a quick rally, and business was done up to 87½s. immediate payment, 88s. usual prompts, 88½s. three months, closing rather buyers than sellers at highest rates.

Tin Plates.—There is very little doing. The market is extremely quiet on this side, and the English market is very dull. We quote, per box, as follows: Charcoal tins, Melyn grade, ¼ cross, \$6½; Allaway grade, \$5¾@5¾. Charcoal Roofing, Dean grade,

\$5¾@5¾ for 14x20, and \$11 for 20x28; Allaway grade, \$5¼ for 14x20, and \$10¼ for 20x28. Coke Roofing, B. V. grade, \$4¾@5 for 14x20, and \$10@10¼ for 20x28. Coke tins, A. B. grade, IC, \$5¾@5¾; B. V. grade, \$4.95@5; ICW, \$4¾@4.45 for 14x20. Messrs. Robert Crooks & Co., of Liverpool, under date of May 5th, say of Tin and Terne Plates:

Production continues to be on a limited scale, there being quite 70 mills standing idle, and stocks are everywhere decreasing. In spite of these encouraging features, buyers place their orders most sparingly, and the few makers who are obliged to sell have to accept the lower figures named below.

Lead.—The market here is very quiet with small sales at 4¾c.; closing with 4¾c. bid.

The Age of Steel, under date of St. Louis, May 14th, says:

Since our last, there has been quite a flurry in the lead market. Holders of lead in St. Louis are now firm in their demands, prices ranging from 4½ to 4½ cents, according to quality, some lots of refined being held at ½. The sales during Friday, Saturday, Monday, and Tuesday aggregated 1000 tons.

Shipments over the St. Louis & San Francisco Railroad for week ending May 14th were 256 tons.

Spelter and Zinc are both quiet. The former we quote at 5c. for Western, and the latter at 6¾c. for sheets in cask.

The Age of Steel, St. Louis, under date of May 14th, says:

We could hear of no transactions in spelter during the week. The article commands such a low price at present that no sales are being effected, and previous quotations are merely nominal. Manufacturers, however, express confidence that there will be a revival of the demand for spelter soon, and as evidence of that confidence we point to the fact that the Missouri Company is about to greatly enlarge its productive capacity; that the Carondelet Company is in readiness to start up its works at an hour's notice, should a satisfactory advance in price be announced; that the Glendale Company intends to start up afresh a little later in the season under any circumstances, and possibly at a very early day; and that the Collinsville furnace, which has not been cooled down at all, is running to its full capacity.

Antimony.—There is no market and nothing doing, but the lowest prices at which this metal is obtainable is for Cookson's 14¼@14¾c., Hallett's and Johnson's 14¾c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 20.

The week under review has been a very quiet one, yet there has been no further weakness developed. In fact, there have been some signs of improvement. Hard-pan has been, or is, nearly reached. Some articles may be forced down a little, and if so, all offerings will be absorbed by strong parties, and a different condition of affairs may then be looked for. The consumption of all kinds of iron continues to be enormous, and although consumers are using up their stocks and not making heavy purchases, there is but little if any accumulation of iron. The present quietness in the iron trade is abnormal and will certainly be followed by great activity, although, probably, not very much higher prices.

American Pig.—There have been some large inquiries, although we learn of no business. One large house reports an offer of \$23.50 for 10,000 tons of iron. Prices are fully as strong as they were a week ago. Consumers are drawing very heavily on contracts made earlier in the season. We quote No. 1 Foundry at \$24; No. 2 Foundry at \$22; and Forge, \$20.

Scotch Pig.—We learn of sales of 200 tons of Eglinton and 200 tons of Summerlee, from store, on private terms; also, 150 tons of Coltness at \$23¾. The arrivals are small, and are absorbed without the necessity of putting into store. Glasgow prices are a shade weak. Freights this way are higher, ranging between 7s. 6d. and 10s. We quote Eglinton at \$20½@21; Coltness, \$23½; Glengarnock, \$22; Gartsherrie, \$23. Bessemer iron has been fairly active, the sales aggregating probably 10,000 tons, mostly for shipment, at \$23@23½, delivered here. We note a sale of 500 tons of Middlesbrough red-car at \$18. No. 4 Middlesbrough can be purchased at \$17. The best grades can be purchased at about \$18, in moderate quantities, while the large lots are mostly held at \$19@20, and, in some cases, even higher.

