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CONTENTS.

EDITORIALS :	PAGE.		PAGE.
The Hartford Mine, Arizona	263	Alcohol in the Ground, in the Water, and in the Atmosphere.....	269
The New East Docks at Swansea, South Wales.....	263	Concrete Slag as a Substitute for Stone.....	269
Reports of the U. S. Commissioner of Mining Statistics.....	263	Inoxidizable Coating on Iron Articles.....	269
A National Mining Exposition.....	263	Mining Explosives.....	269
The Meter as a Unit of Measure.....	263	NOTES:	
The Chicago Coal Trade.....	264	Iron-Workers' Wages.....	265
New Publications.....	264	Canadian Phosphate Mine.....	269
The Meter in Practice.....	264	Advancing Prices of Nails.....	269
Mexico.....	264	A Rolling-Mill Burned.....	269
Arizona Coal and Copper Discoveries— and the Silver Bell, Tombstone, Harshaw, and Empire Districts.....	265	Titanic Iron.....	269
The Fairbairn Gauge-Cock.....	265	GENERAL MINING NEWS:	
Copper Smelting—Its History and Processes.....	266	Arizona.....	270
Fires in Coal Mines.....	267	California.....	270
British Iron Trade Report.....	267	Colorado.....	270
The Mines of Nova Scotia.....	268	Montana.....	270
The Tin Plate Trade.....	269	Nevada.....	271
Chicago Coal Receipts and Shipments—Jan. 1 to April 1, 1881.....	269	Newfoundland.....	271
The Coke Trade of Western Pennsylvania.....	279	PROPOSALS AND SALES.....	271
Alleged Undervaluation of Iron Imported into Canada.....	279	FINANCIAL:	
Railroad News.....	279	Gold and Silver Stocks.....	272
PROGRESS IN SCIENCE AND THE ARTS:		Philadelphia Mining Stocks.....	275
The St. Lawrence Tunnel Scheme.....	269	Copper and Silver Stocks.....	275
Molybdenum Discoveries in Newfoundland.....	269	Coal Stocks.....	274
		BULLION MARKET.....	275
		METALS.....	276
		IRON MARKET REVIEW.....	277
		COAL TRADE REVIEW.....	278
		STATISTICS OF COAL PRODUCTION.....	278
		FREIGHTS.....	278
		ASSAY DEPARTMENT.....	271

We are in receipt of a letter stating that Messrs. MASON & SHEPARD have relocated the Hartford mine, in Arizona, as the Monitor, owing to a failure of the company to do the necessary work in 1880. Proposing investors in this stock will do well to look into this matter, and learn from disinterested sources whether or not there is any foundation for the statement.

In this issue is completed Mr. HENRY HUSSEY VIVIAN's lecture on "Copper Smelting—its History and Processes," which has been continued through four consecutive numbers of THE ENGINEERING AND MINING JOURNAL. The subject has excited a great deal of interest, and its able treatment by so high an authority as Mr. VIVIAN has brought us many compliments from the metallurgists in this country, for having produced it in full. We have, therefore, determined to republish the article in pamphlet form; particulars as to price, etc., will be given soon.

In an article which appeared in the ENGINEERING AND MINING JOURNAL of May 8th, 1880, on the New East Docks at Swansea, South Wales, we pointed out that it was strange that, in these days of transatlantic steamship connections, there was no direct line between one of the largest metallurgical centers in the United Kingdom and this side of the Atlantic. The new docks are to be opened by the Prince of Wales in October next; and already one line of steamers, called the "Shamrock line," has been organized. From reliable authority, we are informed that "In view of our new docks being shortly opened, and the position which Swansea is going to take in the near future, several steamship lines are making applications for facilities for their boats, starting from Swansea to New York." We have received returns of the trade of the Swansea Harbor from 1876 to December 31st, 1880, and the increase in 1880 is very striking and satisfactory.

THE Indicator of April 11th says with regard to the annual mining Reports of the U. S. Commissioner:

"We insist that 'the statistics of production were' not 'invariably given in coin values,' and that much of the time Mr. RAYMOND did not know what values they were given in, although he may have thought he knew, and incorporated

them as coin values. We can show many statistics of reduction-works, districts, and territories that were given in currency or greenback values when gold sold at a premium of from 10 to 20 per cent. Outside of one or two counties, the products credited to Colorado were merely wild guesses during most of the years of the RAYMOND reports. * * * * As to the time or delay in publishing the books, we appear to have been about right. Much of the time the statistics were brought up to one summer, and issued next. If Mr. RAYMOND never got any thing for the republishing and selling of the books, he must have generously turned over all the profits to the Scientific Publishing Company, of which he was supposed to be a stockholder. Mr. RAYMOND's objections to our remarks appear very much like a distinction without a difference, except as regards coin and currency values."

If the Indicator will show, as it says it can do, the statistics that were given in currency values and ignorantly "incorporated" by Mr. RAYMOND as coin, it will render the public a substantial service. The Commissioner took a good deal of pains to avoid this error; and reduced the currency values to coin in all cases known to him. But the truth of history is more important than individual credit; and even at this late day, the discovery and correction of mistakes will be welcome. Vague talk about "insisting" instead of proving, and "much of the time," instead of definite instances, will not help the student of facts. If the Indicator has better knowledge, and is desirous of spreading information, why does it not do its part to enlighten the world? We venture to point out that the question is, not whether local currency statistics were ever given in the Reports, but whether they were "incorporated" in the totals as coin, without the proper reduction.

If the Indicator can cite any instances in which statistical reports of such compass have been rendered more promptly, or can suggest how that may be done, it will render another public service.

Finally, the Indicator's statement concerning the Scientific Publishing Company should be either proved or retracted. Proved it can not be; since neither the Scientific Publishing Company nor any other concern in which Mr. RAYMOND now has, or ever did have, the slightest interest, did at any time republish his Reports, or any one of them. The Indicator has charged plainly, and now insinuates, that Mr. RAYMOND derived, directly or indirectly, pecuniary advantage from the republication of these volumes. Mr. RAYMOND absolutely and unqualifiedly denies this assertion. If this is what the Indicator calls "a distinction without a difference," it would throw much light on this and other questions by informing the public what it considers to be the distinction or difference between truth and falsehood.

A NATIONAL MINING EXPOSITION.

The National Mining and Industrial Exposition, recently incorporated in Denver, Colo., is intended, we are informed, to provide a permanent exhibition of mining and milling machinery, and of the various ores of the United States, and a head-quarters of information and repository of records on all subjects connected with the mining and reduction of ores and useful minerals. The officers are H. A. W. TABOR, President; HERMAN SILVER, Vice-President; W. A. H. LOVELAND, Treasurer; HAMILTON S. WICKS, Secretary; H. D. PERKY, General Manager; and the Board of Directors comprises also JOHN W. KNOX, S. T. ARMSTRONG, W. B. DANIELS, and A. C. HUNT, while the governors of the States and territories generally are named as honorary Vice-Presidents.

It is evident that this enterprise, if vigorously pushed by its projectors and suitably supported by the mining public, may accomplish a good deal for the mining industry, chiefly in Colorado, but incidentally throughout the West. It is a new indication of the metropolitan ambition of Denver; and although we do not anticipate that it will immediately become the chief, or ever the only, good thing of the kind in this country, it may prove attractive and useful enough to be permanent.

The manufacturers of mining machinery are not now located in Denver, nor do the companies which buy such machinery have their headquarters there; but Denver is in many respects a suitable place for the interchange of information between buyers and sellers, and for the establishment of depots of mining supplies, tools, and at least the smaller machines and the parts of larger ones which need to be replaced. In this line, the trade of that city is already considerable; and with the increase of the mining industry in the mountains, it may be largely extended. Manufacturers will do well to try this medium of making their wares known, particularly to those numerous individual mine-owners who often visit Denver, and do not often visit any other large city. Mr. WICKS, the Secretary of the Exposition, may be addressed, in care of this office, by persons desiring further information on the subject.

THE METER AS A UNIT OF MEASURE.

We publish this week a letter from Mr. FERNOW on the meter as a unit of measure, which presents, to some extent, the other side of the question, namely, that of the practical objections to the use of this unit. While we do not wholly agree with Mr. FERNOW, it would be foolish for us to deny, as advocates of the metric system, that the meter is too long and the decimeter too short to be a convenient substitute for the foot. The result undoubtedly has been that the metric system has been easily introduced in purely scientific calculations and in all practical measure-

ments in which the yard or some similar unit had previously been employed; but it has everywhere been found difficult to make the meter take the place of the foot; and the foot is, unfortunately, the most nearly universal of all the units of measure.

Mr. FERNOW does not state the whole case in favor of the metric system, however, when he speaks of its decimal character as its main virtue. It is not merely the decimal basis of this system, but the simple relations of measure and weight which it establishes that recommend it for use, and make it, in spite of all drawbacks, by far the most convenient system upon which civilized nations can reasonably be expected to unite. Absolutely perfect, it is not. If one could begin at the beginning, and construct such a system as would meet most perfectly the demands both of science and of practice, not only the meter but the whole decimal notation would "go by the board," and a new notation, with eight instead of ten as its basis, would be substituted to the great comfort of mankind now plagued by the awkward decimal expression of the most frequent vulgar fraction. The natural division into halves, quarters, eighths, etc., which can be most readily approximated by the eye or executed by the hand without instrumental aid or calculation, never has given way and never will give way in practice to the division by tenths. Yet we manage to combine the two, or rather to use them side by side, in daily life, without conscious friction; and ninety-nine out of a hundred of us believe in decimal notation as if it were a law of nature founded in the relations of numbers, instead of a mere accident inherited from some ancient tribe of savages, who, in counting with their fingers, unfortunately included their thumbs.

Nobody seriously advocates an attempt to reform the decimal notation. It is too deeply rooted and too widely spread. The best thing that can be done is to adapt to it, so far as possible, all weights and measures. In this practical reform the French, with their metric system, took the lead, and that system has now become so well established as to make speculative discussion of its theoretic basis futile. Its adoption will bring great advantages; no other or better system has any chance at all to be adopted; and even the admitted difficulties, to some of which Mr. FERNOW has referred, will be less felt by posterity than by the present generation. We may even imagine reformers of the twentieth century attacking the decimal metric system, then everywhere practiced, and receiving in reply protests from practical men who will, by that time, have got so used to the meter and its subdivisions as to believe that they are founded in the nature of things, and peculiarly well suited to the mind of man. *

THE CHICAGO COAL TRADE.

The following are the statistics of the Chicago coal trade for the first quarter of this year, as compared with the like period of 1880:

	1881. Tons.	1880. Tons.
Receipts of anthracite coal by rail.....	158,825	121,783
Receipts of bituminous coal by rail.....	496,340	435,935
Total.....	655,165	557,718

The above figures show that the receipts of anthracite coal this year have been 37,042 tons greater than for the corresponding period of 1880, and of bituminous coal 60,405 tons, making a total increase of 97,447 tons. The shipments during the first quarter of this year were 162,746 tons, as compared with 163,768 tons for the first quarter of last year, showing a falling off this year of 1022 tons.

NEW PUBLICATIONS.

GEOLOGICAL SURVEY OF NEW JERSEY. *Annual Report of the State Geologist for the Year 1880.* Trenton. 1880. 8vo, 220 pp. (Index and Map.)

This volume of Professor COOK's reports is valuable to science by reason of its complete and lucid account of the surface geology of the State; that is, of the glacial and pre-glacial drift and the modified outcrops of the older formations, constituting the present sand, gravel, and soil of the surface. A full description of the great continental moraine which crosses New Jersey from Perth Amboy to Morristown, Denville, and Belvidere, is given in detail; and numerous "moraines of recession," terraces, and deposits of modified drift are discussed, with reference to their order in time and the geological changes of which they are the results or the indications. If we mistake not, credit is largely, perhaps chiefly, due to Professor SMOCK for this patient and accurate summary. The same gentleman has been engaged during the year in superintending for the U. S. Census the collection of statistics of iron mines and furnaces. The extraordinary increase in the mining of iron ore in New Jersey is shown in the figures on page 99, where it is said that the quantity mined was in 1878, about 410,000 tons; in 1879, 488,028; and in 1880, 840,000 tons. This is 175,000 tons more than the product of 1873, a year of unexampled activity and prosperity in the iron business. Yet, of the 350 iron mines on the list of the survey, only 136, or 39 per cent, have been worked at all during the year; and only 81, or 23 per cent, were working at its close. A good many of the idle ones, it must be confessed, do not offer much encouragement to this generation. Posterity will have to come down to lean ores; the iron-master of to-day begs to be excused. But it is evident, nevertheless, that the resources of New Jersey are not seriously impaired as yet,

A few well-known mines, such as the Hacklebarney, Byram, Dickerson, Hoff, Mount Hope, Richards, Mount Pleasant, Hibernia, Green Pond, Charlotteburg, the Ringwood group, West End, Hurd, Oxford, Kishpaugh, etc., have furnished the greater part of the ore. Of new mines, the Cooper, at Chester, which furnished about 12,000 tons of "red" ore during the year, is perhaps the most important.

Professor SMOCK gives an interesting table of results obtained by actual tests of Jersey fire-clays, in comparison with noted foreign varieties. The extent of the clay-industry in the State appears from the fact that 267,800 tons of this material were mined during the year. About 10,000,000 fire-bricks and 100,000,000 red bricks were manufactured. The 110 pottery kilns at Trenton, Elizabeth, and Jersey City made about \$3,000,000 worth of white ware. The marl trade of the State was about 70,000 tons.

Mr. BOGARDUS, the chemist of the Survey, gives a number of assays and analyses, from which it appears, among other things, that some attempts have been made to plant a gold and silver excitement on Jersey ground. The copper ores of the Triassic sandstones (contact-veins near the trap-dikes) do contain some silver; but the deposits themselves have proved precarious hitherto. Mr. BOGARDUS has found no gold in any specimens submitted. In fact, he has cruelly smothered the boom in its cradle. *

THE METER IN PRACTICE.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The reading of your remarks and those of President Barnard in the last two numbers of your paper in regard to the metric system and its basis, induces me to utter from my obscurity a few suggestions arising from experience.

No matter whether the meridian, from which, in the first place, the basis for the metric system was derived had been measured correctly or not—whether the meter has an exact relation to the quadrant or not (which, in my opinion, it must always have, both meter and meridian being expressions of length), every body must agree that the idea involved in this otherwise valuable and highly to be appreciated research of the French Geodetic Commissioners, namely, to establish a unit, which was given by nature itself, unalterable, eternal, which could not get lost for all ages, was as fanciful as many or most of the enthusiastic ideas bred by the first humanitarian impulses of the French Revolution. It is, however, as John Quincy Adams expresses it, "One of those attempts to improve the condition of human kind, which, should it ever be destined ultimately to fail, would, in its failure, deserve little less admiration than in its success."

By the by, it was demonstrated in 1838 by Puissant, not that the measured part of the meridian was inaccurately ascertained, but that there existed important errors in the calculated length of the arc of the meridian, and consequently the result sought after, namely, to find a standard of measure which could be restored in conformity with its definition, is not attained.*

It seems that, on account of the now universally acknowledged instability and eternal change of nature and her works, it would be wiser to establish an arbitrary standard, on which the changes could be easier observed, noted, and computed, than on a meridian; and this, in fact, is your "brass," or President Barnard's "platinum stick."

But the question of importance is not that of the form of our globe, but of the practicability of our measure. And having been bred and educated in a country where the much-praised change of standard has been introduced, having had in my official capacities first to handle the foot-rule, and then to unlearn the old and adopt the new standard in my practice, I positively deny, as do a great many of my former colleagues in similar positions, the superiority of the new standard over the old. The meter is too long and the decimeter too short for a convenient unit in practice, and I believe that our generation, upon which this new standard is to be forced, will have to be evolutionized to adapt their sight to and grasp in their mind's eye a unit like the meter.

There is only one advantage, and that an enormous one, in the attempted innovation; but this feature lies absolutely outside of the unit, and with all its merits, which can not be overestimated, could have been applied to any standard, namely, the decimal character of the system. If by its advocates more stress were laid on this advantage, and less on the pleasure of having a new standard, I believe that the mass of people would be sooner induced to the adoption of the system, and to allow the considerable expense of money which such a change necessarily inflicts upon a country. For the adoption of the meter as unit there is one sound reason; and that is the only one, namely, the fact that so many countries have already adopted this standard, and for convenience sake we have to jump over the stick after them.

Trusting that you will pardon my arrogance in producing these most likely shop-worn remarks, which, however, I have often failed to find in discussions on this matter, I am, yours truly,
B. E. FERNOW.
LEHIGH FURNACE, PA., April 4.

MEXICO.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Some years ago, I went from White Pine to Mexico. As I passed Eureka (or where it now stands), Stetefeldt told me to stay, since Eureka would be the big camp of the coast. His prediction has been amply verified. My first visit to Mexico lasted five years and three months. I served as superintendent of three of the large mines (mentioned by Ward and Humboldt); I visited some of the celebrated old mining districts; and so was enabled to form something of an opinion.

The first idea of the *gringos*, or Americans in Mexico, is annexation to the United States. They are constantly urging it, and often make much trouble for themselves thereby. Our people are energetic, and rush

* See *Edinburgh Review*, vol. lxxvii., p. 238, et seq.

ahead; but in so doing, they respect the rights of no one. They damn the country, the religion, the "grub," the law, and the climate—every thing.

The Mexicans do not forget the lesson taught them in California in 1849 and 1850. They well remember how they were rooted out of California, Arizona, New Mexico, Colorado, Utah, Nevada, etc., and the Texan war is still fresh in their memories. They now number 10,000,000 of people, and it will not be an easy thing to annex them. They are well armed and will fight. So I think that the chances of annexation (under a Republican or Northern administration) will be small. If a Southern administration were in power, there would be a war with Mexico without doubt.

As to climate, there are three kinds: the hot country, the temperate, and the cold. The first is from the sea-level to 1500 feet above the sea; the second, or *templada*, from 1500 to 4000 feet above the sea; and the last from 4000 to 8000 or more feet above the sea.

Calenturas, or chills and fevers, are very common among the foreigners. Still, there are some very healthy natives—but of the chocolate-colored race. Our North American new-comers will suffer much from malaria; but in time they, or their children, will be acclimated.

The food one soon learns to relish. I often wish for a *cazuela de frijoles* and some *tortillas*, etc.

In manners the Mexicans are a kind-hearted people, and very polite in all the relations of life. This politeness extends to all classes.

As to mining, they have worked their mines for three hundred years, or thereabouts; we have worked ours only twenty; and yet we are far ahead of them in present annual product. This does not show that we have better mines. They can show a Valenciana for our Comstock, a Sombretete and Zacatecas, Real del Monte and San Luis Potosi, Batopilas, Candelaria, Botafios, and Guadalupe de los Reyes for our Eureka. Tuscarora, Austin, Leadville, Ontario, Homestake, Tombstone, and Bodie.

Our people must have some new excitement to rush to every spring. This time it is apparently going to be Mexico. No doubt, in some respects, the railroads will effect a wonderful change in Mexican conditions. What the result will be no one can tell. But I can safely say that there are good mines more easily accessible in our own country, and that many of our American companies in Mexico will be badly "cinched."

There are many points to be learned from the Mexicans in mining. They work their ores very closely—much more so than we do ours. But their processes require several stops and a long time. In the mines, they work with few tools and appliances, and yet are very effective miners, using especially very little timber. The grand difficulty in Mexico is in getting around the mountains. The trails are frightfully bad. Railroads will run through the country, but will not benefit all the mining districts.

In 1824, the English made a grand rush into Mexico. Of the scores of companies not one remains—they all went under. The same thing occurred in 1864, when a rush took place from California. The disasters of those two periods will pretty certainly in many instances be repeated. In short, the Mexican boom, like all the other mining booms, will wreck a good many adventurers, and carry a few to fortune.

In my next, I may give some descriptions of English and American enterprises.

NEW YORK, April 11.

ARIZONA COAL AND COPPER DISCOVERIES—AND THE SILVER BELL TOMBSTONE, HARSHAW, AND EMPIRE DISTRICTS.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The present mining excitement is due to the report of the discovery of bituminous coal in the Saddle Mountains, sixty-five miles north of the Southern Pacific Railroad, and not far distant from the proposed route of the Atlantic & Pacific Railroad. From either road accessible wagon-roads can be cheaply constructed. If reports are to be credited, immense beds of a good grade of coking coal exist in shale and sandstone, although surface samples analyzed in Tucson show a large percentage of ash. The owners claim that a better quality is found deeper—an assertion that only developments can demonstrate. It is barely possible that a portion of the coal-field is on the Apache Reservation. If so, according to treaty, the portion so situated can not be located. However, the discovery has started a hegira to the black diamond country.

Hardly had the news of the discovery in the Saddle Mountains been received, when the reports of the finding of coal-veins near Casa Grande, about twenty-five miles south of the Southern Pacific Railroad, were current. If prospectors can be believed, croppings are abundant, and the formation corresponds to that where the best qualities of coal have been discovered. Here it would be more valuable than in the former district, since miles of land being an arid plain, a branch road could be laid at comparatively small cost. The connection of the Southern Pacific and the Atchison, Topeka & Santa Fe roads created some enthusiasm; when anticipations became realities, the travel and traffic settled into routine business. With Arizona's undoubted mineral and grazing resources, aided by railroads, but a few years will elapse before it will reach a high degree of prosperity.