Messrs. John E. Swan & Brothers, of Glasgow, under date of May 6th, report 122 furnaces in blast, as against 114 at the same time last year. The quantity of iron in Connal & Co.'s stores was 552,746 tons, an increase of 2995 tons for the week. The shipments

show a decrease since Christmas of 103,767 tons, as compared with the shipments to the same date in 1880. The imports of Middlesbrough pig-iron for the same period show an increase of 21,432 tons. The following were the quotations of the leading brands of No. 1 pig-iron: Gartsherrie, 57s. 3d.; Coltness, 57s. 3d.; Langloan, 58s.; Summerlee, 56s.; Carnbroe, 52s.; Glengarnock, 54s.; Eglinton, 48s. Middlesbrough pig-iron was quoted as follows, f. o. b.: No. 1 Foundry, 42s.; No. 2, 40s.; No. 3, 38s.; No. 4, 37s. 6d.; No. 4 Forge, 37s.

Rails.—We only learn of a sale of 10,000 tons of foreign steel at \$61½, delivered at New Orleans, for shipment through the season. The price for delivery here is \$62½@63. For American steel rails, there is no business reported for the week, although there is said to have been sold lately, for winter delivery, over 50,000 tons, at from \$56 here to \$56 at the mills. This price has probably been brought about by the very much lower prices at which Bessemer pig-iron can now be bought, and there is no question but what it affords the makers a very handsome profit. There is a good inquiry for English iron rails, and considerable negotiations under way, but we learn of no business. Heavy rails are held at \$46@47 here. A fair business is reported to have been done with the American mills. We quote at mills at \$46½@47. We learn of a sale of 3000 tons of steel blooms at \$6 7s. 6d., and quote \$6 10s. c. f. i.

Old Rails.—Sales of 3000 to 4000 tons are reported. We quote Ts. at \$26½, and D. Hs. at \$27½.

Wrought Scrap.—This article is very quiet. No. 1 is quoted at \$28@30 from yard.

We publish the following letters from our regular correspondents:

Cincinnati. May 18.

[Specially reported by JACOB TRABER & Co.]

The demand for pig-iron continues regular, at about previous prices, and we quote as follows:

Table with 2 columns: Item and Price. Includes Hanging Rock Charcoal Pig-Iron, Tennessee, Hanging Rock Coke, Jackson Co. Stone Coal, etc.

Columbus, O. May 18.

[Specially reported by KING, GILBERT & WARNER.]

The situation in the pig-iron market remains unchanged. The demand continues light. Stocks of iron on consumer's hands are running low. We therefore look for a more active demand before long. We quote as follows:

Table with 2 columns: Item and Price. Includes Hanging Rock Charcoal, Hocking Valley, American Scotch, Glasgow, Jackson County, Silver Gray, etc.

Mill Irons.

Table with 2 columns: Item and Price. Includes Gray neutral, Mottled and white neutral, Gray cold-short, Mottled and white cold-short, etc.

Louisville. May 17.

[Specially reported by GEORGE H. HULL & Co.]

The market continues quiet, with few sales and very little if any change in prices, though indications are that, if any considerable lots were pressed on the market, it would cause a decline.

Pittsburg. May 17.

[Specially reported by A. H. CHILDS.]

There has been some movement of pig-iron at the concessions noted in last report, and several buyers have replenished their stocks to some extent, but no great confidence is felt in prices, even at the decline, and purchases are mostly confined to supplying immediate wants.

Richmond. May 16.

[Specially reported by ASA SNYDER.]

The aggregate of sales of pig-iron is surprisingly large, considering that so large a business is done on small orders. Prices continue weak, and the quotations below are nominal.

Table with 2 columns: Item and Price. Includes Scotch Pig-Iron, Anthracite Pig-Iron, Virginia Coke Pig-Iron, Va. Charcoal C. B. Wheel Iron, etc.

Freight to New York, by sail, \$1.80 per 2240 lbs.

St. Louis.

May 14.

[Specially reported by HOFFER, PLUMB & Co.]