Silver Bell District—a tributary to Tucson—has recently gained notoriety from the discovery and developments of a few mines, the ores chiefly argentiferous copper. Now capital seeks investments in copper mines, owing, no doubt, to the profitable results of the Copper Queen mine, of Bisbee. By the way, it is rumored that a large plant will be erected on the San Pedro River, to treat by smelting process the large bodies of malachite of twenty per cent copper that this district contains. Although a long distance to freight the ores, an abundance of water is secured. The fifteen-ton furnace was profitable; therefore several smelters of larger capacity must make a greater paying plant.

Tombstone steadily increases in population, while the bullion-producing mines keep pace with the growth. The Grand Central has started its 30-stamp steam mill successfully, and has ore-reserves of high grade to guarantee dividends for many months. From reliable sources, I am informed that \$3,500,000 were offered for the controlling interest, and refused. Its neighbors, the Contention and Tough Nut, still yield their usual amount of bullion, and could no doubt make more if supplied with

stamping facility. The Bob Ingersoll, a mine lately capitalized for \$5,000,000, came near obtaining greater notoriety through a lawsuit than as an ore-producer, due to a dispute between claimants, one holding under the old assessment law; the other, under the new. The differences have, however, been wisely adjusted, and ere long, no doubt, the mine will produce a high-grade ore. But all is not silver that shines, and Tombstone must guard against the sharp practice of stock-mining manipulators, of which I fear it is now having some experience.

The Hermosa mill, in the Harshaw District, is running smoothly, but not so satisfactorily as the owners would desire. They would like larger bullion balances at the month's end. Under Mr. Boss's efficient management (by the way, I am informed that he leaves soon for Sonora), the expense of milling per ton has been reduced to a very low figure, probably not over \$4.50 per ton, with little loss in tailings. Nowhere except in the free and easily crushed sandstones of Utah, is silver-bearing rock so cheaply handled. The future of the Harshaw seems assured. Reports of late are that large bodies of ores, similar to Hermosa, have been discovered. The staid New Yorkers, owners of the Alta, appear to be contented with the facts of a true fissure of high-grade refractory ore at 165 feet deep, since they suspended operations several months ago, and there are no indications of an early renewal of work. Their neighbor, the Trench, probably on the same vein, is down about 250 feet, hoisting ore and waste with considerable zeal. The "Pool mines," of Washington Camp, are not vigorously worked. The arrival of Mr. Buckminster, of Comstock, is awaited to push development on several of their mines. However, the Ohio has a promising lode of medium grade. The Davis will soon have its 30-ton furnace successfully in operation. The Silver Bill proves better by development. Unfortunately, the Holland has blown out. It is hoped that the mine will resume work, since it is thought to have a body of ore.

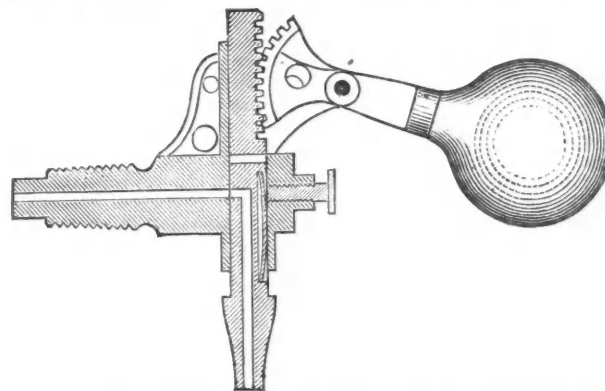
The Total Wreck, Empire District, owned by Vail & Harvey, has been opened by shafts, tunnels, and drifts several hundred feet, showing horn-silver inclosed in large boulders of the calcite gangue. I am told that \$200,000 was refused for it. Being near the Southern Pacific Railroad, the owners contemplate erecting a mill there. Notwithstanding these favorable accounts of some properties, it must be remembered by those investing in mines that they should exercise caution to prevent the many unscrupulous vendors here from palming off a claim for a mine. If this simple advice be heeded, the true mining interest of this section will not suffer.

PIMA COUNTY, ARIZ., March 28.

J. M. G.

THE FAIRBAIRN GAUGE-COCK.

The New England Gauge Company emphasizes three points in this gauge-cock: First, no packing is required; secondly, it is self-closing; thirdly, it can be cleaned out while steam is in the boiler, without burning the hands or face. This last feature is a very important one, as there is nearly always more or less deposit or sediment in the water used in steam boilers, and the gauge-cocks are very liable to get stopped up, thereby cutting off the means of ascertaining the height of the water in



the boiler, and in fact becoming a source of danger. In the Fairbairn Gauge-Cock, the danger from this source is said to be overcome by a very simple and effective process. All that is necessary to be done in such an emergency is to give the little thumb-screw three or four turns, releasing the spring, which allows the handle to be raised high enough to bring the upper hole in the piston down opposite the connection to the boiler and even with the thumb-screw, which has a hole through it, thus making a direct connection to the boiler. A wire can then be pushed clear through into the boiler, and after the passage is cleared the handle can be dropped down, cutting off all escape of steam, the thumb-screw can be turned up, and all is perfect again.

IRON-WORKERS' WAGES.—A Pittsburg telegram to the *Herald*, dated April 7th, states that the Amalgamated Association of Iron and Steel Workers have given the manufacturers notice that all scales of wages will terminate on June 1st, causing much anxiety among the employers. The puddlers' scale expires on that date, but the scales of rollers, heaters, and numerous other classes of workmen in the iron mills run much longer. All scales but the puddlers' require that sixty days' notice shall be given by either side desiring change in prices, and this notification looks as if the workmen contemplate an advance in wages, for some classes of men at least. Officers of the amalgamated association declare that the chief object of the notice is to change the scales so that all shall expire on the same date, and thus the wages of the different classes of workmen can be more fairly graduated. There may, however, be some change in prices in June, but it will not affect the boilers' scale of \$5.50 per ton when iron sells at 2½ cents. The bulk of wages is paid to boilers, while bar iron does not really bring 2½ cents now. All the Pittsburg mills are running along successfully, and most of them are making money on specialties.

COPPER SMELTING—ITS HISTORY AND PROCESSES.

By Henry Hussey Vivian, M.P.

(Concluded from page 250.)

REFINERY.

"The material dealt with in the refinery furnace is the 'blistered' copper produced in the roaster-furnace, and contains from 96 to 98 per cent of copper. The charge occupies twenty-four hours, and weighs from nine to ten tons. It is melted during the night, and remains several hours in the furnace in a melted state. The first operation in the process of refining is the skimming off from the surface of the copper the slag which has been produced in the melting of the charge, in order to facilitate the separation of the last portions of sulphur from the copper. To ascertain when the copper is 'fine,' or when it is perfectly free from sulphur, a portion is taken out in a ladle and allowed to cool. If it still contains sulphur, the copper rises in the center of the ladle, or bubbles out over the surface of the set portion, or shows a number of black spots, generally forming a circle according to the quantity of sulphur still left in the metal. When perfectly free from sulphur, there occurs a depression in the center of the copper in cooling, called the 'set.' When it has arrived at this state, the copper exhibits in the fracture a dull red appearance, and is very brittle and unmalleable. In this state, the copper contains a considerable quantity of protoxide of copper, which has been taken up or absorbed by the melting mass as quickly as formed at the surface. In most cases, it reaches the point of saturation by the time the whole of the sulphur has been driven off, to effect which the surface of the copper is left exposed to the action of the air. The next operation is a reducing or deoxidizing one—to convert the oxide of copper, which the copper holds, into the metallic state. The surface of the charge is covered either with stone coal or charcoal; and in order to bring every portion of the mass under the influence of the reducing covering on the surface of the charge, a pole of hard wood is pressed down into the melting mass, and the ebullition caused by the escape of the gases from the burning pole so stirs the whole mass that gradually every portion of the charge is brought into contact with the carbonaceous covering, when the oxide of copper yields up its oxygen to the carbon on the surface, and the whole mass becomes malleable. The changes which take place during the 'poling' process are ascertained by frequently taking small portions of the copper, and examining the fracture, which, when the process is complete, is smooth and silky. If the process of poling be carried too far, the whole mass suddenly becomes 'overpoled,' in which state the color of the copper becomes much whiter in the fracture, and the copper assumes a fibrous, crystalline structure when broken, and when ladled into a mold, on setting it rises in the center, just as silver does when cooling in a test. Whatever may be the cause of the appearance or condition which is thus called 'overpoled,' whether from the copper taking carbon into its composition, or from its being deprived of the whole of its oxygen, the means of remedying the matter is the exposing of the surface of the copper again to the action of the atmospheric air."

The continental system was to melt the black copper in a shallow "hearth," called a Gaarheerd, like a blacksmith's forge, by means of a blast issuing from a sharply-inclined tuyere, and impinging on ignited charcoal. Slag forms on the surface of the copper, and is from time to time removed. Tests of the condition of the copper are taken; and when these tests indicate that the copper is fine, the blast is stopped, and either the copper is ladled out and cast into molds or taken off in round thin masses ("rosette" copper) as the trade may require.

We have now obtained our copper in a fine and marketable state, containing at least 99½ per cent of pure copper. But what have we got? Is it pure copper? Is it in a marketable state? I am almost disposed to tell you that no ten persons in this room differ more from each other than perhaps the quality of ten succeeding charges of copper made by a copper smelter differ from each other. Mind, I speak critically, not with the enthusiasm of youth, which thinks every face beautiful. I speak of minute differences of quality, generally of no moment, but sometimes of very great moment. I think if I were to ask Mr. Morgan what had been the chief labor of his life, he would reply, "To make good copper." I am sure it has been one of my most constant problems. Now, I have caused a few specimens to be prepared, which will show you upon what minute quantities of what our friend, Jochim Gans, three hundred years ago, not inaptly called "corrupt humors," which we should now call "impurities," the quality of copper turns. Let me first say that copper may be of first-rate quality for all copper uses, and yet very inferior when used for making brass; and when I tell you that nearly one half the copper produced in the world is used for the latter purpose, you will at once appreciate the enormous importance of producing copper of such a quality as to render it available for that manufacture. I well remember when our copper was never tried for brass before it left our works; indeed, I myself introduced the practice even before I took the management of them some six-and-thirty years ago. Many was the cargo of copper we had thrown on our hands by the French brass-makers in those days, and a very unpleasant business it was. We, however, very soon introduced a perfect system of trials for quality which has enabled us to avoid such annoyances. In very early days, I took in hand a series of synthetical trials, which proved of great value. I found chemical analysis slow and most unsatisfactory; traces of this, that, and the other impurity were reported; but who could say to what extent the quality of the copper for one use or another was really affected? It occurred to me that the true way of solving the difficulty would be to take the best copper I could get, and make it bad by various known mixtures of impurities; and I soon found that I was thus enabled to unravel much of the mystery of quality. For the purpose of my lecture to-night, I have caused a few of these synthetical trials to be repeated, and here they are. I do not present them to you as complete or exhaustive, but rather to illustrate this branch of my subject.

Take the case of antimony, it will be seen that the one thousandth part converts first-rate "best selected" copper into the worst conceivable, so bad as to be only fit for casting as brass; short in fracture and a bright yellow. That one four thousandth part makes it unfit for any thing but inferior brass purposes, below the quality known as tough ingot. That one eight thousandth part reduces it from "best select" to tough ingot

quality, and that one sixteen thousandth part sensibly deteriorates the quality. You will observe that one one thousandth part of nickel, cobalt, bismuth, arsenic, and phosphorus reduces "best selected" to tough ingot quality.

White nickel and arsenic in combination, and mixed in the proportion of one five hundredth, make copper unfit for brass.

The last trial shows that two substances in combination may often produce a far more hurtful effect than either of them separately. I am indebted to Mr. A. S. Merry for this latter suggestion.

One curious inquiry arises, namely, How is it that any given admixture of another metal with brass causes it to change its character, even if that admixture is infinitely small? I remember well that some thirty-five years ago, just after I had finished my synthetical trials, I had a conversation with the late Mr. George Frederick Muntz, the inventor of yellow metal, who was probably the best brass manufacturer of his day, upon this point, namely, the brittleness and yellow color of bad brass. He told me that he could not explain it, and that, although he had sought an explanation from some of the best chemists of the day, not one of them had been able to give him a satisfactory reply. I was very young at that time, and felt proportionately proud of being able to give him such an explanation as he at once admitted to be satisfactory. It was as follows, and I believe in it is contained the true cause of brittleness and toughness in all metals: During my experiments, I had observed a case—I think it was the admixture of a certain amount of tin with brass, in which the fracture was rough, coarse, and mottled, drab and yellow. Upon close examination, I discovered that this appearance was due to the metal being composed of large crystals. I found that the mottled appearance was due to some of these large crystals being broken through, while others had separated, having their facets bright and unbroken. The former presented a drab appearance, while the latter, reflecting back the light, were bright yellow. I at once saw that the brittleness and yellow color of bad brass were due to the crystallization being extremely small, so that each crystal, being very minute and having an existence separate from its neighbor, parted without fracture, and, possessing unbroken facets, reflected back a yellow light like polished brass. This is further confirmed by the well-known fact that if, instead of allowing bad brass to cool slowly, you quench it in water and thus change its crystallization, it is no longer brittle and yellow when broken. When a metal forms in long crystals in cooling, it is sure to be tough; but when the crystals are fine and sand-like, then it must be brittle. I believe this same law applies to all metals.

Now, having spoken so much of bad copper, I may naturally be asked how to make good and how to avoid making bad copper? I fear my answer can neither be complete nor satisfactory; but I may at least contribute something toward the solution of the various problems involved in this difficult question.

My first advice is, to do your best to determine beforehand the quality of the ores you have to treat, and never to mix a bad ore with good ores. I speak in the plural because it is surprising how small a quantity leavens the whole lump.

My next advice is, that, when you have once got impurities out of your smelting mixtures, never put them back again. One of the greatest improvements we have ever effected in copper smelting is never to allow roaster or refinery slags to be melted in the metal furnaces, but to treat them by themselves. It is true that by so doing you lose the advantage of their oxidizing action, but that is a small matter compared with the perpetual addition of deleterious substances to your mixture.

Then I would say, avail yourself of the old "best selected" or "regule" process where your material contains impurities which pass into the copper bottom formed in that process. All the foregoing recommendations refer to copper material in course of treatment, not to copper itself when once made. What are we to do with bad copper? My answer is, that that is a question of degree. Copper may be so bad as to be only fit for casting as brass. In that case, make up your mind to sacrifice a pound or two per ton, instead of expending perhaps twice as much in trying to make it better. It is no doubt difficult to make bad metallic copper into good, but by our present improved methods much may nevertheless be done. I think about the year 1851 or 1852, I accidentally hit upon a plan of improving metallic copper, which has stood us in very good stead ever since. I was experimenting on the separation of nickel and cobalt, contained in some ores we were then receiving, by the admixture of arsenic, and I naturally managed to get an excessive quantity of arsenic into the copper so experimented on, which did not improve its quality. Arsenic was retained by the copper through the refining process, and was present in the tough cake copper sent to the mills. This copper was tried by rolling in the usual way, and the trials, which were of course extremely bad, were laid out for my edification and inspection on the iron plates of the mill-floor. To my surprise, in turning them over I saw that the iron plates on which these trials had cooled were as white as if they had been whitewashed. I saw at once that arsenic had been distilled out from the body of the copper, while in the annealing furnace at a red heat, and had continued to pass off even while the copper was cooling on the mill-floor. It occurred to me that what had happened accidentally might be made available systematically, and I caused bad blistered copper to be submitted to a slow, constant, long-continued heat in the roaster-furnace without melting it until it was desired to withdraw the charge. To this process I gave the name of "dry roasting." I see that Dr. Percy, on page 380 of his work of 1861, talks of "dry roasting" practiced in former days, as described to him by an old smelter; but that was evidently a wholly different matter, depending on the exposure of pigs of *regulus* during the greater part of the process of roasting to a less degree of heat than sufficed to melt them, and the roastings were repeated often three times until "blister" copper was obtained. My plan does not come into operation until after "blister" copper is obtained. We always roast our *regulus* down very slowly; and I do not see how the process above described could have been carried out, since white metal melts at a very low temperature, and parts easily with its sulphur, setting free metallic copper: how the pigs are to be withdrawn from the furnace often three times without melting, I fail to see. I have heard of the frequent calcination of *regulus* and remelting, practiced in olden days, having the effect of improving quality, and I think the old smelter must have alluded to what was done

at some works even in my time, namely, calcining ore-furnace metal only sufficiently to produce "blue" or "red" metal, and then calcining again before producing "white metal." This was called coarse and fine metal melting, but had no relation to the process I have described, which we, I believe, were the first to put in practice. I do not even know that it is used at any other works at this moment. The effect of this "dry roasting" of blistered copper is very marked; we can bring up copper which, if refined without dry roasting, is so brittle that it is reduced almost to powder in passing through the rolls, to a tough quality fit for all ordinary copper uses. This is effected by keeping the pigs of blistered copper at a good red heat in a roaster-furnace for twenty-four hours, then melting and tapping in the usual manner; this process is again and again repeated until the desired degree of quality is attained. I have tried the effect of carbonizing, or, perhaps I should rather say, deoxidizing the copper before tapping, believing that volatile impurities would be more readily sublimed when in a metallic state, but no very sensible difference resulted. The process ceases when the copper is melted.

Another and more recent system of improving the quality of metallic copper is the addition of niter and lime in the refining furnace; to whom the first suggestion is due, I know not; it has been kept, and is to this day, one of those profound secrets which every body knows and avails himself of when it suits him, without imparting it to his neighbor. This process is as follows: 25 lbs. of nitrate of soda and 75 lbs. of lime are intimately mixed and thrown on the charge of copper in the refinery after the slag has been removed; the charge is then poled or "flapped" for half-an-hour, and then the slag is skimmed off. If the first operation does not sufficiently improve the copper, it is repeated again and again. We have found that the quality of copper is decidedly improved by this system, both for brass and copper uses; but I have reason to fear that it is attended with some loss of copper, and it is also expensive if often repeated.

Before taking leave of copper-producing industries, I ought briefly to mention two most important systems by which copper is extracted from pyrites rich in sulphur and poor in copper by the wet way; the one I have already alluded to, namely, the system adopted in Spain at the great works of the Rio Tinto and Tharsis companies and at those of Messrs. Mason & Barry; the pyrites is placed in large heaps in the open air; these are set on fire by a layer of wood placed beneath, and continue to burn for many months; the copper contained is partially converted into sulphate, the burnt ore is then washed with water in vats, whereby the sulphate of copper, being soluble, is extracted; the liquor is then run over iron, whereby the copper is precipitated and collected in the metallic state. The residua of this lixiviation are then deposited in immense heaps with a certain proportion of raw pyrites, water is laid on, and the remaining portion of copper is said to be completely washed out in some six years; the liquors issuing from the base of the heaps are, of course, collected, and the copper they contain is precipitated in the manner described above.

The other process is that of Mr. Henderson for the treatment of the burnt pyrites obtained from the kilns of sulphuric acid makers. I have never seen this process, and it would therefore be improper that I should do more than mention it as a process which has proved eminently successful for the treatment of that material, extracting the copper, I believe very completely and leaving a residue composed of almost pure oxide of iron, valuable in iron smelting. I am informed that the burnt residua of the kilns are calcined with salt so as to convert the copper into a chloride, which is partly volatilized and condensed and partly obtained by lixiviation—first with water and subsequently with dilute hydrochloric acid.

FIRES IN COAL MINES.

Written for the Engineering and Mining Journal by A. Wasmuth, M.E.

Most varieties of coal retain larger or smaller quantities of pyrites, which decomposes in the moist air of the mine, and, in combination with the pressure exerted by the rocks upon the excavations of old workings, causes mine conflagrations. As is well known, the rising or sinking of the coal has disturbed the seams, that is to say, their continuity is more or less interrupted. By these dislocations, slickensides and fissures have been found ranging in width from a few inches to many feet, and filled with the ingredients of country-rock, coal, pyrites, etc. Quite frequently, mine fires originate through decomposition and spontaneous combustion in the substance filling such fissures. Fires may also occur as a consequence of explosions. Mine fires of the first class above mentioned occur in the goaves or worked-out portions of the seam. In the extraction of coal, small pillars may have been left, which, in the course of time, become crushed by the weight of the overlying rock, and thus constitute heaps of fragments of rock and small coal. In many cases, the passages leading to the old workings have not been completely shut off; and by the access of air, together with the pressure, this rubbish is raised in temperature, the pyrites decompose, and spontaneous combustion is the result. Generally this is not immediately discovered, because the locality of the fire is inaccessible. As the fire makes progress, the air is drawn in, and in from twelve to twenty-four hours there may have been developed a serious fire, the suppression of which will involve great expense and perhaps a prolonged interruption of production.

Soft bituminous coals and lignites take fire most easily. In Westphalia, the mine fires have been almost exclusively in the seams of the best coking coal. In Zwickau, Saxony, the coal is less suitable for the manufacture of coke; nevertheless all the mines are liable to fires, which not infrequently necessitate the abandonment of large areas. The Bohemian brown-coal is specially liable to spontaneous combustion. Both in Zwickau and Bohemia, the cross-fissures frequently take fire.

The control of a mine fire is best obtained by bringing bulkheads as near as possible to the burning mine. For the more complete prevention of the access of air, brick walls are afterward added. The portion of the coal-beds thus isolated is, in the case of pit coal, usually lost, because, even after the fire and again admitting air, it is found that a rapid development of gas takes place, in which men can only advance with artificial aid to convey air to them, and a successful restoration of the conditions suitable for regular labor is very doubtful. After mine fires in brown-coal or

lignite, on the other hand, it is frequently possible to recover the isolated fields. It remains for a considerable time untouched, until the fire has been suffocated. In the mean time, the ventilation is so regulated that the outlet may also serve as intake. If skillfully managed, the operation succeeds.