There is no change to report in the condition of the market. Business is so restricted that it is out of the question to name firm prices. We quote, therefore, the following as the nominal prices of pig-iron in this market:

Table with 2 columns: Item (Missouri, Southern, Hanging Rock) and Price (\$27.00@27.50, 25.00@25.50, 28.00@29.00)

COKE AND COAL.

Table with 2 columns: Item (Missouri, Southern, Ohio) and Price (\$27.00@28.00, 24.00@25.00, 24.00@25.00)

MILL IRONS.

Table with 2 columns: Item (Cold short, Red short) and Price (\$21.50@22.50, 25.00@26.00)

CAR-WHEEL AND MALLEABLE IRONS.

Table with 2 columns: Item (Missouri, Southern, Ohio) and Price (\$31.00@32.00, 35.00@38.00, 35.00@42.00)

Cleveland.

May 4.

A correspondent in Broadstreet's of May 7th says: Of course, a notable quiet is observable in the vicinity of our large foundries. It is a source of general regret that this important and extensive branch of industry should be idle at such a time. Iron mills are running generally on full or over-time, and production is fully as large as for several years. Pig metal is very dull, but essentially unchanged from prices in force a month ago. Foundry irons must, however, be an exception, as there is really no demand, and certain holders feeling a strong disposition to realize on at least a portion of their stock, prices have a downward tendency. The situation of the ore market is quite interesting. The well-known and strictly Bessemer ores are essentially sold up for the season, but there is a large stock of non-Bessemer ores still unmarketed. Furnaces are generally holding back, not so much for the purpose of bearing the market as to await a favorable turn in prices of manufactured iron, which will enable them to see their way through a season's stock of ore at figures demanded by producers. It is probable that three fifths of the entire Lake Superior product for the current season is now sold; and still the majority of furnaces have not bought any, a very few a partial stock, and still fewer their season's supply. A larger amount than ever before has been sold to Chicago—fully 650,000 tons—and it is almost certain that more than this amount will be consumed at the local charcoal furnaces there and upon the lakes, leaving the Chenango and Mahoning valleys and Pittsburg with a smaller surplus to draw upon than they have expected. Such are the theories of ore men here, and, with few exceptions, they are holding prices steadily. They mention most of the furnaces making pig-iron for the general market, and say that they have no supply of ore, and that time will certainly bring them into the market.

John H. Austin & Co.'s Special Market Report.

LONDON, E. C., May 5. STEEL RAILS.—£9 10s. 6d. per ton; market fairly steady. IRON RAILS.—£5 2s. 6d. @ £5 5s. per ton. Owing to the loss entailed on present prices, Messrs. Crawshaw Brothers, the well-known South Wales makers, have decided not to enter further orders, thus diminishing the supply of iron rails by about 800 tons per week. BAR IRON.—£5 6s. 6d. per ton; flat market. OLD RAILS.—A limited inquiry for Flanges at 75s. c. i. f., Philadelphia. HEAVY WROUGHT SCRAP-IRON.—Nothing doing. OLD RAILWAY LEAF SPRING STEEL.—C. i. f. usual ports, £5 15s. @ £6 per ton, May, June shipments. OLD CAST-IRON RAILWAY CHAIRS.—42s. per ton. STEEL BLOOMS, 7" x 7" AND UPWARD.—£5 15s. @ £6 per ton. BESSEMER PIG-IRON, Nos. 1, 2, AND 3.—55@60s. per ton; flat market. SCOTCH PIG-IRON.—47s. 6d. @ 47s. 9d. cash. MIDDLESBROUGH PIG-IRON, No. 3.—38@38s. 3d. cash.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 20.

Anthracite.

The features of the week have been a smaller business, lower prices, scarcity of vessels at all of the shipping ports, and higher freights. Some buyers are of the opinion that the combination is strong, and are buying; but the great majority are still doubtful and holding off in their purchases. There has been quite an increase in the production this year as compared with last year, and still the stocks in the hands of the companies were but 528,198 tons of coal on April 30th, as compared with 718,944 tons in 1880, and 637,486 tons in 1879. While in the two past years there were good stocks throughout the country, they are very light at the present time. There will be an increase in the actual consumption this year as compared with 1880, while the great scarcity of coal at many centers last winter will cause a larger purchasing for the coming winter. It is very evident that there is to be a large demand for coal previous to December 1st; and it is a fact that, owing to the policy adopted by buyers in 1879 and 1880, similar to the one now being practiced, the companies were enabled to advance prices in the fall, and freights were very much higher. With this record before us, and no indications of the combination breaking, we feel called upon to advise our readers to buy early; for the chances of higher-priced coal (espe-

cially domestic sizes) and higher freights appear to us certain.