In order to avoid mine fires, it is advisable not to give to the passages leading to the breasts too large dimensions, and to place in them, after the field is worked out, walls which resist the pressure of the roof. In a word, the access of air to the worked-out field must cease. Moreover, fires may be localized and prevented from rapid spreading if the ventilation can be instantly reversed.

Mine fires of the second class, originating in the faults or fissures and other filling, are frequent in lignite. A fire of this kind is more easily discovered in the neighboring levels. The source is usually accessible, and the smoldering mass can be actually removed. After cutting out the fire, the fissures must be closed with masonry, since otherwise the spontaneous combustion in such places will reappear. It is advantageous, at the time when in driving levels such fissures are cut, to excavate them for about six inches all around the level, and fill with cement or close with light masonry.

Mine fires of the third class, caused by the ignition or explosion of fire-damp, have become much more frequent in recent times. A skillful and thorough ventilation is the only preventive for them. Indeed, the avoidance and the suppression of all fires in coal mines depend directly upon a proper arrangement and maintenance of ventilation.

BRITISH IRON TRADE REPORT.

By Messrs. Bolling & Lowe.

In our report of November last, we expressed the view that the moment was favorable for intending purchasers, and since then new enterprises in railways, canals, water-works, mortgage companies, etc., have been brought out and looked upon favorably by investors.

As an instance, the capital required for the Hull & Barnsley Railroad and Dock Company was subscribed three times over. Other railroads here and abroad, as well as dock and harbor schemes, are being matured, and will in due course be brought before the public.

Abroad, the Panama Canal project has been floated in Paris, and this work will absorb much labor and material. The projected railways in Australia and Canada are also likely to give work for our rail-mills.

It is curious to observe how the interest in our branch of trade centers in the prospect of renewed demand from the United States. In considering this question, it must not be lost sight of that, when the demand in 1879 sprang up, the Americans had hardly a stock of any kind of material manufactured in the old world. At the present time, there are several hundred thousand tons of pig-iron, and old material as well as new steel and iron rails, to draw upon when the renewed demand sets in. In looking at the enormous exports for 1880 to the United States from this country alone, we may assume that nearly half the quantities are in stock in different parts of the States. As regards old iron, it is probable a quantity is held equal to our own exports; for the whole world has contributed to the demand of the United States.

Seeing that for some years the United States were able almost entirely to dispense with supplies from this side, it is but reasonable to suppose they are striving might and main to free themselves altogether. Going through the items of our exports, we regret that nearly the whole of them represent a small quantity of labor, being not much above raw material.

	Tons.	Value.
The total of our year's exports to the States for 1880 were.....	1,355,582	£9,836,463
and deducting from this the high-class manufactured material, say		
Bars.....	51,913	
Hoops.....	45,159	
Tim plates.....	164,284	
Steel.....	44,099	
Manufactured.....	20,467	325,922
		5,386,116

we have for pig, and old iron, and rails..... 1,029,600 £4,449,347 on which comparatively very little manual labor, which means wages, is spent.

It is likely they will take yet a good deal of old material and pig-iron; but, as a whole, we foresee a continued decreasing demand from the United States for the finished article, as the mills are increasing their productive capacities.

Approximately, during the year 1880, there have been laid down in the States 7000 miles of railroad, consuming about 750,000 tons steel rails and 230,000 tons of iron rails. Of these, a considerable quantity has been obtained from this country and abroad. It is probable that in 1881 the United States will not be under the necessity of calling upon strangers for more than 250,000 tons: this is considerably less than 1880.

Nearly 1600 new locomotives have been put on the roads, and 68,000 cars, all manufactured in the States themselves.

On good authority we may assume that on January 1st the stocks in bonded and free stores of the United States would reach about 245,000 tons pig-iron, 262,000 tons scrap-iron and old rails, 50,000 tons new iron rails, 40,000 tons steel rails, 40,000 tons other manufactured iron, making a total of 637,000 tons, equal to nearly half of what was exported from this country during 1880.

The wonderful mercantile prosperity of the United States is continually referred to, and such a fact as the decrease of their debt is pointed to as the best proof of all. It is certainly a wonderful thing that a nation reduces its debt at the rate the United States have done. Its interest-bearing debt in August, 1865, amounted in round figures to \$2,756,000,000, while at end of January, 1881, it amounted only to \$1,675,000,000, thus reducing it by \$1,081,000,000, or at the rate of nearly £15,000,000 sterling a year during the preceding fifteen years. We think, however, that this must be ascribed as much to the small expenditure under the head of army and navy as to any thing else. We see a nation of fifty millions keeping up a military force of only 25,000 men—a less number, in reality, than this country at present employs in Ireland.

Looking to the political circumstances in the East, Greece and Turkey arming to the teeth, our troubles in South Africa and agitation at home

and the deplorable event in Russia, we think the trading community in Great Britain can not look for any reduction in taxes to help them.

It is the custom to cry out against foreign governments who put a heavy import duty on such goods as we principally export from this country. Each nation taxes itself in the way that suits it best, and we can not expect them to alter their system to please us; they will follow what they consider their self-interest as their own counselor.

Concerning the position of our trade as a whole, we think it may be said that the firm tone in prices is caused more by the hope of a prosperous future than based on any actual facts that can be pointed to as a well-founded basis for such feeling.

As a curious instance of the cycles in trade, we give the respective prices of a few of the leading articles ten and twenty years back, taken from our old reports, which will show how comparatively small a difference there is in any of them except steel rails and tin plates:

YEAR AND MONTH.	Staffordshire List Bars at Works.	Scotch Pig Warrants.	Heavy Iron Rails at Works.	Heavy Steel Rails at Works.	Tin Plates.
March, 1861	£ s. 7 10	s. d. 48 0	£ s. 5 10	£ s. not quoted	23s. per box.
" 1871	7 10	53 0	6 10	11 10	23s. "
" 1881	7 10	48 3	5 5	6 5	16s. "

The stock of pig-iron in Glasgow and Middlesbrough is exceedingly heavy, reaching approximately 1,300,000 tons, and it seems to be largely used as a speculating medium.

With the present great production, the question arises, Where is it all going to be absorbed? Can we count upon the erection of large water and gas-works throughout the world? This would be an absorbing element. Without such a demand, and with the stock and production combined, it is not easy to foresee what is to uphold prices of pig-iron. There must also be considerable expenditure, as interest and storage of such quantities of materials, which may be taken at a round estimate to amount to £3,000,000 in value.

For the next few months, works in the heavy branch of trade in this country are likely to be pretty well employed. Imports of raw material for our iron and steel-works continually increase; from the port of Bilbao alone, we may reckon that we have drawn two million tons of ore in 1880, making, with what we take from other Spanish and foreign ports, a total of about three millions.

The Colonies continue to be our best customers; and as long as their financial position is undoubted, they will be able to place their bonds in this market, taking railway materials in return.

In France, principally through the extension of home railroads, the works are full in every direction; in Germany, the same is not the case. The works there are not too well off for orders; of late, however, they have taken large contracts for Spain and Italy, amounting to nearly a total of 100,000 tons steel rails for the year 1881, irrespective of large quantities of blooms and rails for the United States, which, very likely, will considerably exceed this figure. Our export to Russia is likely to be much curtailed, on account of the increased duty and the effects of a bad harvest.

The Scandinavian countries are slowly extending their railway system. The newly-created states in Eastern Europe have not yet sufficiently settled down to become customers on our terms of payment, and are, therefore, more likely to be customers of the German manufacturers, assisted as they are by their financial houses. On the other hand, Italy, Brazil, Mexico, and India continue to be fair customers.

A noteworthy feature in the consumption of manufactured iron is the iron sleeper. In this country, it has only been used experimentally; but in Belgium and Germany, it has been employed for a considerable time. In the past two years, it is calculated that nearly 130,000 tons have been placed on the German railroads. It is only natural to suppose that its adoption will follow in this and other countries, and afford a large employment to mills engaged in the manufacture.

2 LAURENCE POUNTNEY HILL, LONDON, E. C., March, 1881.

THE MINES OF NOVA SCOTIA.*

We have received a copy of the report on the mines of Nova Scotia for the year 1880, by Edwin Gilpin, Jr., A.M., F.G.S., the Government Inspector of Mines. From it we gather that the yield of gold during 1880 was 13,234 ounces, against 13,801 ounces in 1879. But for the falling off in the most important district of Sherbrooke, which shows a decreased output of fifty per cent, and the stoppage for some months of the Rose mine in the Montagu District, the yield would have been much higher. Extensive preparatory works are being prosecuted in a number of the districts, and the yield in 1881 may be expected to greatly increase.

At Caribou, the Free Claim lode has been the most successful. At Fifteen Mile Stream, the property of Messrs. Hall has been opened for about 200 feet of the lode: some 191 tons yielded 558 oz. 19 dwt. 20 grs., or at the rate of 2 oz. 18 dwt. per ton. At Lawrencetown and Gay River, a little prospecting has been done. In the Montagu District, the Rose lode mine, which was flooded in the fall, has been freed from water, and operations continued; in the eastern extension of the lode, a second pay-streak was discovered as rich as the one first opened. Other properties in the district have done well, and promise good results. The total yield of this district for the year under review was 1222 tons of quartz, yielding 4270 oz. 17 dwt. 8 grs., almost all of which came from the Rose and Symonds properties. On the Burkner area, Waverly District, tributaries stope some 180 feet to a depth of 30 feet. A 15-inch lode west of Mr. McClure's mill promises well; a trial crushing gave as high as 1½ ounces of gold to the ton, and another lode of a promising character has been proved a short distance south of the one just mentioned. The Baker area, Oldham, furnished a large quantity of quartz averaging about 8 dwt. of gold per ton from a lode 3 feet wide. At Renfrew District, little work was done; the Hartford property was reopened, and pumping and hoisting machinery put up. At Sherbrooke, which was the most important district in the province until the finding of the Rose lead

* Report of the Department of Mines, Nova Scotia, for the year 1880. Halifax, N. S. 1881. Pamphlet, 8vo, 35+(32) pages.

at Montagu, the yield has fallen off; 6465 tons gave 4042 oz. 7 dwt. 9 grs. of gold, an average of 13 dwt. 10 grs. per ton, against 9209 tons, yielding 7389 oz. 17 dwt. 15 grs. in 1879, an average of 16 dwt. 1 gr. per ton. The Denver lode, on the Wellington area, 550 feet in depth, was reached, and three levels were driven west to the pay-streak, which gave from three to five ounces of gold to the ton. A shaft was sunk 100 feet on the Murray lode, lying north of the Denver, which is four inches wide. Some work was done on other properties in the district. Some quartz was crushed at Sherbrooke from the Stormont District, which yielded at the rate of nearly 2 oz. of gold per ton of ore. Some promising areas in this district will receive considerable attention this coming summer. At Tangier, the Forrest and Dunbrack lodes are worked, and a rich chule of ore was struck in the former. The Pittsburg Company has sunk four shafts on the Field lode, extending over an area of 1850 feet. It has also erected a ten-stamp mill to be worked by water-power, and has made the necessary arrangements for steady work.

At Uniacke, the Bunker, Mitchell, and McPhail lodes have been worked, and the lode west of the mill has been worked to a depth of 120 feet, and stope about 100 feet to the east. Some work of a desultory character has been done at Wine Harbor.

A considerable amount of prospecting has been done in other and new districts, and in some cases with promising results.

From the foregoing it would appear that Nova Scotia is at last going to take her place, in the near future, among the gold-producing countries of the world.

The coal trade of the province shows material improvement, as can be seen from the following figures:

The total sales for the year 1880 amount to 954,650 tons, being an increase over the sales of 1879 of 266,035 tons, and form the largest sales yet recorded.

The most noticeable points in the trade were an increase of 74,793 tons in the home sales, an increase in the sales to Quebec and Ontario from 154,118 tons in 1878 to 239,091 tons in 1880.

The sales to New Brunswick, Newfoundland, Prince Edward Island, the West Indies, and Europe all show decided increase.

The trade to the United States rose from 51,641 tons in 1879, to 123,423 tons in 1880, forming the largest export to that country since 1874.

In copper mining, a shaft was struck at Eagle Head, Cabarus Bay, to a depth of 75 feet, and a considerable quantity of ore taken out for shipment to England, and some prospecting has been done in other districts.

Discoveries of silver ore are reported in Musquodoboit, assays showing as high as \$100 to the ton.

Mention is made of the presence of nickel and cobalt in the arsenical pyrites of the gold mill tailings.

In iron mining, the Steel Company of Canada, at Londonderry, has continued its operations during the past year, and reached an output of 50,696 tons of iron ore against 29,889 tons mined in 1879. Also 4772 tons of ankerite quarried for flux. Iron ore was also supplied to the company from Clifton, Colchester County.

The operations of the company were continued at both its mines, and the ore on the west side of the Cumberland brook opened. The ore on Cook's Brook was also tested.

At Clifton, Mr. A. McDonald has opened on a 7-foot vein of red and brown hematite, and sent 497 tons to Truro, for the Steel Company, as mentioned above.

At Upper Stewiacke, a little prospecting was done on a deposit of brown hematite, said to be of large extent. Specular iron ores were tested at Marshy Hope, Guysboro', and some prospecting work was done on the East River of Pictou by H. S. Poole, Esq.

Discoveries of limonite were reported from Rawdon. Practical tests of the red hematite cress of French Vale, belonging to the Hon. E. T. Moseley, and of Smith's Brook, belonging to Mr. Burchell, have shown that they are of excellent quality, the metallic yields being respectively 57 and 56 per cent, with very little deleterious matter.

A short reference is made to cement and fire-clay, and the following information is interesting in connection with the oil-wells of Cape Breton. Indications of the presence of petroleum in Cape Breton were brought into public notice as far back as 1864; two holes were bored to a depth of about 600 feet on the McIsaac farm, near Lake Ainslie, but the holes were lost, and work ceased for want of funds.

During 1879 and 1880, large tracts of land were carefully examined, and globules of heavy, dark petroleum were seen rising through the waters of Lake Ainslie; the rocks on the shore were in many places saturated with it, and this was observed for several miles. Swamps were frequently found to be covered with oil, and many springs were so impregnated with it as to be unfit for domestic use. Gas was also observed issuing from fissures in the rocks at many places.

These indications prevail over a district from five to seven miles wide, extending from the Margaree District, down through Lake Ainslie, Skye Glen, and the River Denis Basin. Similar indications are observed at the Middle and Baddeck rivers. The Victoria Oil Company has put a six-inch hole down near Baddeck to a depth of about 500 feet, and claims to have struck promising rock. This company is prepared to test the district thoroughly, and to put down two more holes during the coming season.

In the Lake Ainslie District, seven wells have been put down on the western shore, some two or three miles south of Lough Ban. Among the bore-holes may be mentioned that of the Cape Breton Oil and Mining Company, which has reached a depth of 1100 feet, and is claimed to have reached the "third sand-rock" at a depth of about 1000 feet.

Considerable quantities of oil have been secured and barreled for testing in the States. At present, the quantity of salt water in the strata has caused a delay, and necessitated fresh pumping appliances. The oil is stated to give the following results: gravity, 22.5; flash-test, 390'; fire-test, 440'; it was found to be limpid at zero, and in the crude state to be equal to any manufactured lubricant.

Professor Richards, of the Massachusetts Institute of Technology, carefully examined the district during the past summer, and in his report unhesitatingly states his belief in its value as an oil producer. The following companies are now at work: The Cape Breton Oil and Mining Company, the Inverness Oil and Land, the American Oil, and the Victoria Oil companies.

An important step has been taken toward the testing of these districts, and the coming summer will see an increased number of bore-holes put

down. The nominal capital of the companies interested amounts to some \$4,000,000, and over \$100,000 has already been expended.

The report concludes with a series of valuable tables on the gold, coal, and other mineral productions of the province.

THE TIN PLATE TRADE.

A correspondent of the *London Iron*, in its issue of March 25th, reviews the causes which have contributed to the prostration of a trade, the expansion of which within the last fifteen years can scarcely be paralleled in the iron trade or in any of its allied industries. In 1865, the production of tin plates may be safely put down as not exceeding two and a half million boxes; to-day, the power of production is not less than eight and a quarter millions per annum. Seeing that the consumption has been yearly increasing, there must be some predominating causes to account for the fact that the manufacture of tin plates is at present attended by a loss to the maker of from 1s. 6d. to 2s. a box. These causes are two, namely, long credit and limited liability. The usual terms of payment for bar iron are cash, less 2½ per cent on the tenth day of the month following delivery, or by bill at four months from the same date, at buyers' option—which means in many cases, five months' credit. Tin has also of late been obtainable at four months from date of purchase. These two items form about two thirds of the total cost of the plates.

It may now be asked in what way this system of long credit particularly affects the tin plate trade. A works (excluding forge power) consisting of two mills and the necessary finishing plant, capable of turning out 1000 boxes weekly, can be erected at a cost of £8000 or £9000, according to completeness, and such a works will require about 60 tons of bar iron a week say 1000 tons in four months—which at £6 10s. per ton will represent £6500; and the credit for tin would, for the same period, reach about £2500. By the time, therefore, that the maker is called upon to pay for either bar iron or tin, he has at his back, from the credit afforded him, a working capital of £9000. It may here be mentioned that bar iron can be converted into tin plates and delivered in Liverpool in less than fourteen days; and in another fourteen days the maker receives cash for his goods; or immediate payment if wished, less fourteen days interest, in contradistinction to the deferred terms of payment for bar iron and tin. For the last few years, there seems to have been an unfortunate mania for every small capitalist in South Wales, with £100 to invest, to become a tin-plate manufacturer; and so great are the facilities for starting a works that, led away by some conspicuous successes during the first half of the last decade, they have failed to see how this head-long speculation could only result in overproduction and collapse. What has been the result? The ever-increasing consumption of the world now stands at about six million of boxes per annum, and the power of production at more than eight. Ordinary coke plates are to-day sold at 14s. 6d. to 15s. a box at Liverpool, and with the present prices of material, they can not be made for less than 16s. 6d. Within a very recent date, some works erected on the principle above described have stopped payment, their operations not extending over two years, and in one case for not half that period. Can any thing point more clearly to the unsoundness of the system on which this trade has lately been conducted? The past tense is used advisedly, because there are at least indications that the sellers of bar iron and tin are taking alarm at the recent failures, and at other difficulties looming in the distance.

CHICAGO COAL RECEIPTS AND SHIPMENTS—JAN. 1 TO APRIL 1, 1881.

	Tons.
Receipts by rail of anthracite coal from Jan. 1st to April 1st, 1881.....	158,825
Corresponding period, 1880.....	121,783
Increase by rail, 1880.....	37,042
Receipts by rail of bituminous coal from Jan. 1st to April 1st, 1881.....	496,340
Corresponding period, 1880.....	435,935
Increase by rail, 1881.....	60,405
Total receipts of all kinds of coal, including coke, from Jan. 1st to April 1st, 1881.....	655,165
Corresponding year, 1880.....	557,718
Increase in 1881.....	97,447
Total shipments of coal by lake and rail from Jan. 1st to April 1st, 1881.....	162,746
Corresponding period, 1880.....	163,768
Decrease in 1881.....	1,022

The shipments by months were as follows: Jan., 61,126 tons; Feb., 50,377 tons; March, 51,243 tons.

The receipts of coke are included in the receipts of bituminous coal.

H. PRATT, Secretary Chicago Coal Exchange.

PROGRESS IN SCIENCE AND THE ARTS.

The St. Lawrence Tunnel Scheme.—There is now no doubt entertained by the promoters that the scheme to tunnel the St. Lawrence will be successful. The engineers have in several places bored to a depth of 25 feet, and they report most favorably.

Molybdenum Discoveries in Newfoundland.—Fields of molybdenum—a rare metal chiefly valuable on account of one of its compounds—have been found in the Valley of the Humber, near the Bay Des Isles, on the west coast of Newfoundland, and there is talk of organizing an American stock company, with a capital of \$1,000,000, for the purpose of working the fields. Warning is given by the State Department that, under the provisions of a declaration annexed to the Treaty of Versailles, of 1783, the use of the tract in which these fields lie is guaranteed to the French fishermen, and the erection of stationary buildings, such as would be indispensable in such an undertaking like the one proposed, is strictly forbidden.

Alcohol in the Ground, in the Water, and in the Atmosphere.—M. Müntz, in a paper read at a meeting of the Paris Academy of Sciences, gives some interesting facts ascertained after the development of a method

depending on the change of alcohol into iodoform, so that one millionth of alcohol in water can be detected. Alcohol is found in all natural waters, except very pure spring water; and more of it in snow. Rain-water and water from the Seine contain about one grain per cubic meter. Alcohol no doubt exists as vapor in the air. In soils, especially those rich in organic matters, there is a considerable quantity. The destruction of organic matter by various agents of fermentation accounts for the wide diffusion of alcohol in nature.

Concrete Slag as a Substitute for Stone.—The *London Engineer* says that the Aireside Hematite Iron Company, which has introduced this slag as a substitute for stone, has erected new offices at its works in Hunslet, Leeds, in which all the door and window facings, and the ornamental work, are composed of the slag from its own furnaces. A new feature of such an elevation is a display of imitation carved bricks, in various colors, made of the slag, the cost of which is said to be fifty per cent less than the real article of clay, which hitherto has been so much in fashion. The company also supplies the Midland and North-eastern railroad companies with slag concrete flags, ready prepared for use, in the laying down of platforms at railroad stations. The Staveley Company has for a long time used slag lumps for building purposes, much of the slowly-cooled massive slag having the appearance of basalt and other rocks.