The bituminous coals are very much interfering with anthracite steam coals. Unless a change in prices takes place, the bituminous producers will absorb the steam coal trade to their ability to supply it.

The indications of strikes are again disappearing. Our Philadelphia correspondent, under date of May 19th, says:

The local trade is very quiet. At this season of the year, large orders for winter use begin to come freely; but buyers seem to hold back more than usual, expecting that coal may be lower. It has been a mistake not to start low enough to induce early buyers to come in freely; but it is not likely that those who expect to get coal cheaper by delaying their purchases will have their expectations gratified. The trade is held firmly in hand by the companies, and there is nothing to indicate that it will not continue to be so.

The orders for shipment at tide-water are coming much faster than the ability to ship, owing to continued scarcity of vessels, and the accumulation of such orders is quite large and sufficient to keep the collieries moving lively for many weeks, if the other branches of the trade take a fair start.

Freights are steady and firm at \$1.40@1.45 to Boston, and \$1.25 to Rhode Island.

The production of anthracite coal last week was 430,162 tons, as compared with 627,192 tons the previous week, and 390,117 tons the corresponding week of 1880. The total production from January 1st to May 14th was 8,912,430 tons, as against 7,540,846 tons for the like period of last year, showing an increase this year of 1,371,584 tons.

Bituminous.

This trade is quiet, with prices very much demoralized. A month or two past, the Cumberland companies stated that the Clearfield companies were undercutting and taking all of the orders. Now the Clearfield companies say that the Cumberland companies are undercutting; but nobody appears to be taking more than the current small orders.

Chicago.

May 18.

[Specially reported.]

Nothing important since my last, condition of trade being about the same.

On Saturday, the 14th inst., the local coal exchange lowered the retail prices to \$7.25 for broken and egg, \$7.50 for stove and chestnut delivered to families. Prices to dealers, carts at yards, being one dollar per ton less. These figures are being cut to some extent by parties whose only endeavor seems to be to make a tonnage regardless of profit or cost. Car prices are also being cut with the same intent.

Some charters have been effected at Buffalo at the rate of 75c. per gross ton to this port.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ending May 14th, and years from January 1st:

Table with columns: TONS OF 2240 LBS., 1881 (Week, Year), 1880 (Week, Year), and various regional production data.

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.

Table with 2 columns: Item (Total same time in 1876, 1877, 1878, 1879) and Value (5,104,125 tons, 6,742,014, 4,858,034, 8,130,260)

Belvidere-Delaware Railroad Report for the week ending May 14th:

Table with columns: Week, Year 1881, Year 1880, and production data for Coal for shipment at Coal Port (Trenton), Coal for shipment at South Amboy, Coal for distribution, and Coal for company's use.

The decrease in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania

Railroad amounts to 80,243 tons, as compared with the corresponding period in 1880.

The Production of Bituminous Coal for the week ending May 7th was as follows:

Table with columns: Region (Cumberland, Barclay, Broad Top, Huntingdon, East Broad Top, Clearfield, Snow Shoe, Tyrone and Clearfield, Allegheny, Pennsylvania, West Penn, Southwest Penn, Penn & Westmoreland, Pittsburg, Snow Shoe), Week Tons, Year Tons.

For the week ending May 14th.

The Production of Coke for the week ending May 7th, and year from Jan. 1st:

Table with columns: Region (Penn. RR., West Penn RR., Southwest Penn RR., Penn. & Westmoreland, Pittsburg, Snow Shoe), Week Tons, Year Tons.

FREIGHTS.

Coastwise Freights, Per ton of 2240 lbs.

Representing the latest actual charters to May 20th, 1881.

Large table with columns: PORTS, From Philadelphia, From Baltimore, From Elizabethport, Port Johnston, South Amboy, Hoboken, and Weehawken. Lists various ports and their corresponding freight rates.

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