Inoxidizable Coating on Iron Articles.—Our readers are familiar with the Barff and Bower processes, from full descriptions previously given in these columns. A new process, devised by Mr. Ward, consists, according to the *London Engineer*, in the combined application of silicates and heat, this process being the basis of several subsequent processes for ornamenting the surface of the metal. The iron objects are coated with a silicate composition, which is applied either by means of a brush or by dipping the iron in a bath of the solution. The coating quickly dries upon the objects, which are then passed through a furnace heated according to the nature of the articles under treatment. The silicate composition is thus fused, and, it is said, absorbed into the pores of the metal, becoming homogeneous with it. Upon cooling, the articles treated are found to be covered with a dull black coating, which, it is stated, is found not to suffer change from long exposure to the atmosphere, nor to disintegrate or separate from the surface, to which it has become applied.

Mining Explosives.—London *Iron* says the joint committee of the Royal Cornwall Polytechnic Society, the Miners' Association of Cornwall and Devon, and the Mining Institute of Cornwall, appointed to inquire into the nature, economy, efficiency, and safety of the various explosives in use, or proposed for use, in the mines of Cornwall and Devon, have issued their report. They regret that they have been unable to carry out so extended a series of experiments as they would have wished, owing to the limited response to their appeal for funds from those specially interested. The following explosives were dealt with: 1. Gunpowder of five different grades. 2. Espir's explosive powder, a mixture of nitrate of soda 60, sulphur 14, sawdust 26 per cent. 3. Gun-cotton. 4. Tonite, said to be gun-cotton combined with nitrate of baryta. 5. Titanite. 6. Dynamite, two varieties; nitro-glycerine 75, and kieselguhr (or infusorial earth, consisting of the siliceous skeletons of microscopic organisms) 25 per cent. The second variety contained less nitro-glycerine, and some charcoal and nitrates. 7. Blasting gelatine, collodion cotton seven to ten parts, combined with 90 to 93 of pure nitro-glycerine, nearly all the cotton being soluble in alcohol. 8. Liverpool cotton powder, a mixture of gun-cotton and nitrate of potash. The first trials were in an open quarry (Seveock, near Chancewater), a number of holes having been drilled to give as far as possible similar conditions. Each competitor had three holes, and the value of the work done was estimated from the cost of the powder as a standard. Seven different kinds of explosives were used, including three varieties of powder—common, compressed, and especially strong. The results showed that, assuming the work done to be approximately proportionate to the depth of the holes, common powder was the cheapest—2½d. per foot of hole—and dynamite the most costly—3½d. per foot. The second series of experiments consisted in driving levels not less than 7 feet high and 4½ feet wide. Six kinds of explosives were tried—dynamite, Espir's Liverpool cotton powder, compressed and common powders, and tonite. Here the compressed powder took the lead, the total cost per foot run of level having been 5s. 1½d. (1s. 1d. for materials and 4s. 0½d. for labor); the dynamite came out fourth and the tonite was most expensive. A list of questions referring to the relative advantages and disadvantages of the various explosives was sent out to about 250 persons interested in the subject, and 35 replies only were received, some of which were very brief. In wet grounds, dynamite was almost unanimously declared to be the best, and a majority declared for the same explosive under most circumstances, except very dry ground, where powder was preferred. Nearly all agreed that the fumes from dynamite are the most dangerous, and a considerable weight of opinion intimated that powder was less dangerous to deal with than any other explosive. One authority stated that there was always danger in using dynamite in fissured ground, as unburnt portions of the charge were blown into the fissures, and exploded unexpectedly afterward by the workmen.

CANADIAN PHOSPHATE MINE.—It is said that Mr. A. D. Cameron, of Buckingham, Province of Quebec, Can., recently sold for \$12,200 his phosphate mine in Range 8, Lot 26, Portland East, to a person from Boston, representing an American fertilizing company.

ADVANCING PRICES OF NAILS.—PITTSBURG, PA., April 13.—The Western Nail Association met to-day, and, after discussing the state of trade, unanimously agreed to advance the price from \$3 to \$3.15, the prevailing opinion being that the advance was justified by the increased demand.

A ROLLING-MILL BURNED.—TOPEKA, KAN., April 8.—The rolling-mill owned jointly by the Union Pacific and Atchison, Topeka & Santa Fé railroad companies, and located here, was burned at 9 o'clock last night. An alarm was given by the engineer, and the operatives, nearly 100 in number, barely had time to escape before the roof fell in. The loss is estimated to be \$100,000. From 200 to 300 men are thrown out of employment.

TITANIC IRON.—A purchase has been made, by a company of American

capitalists, of the mines of titanic iron, and the works in connection, at St. Urbain, Bay St. Paul, on the north shore of the Lower St. Lawrence, Province of Quebec. It is stated that the principal drawback hitherto experienced to the successful working of these mines, namely, the inability to separate the titanic acid from the iron, has been overcome by a recently discovered process, which permits such deposits to be profitably worked.

GENERAL MINING NEWS.

ARIZONA.

GLOBE DISTRICT.

CENTENNIAL.—The *Globe-Chronicle* says: Within the past two months and a half, incline shaft No. 1 has been sunk to a depth of 93 feet, and 323 feet of drifts have been run. The company intends to build or purchase a mill. No more work will be done until arrangements for milling facilities have been made. The new hoisting-works are *en route*.

TOMBSTONE DISTRICT.

The Tombstone *Epitaph* has the following reports of the mines of that district: **EMPIRE.**—The cross-cut west on the 400 level is in 180 feet. The drifts north and south on the same level are in respectively 90 and 89 feet.

GRAND CENTRAL.—The cross-cut west from the old main shaft, 400-foot level, is in 75 feet, the face in soft ledge-matter. The first 40 feet of this cross-cut was made with the expenditure of considerable muscle and powder, as the rock was very tough. Since this was passed, however, progress has been rapid, one shift making as high as 8 feet.

TOMBSTONE MINING AND MILLING COMPANY.—The winze on the 300-foot level of the Tough Nut is down 7 feet, all in good ore. The main shaft is down 214 feet.

CALIFORNIA.

THE BODIE DISTRICT.

The following summary from the *Bodie Free-Press* of the 5th inst. embodies the latest facts regarding developments on these mines: The Lent shaft is sinking with all possible dispatch, and work is pushed on the foundations for the powerful pumping machinery. The Red Cloud shaft is down 535 feet, and is sinking at the rate of 20 feet per week, all the machinery being in first-class working order. At the 600-foot station, another cross-cut will be run to the Concordia. Boston Consolidated is still sinking, being down 55 feet below the 300-foot station, and in softer ground, with some ore coming in. The vein in the north drift of Boston 300-foot level is five feet wide of fair milling ore, at a point 362 feet north of the shaft. Goodshaw struck a troublesome flow of water at a vertical depth of 700 feet, where the formation became much softer. On the 1000-foot level of Standard, the east cross-cut is in 191 feet, and to the west 142 feet, the latter being in very favorable formation, and all the stopes looking well. Bodie is showing a marked improvement in quantity and quality of ore in the south drift from the south winze below the sixth incline level, and this week's letter is an interesting one generally. Consolidated Pacific is improving both on the 500 and 600-foot levels. The Homer Mine, at Mill Creek, has shown wonderful increase in quality of ore during the past week, the assays having doubled. Jupiter has stopped drifting, and is running east to tap the East Savage vein on the 600-foot level. Black Hawk is cross-cutting east and west on the 790-foot level for the outer veins, the middle vein having been passed through by the west cross-cut. Oro has opened and timbered a station at the 590-foot level, and is cross-cutting east and west. Bulwer is still drifting north in the Stonewall ledge, 400-foot level. Tioga is drifting in the east vein, 982-foot level, the vein having increased in size from five feet on the 800 to 15 feet on the 982-foot level, and the ore shows an improvement in quality. Syndicate is getting better ore and an abundance of it. The south drift and south stope in the west vein of Concordia show improvement, and the large east vein is showing well in the north drift. The Noonday mill, with its new driving power and ten additional stamps, is working admirably. The south drifts on the 412 and 512-foot levels of the Noonday mine are showing fine bodies of ore, and all the stopes are looking well. The various drifts and stopes in the North Noonday are also showing well. It is currently reported, and generally believed, that the following named mines, now lying idle, will be started up within a few weeks: Bechtel, Belvidere, McClinton, Summit, Double Standard, Dudley, South Standard, South Bodie, and Champion.

Official letters of April 2d, from the superintendent of the several mines, say as follows:

BODIE CONSOLIDATED.—At the sixth incline level, the north drift has been advanced 11 feet, or a total length of 50 feet from where the Fortuna was cut after the first faulting by red vein. As has already been explained, this drift is really a cross-cut through a portion of its length and from the point where the Fortuna was again faulted by a vein west of the "red vein." The south drift upon the Fortuna has been driven 12 feet farther, making its total length 20 feet. The south drift from bottom of winze No. 10 is now in 15 feet, a gain of nine feet since last report. On March 24th, a west cross-cut was started from the north drift, second incline level, for the purpose of cutting the Fortuna west of the fault at that level. This cross-cut has been driven 28 feet, and has cut the Fortuna at about 25 feet west of the north drift. The vein, about two inches where first reached, has widened out to eight inches of good quality at the height of about two and a half feet above the floor of the drift. On the Vulcan vein, the south drift has been advanced 7 feet, making its present length 49 feet. From this drift and from the stope above it we are getting a few tons of good ore each week. The other stopes are looking well, and yielding the usual quality of ore. The ore in the south drift from west cross-cut No. 2, sixth level, is of fair quality, and that in south drift from winze No. 10 has greatly improved, both as to width and quality.

BOSTON CONSOLIDATED.—The incline shaft has reached a depth of 55 feet below the 300-foot station; progress for the week, six feet. The ground is breaking fairly and showing indications of the near approach to the vein. We have cut one stringer, pitching across the shaft from west to east. The north drift on the 300-foot level has been advanced six feet; total length, 362 feet. The vein holds a width of five feet of fair-grade milling ore.

BULWER CONSOLIDATED.—The north drift on the Stonewall ledge, 400-foot level, is now in 56 feet; progress during the week, 17 feet. The ledge in the face is 2½ feet wide.

CONSOLIDATED PACIFIC.—The drift north on Pacific Lode No. 2, from the east cross-cut, 500-foot level, has been advanced six feet during the week; total length, 20 feet. The face of the drift is in a vein four feet in width, well defined, and carrying some ore of fair grades. The west cross-cut, same level, has been advanced seven feet; total length, 85 feet. The west cross-cut, on the 600-foot level, has reached a distance of 123 feet from the station; progress for the week, six feet, with no change to note in formation. The north drift from the east cross-cut, same level, has been advanced six feet; total length, 47 feet, the face all in vein-matter, with 18 inches of clay on the east wall, and no west wall in sight. Ore of fair milling grade.

GOODSHAW.—The main vertical shaft has attained a depth of 700 feet, and has passed through a formation much softer and better looking.

NOONDAY.—The Noonday and North Noonday mill having been thoroughly repaired, the new engine in place and ready for work, and the five additional stamps for this company completed, we began crushing ore at six P.M. on the 30th

of March, with the twenty stamps of the company. The mill is now running better than ever before. The only stoppage since work was resumed has been occasioned by the new driving-belt becoming slack, and it having to be taken up. The 212, 312, and 412 stopes all look well. The drift on west prong, No. 1 vein, 412 level, was extended 14 feet during the week. The vein is about 4 feet wide of fine ore. This drift is 682 feet south of combination shaft. The No. 1 south drift, 512 level, is in a large body of quartz, which is improving in quality as we go south; total length of drift, 511 feet; progress for the week, 21 feet.

TIOGA CONSOLIDATED.—During the week, have started a lateral drift north for the purpose of prospecting the vein east of the shaft, 982-foot level. Our progress has been 14 feet. This vein has the appearance of being the same vein cut in our east cross-cut, 800-foot level, where it was 5 feet wide. It is now 15 feet between walls. This lateral drift has been started in the wall of the vein, as better progress can be made, and we shall avoid timbering. The east cross-cut has been advanced but 5 feet during the week, owing to starting this lateral drift, with no change to note.

COLORADO.

CLEAR CREEK COUNTY.

DUNDERBERG.—The managers of this mine have decided to try the leasing or tributing system on their mines.

FREELAND.—The Georgetown *Miner* says: The lower Freeland level is now in a length of 2200 feet, which gives the breast of the adit a depth of 1000 feet. The breast of the adit is looking well, there being from three to four feet of ore at that point, which is probably worth from \$20 to \$30 per ton in gold, silver, and copper. The amount of reserves in this mine is simply enormous. But a small force of men is now employed; but it is rumored that this will shortly be increased by the addition of about one hundred men. The mill is now concentrating about 75 tons of ore daily—one half the eighteen jigs running all the time and the remainder only during the day. The mill at the foot of Trail run is also running on the tailings. Twenty stamps and four circular buddles are employed, and eight to ten men are required to run the mill. Five or six teams are hauling mineral steadily from the mine to the stamp-mill, the projected flume not having yet been put up.

LUCERNE.—According to the Georgetown *Courier*, the character of the ore in the Second Lucerne lode, one of the mines of the Lucerne Mining Company, in Idaho District, is steadily improving. The company now owns 4200 feet on three adjoining veins, and negotiations are pending for the purchase of the Hartman mine. The ore is similar to that of the Stevens mine, and the entire output is contracted for by the Moore smelter, at Golden.

LAKE COUNTY.

The fire which occurred in one of the Chrysolite mines about six months ago, and was the cause of much trouble and expense to the mines adjacent, has again broken out. All the workmen, nearly a hundred in number, were driven out of the New Discovery (Little Pittsburg group) by a tremendous body of smoke and excessively hot air from the smoldering embers of the old conflagration. This portion of the property has for some time past been producing a large share of the ore-shippments of the Little Pittsburg Company. This fire originated six months ago, caused by a fire occurring in a lodging-house over a shaft on the territory of the Chrysolite mine. The fire communicated down the shaft to the underground workings. Finally it was subdued by placing a large number of boilers over each shaft and pouring steam into the mines. Work was then again resumed. In the New Discovery mine, belonging to the Little Pittsburg Company, it has been noticed, however, all the time, that the air has been exceedingly hot, and workmen could only be kept in the faces of the north drifts, near the Carboniferous line, by furnishing a strong draught of fresh air, through pipes, and supplied by a blower driven by the engine at the surface. The shafts have all been closed, and a large boiler placed over Chrysolite No. 1 and Discovery No. 3 shafts, and steam forced into the workings.

The *Leadville Herald* says: The condition of affairs at present is as follows: The present workings of the Chrysolite are protected by bulkheads, and work is not liable to be suspended; but the gases extending into the Little Pittsburg and Little Chief have driven the men from these mines. Early yesterday morning, the men were withdrawn from the Little Pittsburg, and yesterday the Little Chief was obliged to do likewise. One man taken out yesterday was so overcome with the gases that it was necessary to carry him through the drifts, and when he arrived at the surface he was completely exhausted.

ARGENT.—Work has been suspended by this company on the Chieftain mine, and it is now working the Vining claim, situated near the Rock and Dome mines in California Gulch. The *Leadville Herald* says that the developments on the property are as follows: There is a shaft 60 feet in depth. Besides this, there is a tunnel 160 feet in length, at the end of which is a winze 165 feet in depth. Work is now prosecuted in making an uprise at the end of the tunnel.

MINER BOY.—Owing to a breakage of the engine, the Colorado Prince mill was closed down for three days, starting up again on the 6th. The Miner Boy mine, the ore from which is crushed at this mill, is shipping as usual.

MISCELLANEOUS.

The Wyandotte Company, in Gilpin County, is cleaning out the drifts of the accumulated debris and ore, and will soon begin back-stopping the ore which has been passed through in developing the Leavenworth and Crawford County lodes.

The approximate daily output of the leading Ten Mile mines is given by the Summit County *Circular* as follows:

Robinson	80 tons
Aftermath	12 tons
Milo	12 tons
White Quail	60 tons
Total	164

The Silver Cliff *Gazette* approximates the daily output of the mines of that district as follows:

SILVER CLIFF MINES.		ROSITA MINES.	
	Tons.		Tons.
Bull-Domingo	100	Bassick	40
Silver Cliff	100	Twenty-six	1
Milkmaid	100	Polonia	6
Total	100	Total	47

IRON DISCOVERY.—The Golden *Globe* reports the discovery of a large bed of pure iron near the forks of the Platte in Jefferson County. It says: The discovery was made last February; the ore is entirely free from sulphur, being pure hematite; it is ore, not rock; the quantity is apparently inexhaustible. It is undoubtedly the largest and best discovery of pure iron ever found in the State, in fact anywhere. A sample can be seen at this office, which will probably assay 90 per cent pure iron. The ore being entirely free from sulphur, will prove of great benefit to smelters throughout the State.

MONTANA.

ALICE.—The following is from the Butte *Miner* of late dates: Operations are progressing satisfactorily. In all the upper levels of the mine, from the 500-foot level up to the 100-foot level, the drifts and stopes are energetically worked, and are producing an average daily output of ore reaching about eighty tons. The ore coming out is dumped into the 20 and 60-stamp mills, mixed into suitable proportions for successful treatment, and comprising the different grades of ore found in the mine. At the winze on the north vein of the Alice, at the 500-foot level, work is pushed forward with vigor. The winze is going down through a

fine vein of high-grade ore of over seven feet in thickness, and is now down over 65 feet. When it gets 100 feet deep, a cross-cut will be run to the main shaft, and thus establish the 600-foot level of the mine.

MAGNA CHARTA.—The tunnel has been driven along the vein more than 1200 feet. Work at the main shaft of this mine consists of the driving of four levels on the north vein of the mine. The levels are driven to the east and west on a strong vein of first-class ore. In these levels the ore is uniformly good. A new dump-chute, with a capacity of fifty tons, has just been erected.

MOULTON.—The large three-compartment shaft has reached a depth of 270 feet, which is over one third of the distance contracted for sinking it. The shaft is going through extremely hard granite that is hard to drill and blast. Three eight-hour shifts are worked in the shaft, which, considering the hard rock to contend with, is making fair progress downward. Within the last few days, the air had become so bad in the bottom of the shaft that a pipe had to be run down to furnish air for the men below. A small air-pump, driven by hand, will be used until the air-compressors are put up, when the difficulty will be overcome by a constant supply of fresh air.

NEVADA.

COLUMBUS DISTRICT.

NORTHERN BELLE.—The cross cut from the fourth level drift is in the same formation as last reported, and has been extended a distance of 16 feet during the week. The other shaft levels are yielding as usual. The intermediate, between the first and second, has shown quite a decided improvement. The levels above the adit are looking finely, and the outlook for the future is encouraging. The fifth level still continues to show a change for the better. The bullion shipments for the week ending March 30th, amounted to \$26,719.19; and the shipments for the month of March aggregate \$100,466.30.

COMSTOCK LODE.

The starting of the hydraulic pumps at the Chollar-Norcross-Savage shaft will allow a full resumption of work in the Chollar and Potosi mines, and it is expected that cross-cuts will be started in these mines shortly. The Gold Hill News says that people are very impatient to have the hydraulic pumps start up, and seem to forget that it is impossible to calculate the exact time weeks beforehand when such a massive piece of machinery will be ready to operate—there is so much to think about that something is sure to be forgotten. The pump has been tested and found to work all right; but the management have wisely concluded to make its success doubly sure by strengthening it. The change in the superintendency of the Savage will make no change in the workings in the mine. The pumps are being put in at the G. & C. and B. & B. shaft, and every thing is rushing to completion to allow of resumption of sinking at as early a day as possible. The usual amount of ore is extracted from the Sierra Nevada, California, and Consolidated Virginia. The other work also goes on as usual. At the south end, there is no material change, every thing awaiting the starting of the Yellow Jacket pumps, when Imperial promises something of more interest in its reports than the almost stereotyped expression of "Still running the pumps."

BELCHER.—The southwest drift, 500 level, was extended 14 feet the past week; total length, 130 feet. West drift, 400 level, advanced 14 feet; total length, 97 feet. No change in the ground passed through.

CALIFORNIA.—Shipping the usual amount of ore, about 450 tons a week, giving assays of \$21.75 per ton. All work is progressing finely. The joint Consolidated Virginia west cross-cut on the 2500 level is carried toward the C. & C. shaft 34 feet per week; the joint Consolidated Virginia east cross-cut from the south drift was advanced 28 feet, and the joint Ophir cross-cut advanced 39 feet during the week.

CONSOLIDATED VIRGINIA.—Shipping about 400 tons of ore per week, assaying \$20.38 per ton. The joint Best & Belcher rise has been extended 13 feet on the 2300 level. On the 2500 level, the west drift joint with California to the C. & C. shaft has been extended 31 feet. For other workings joint with California see report of that mine.

HALE & NORCROSS.—The north drift on the 2400 level is making rapid progress, and it is expected to be sufficiently advanced to start three cross-cuts on the 15th inst.

MEXICAN.—The joint Union Consolidated east cross-cut on the 2500 level is progressing at the rate of 30 feet per week, and the east winze joint with Ophir is sunk and timbered 15 feet per week.

OPHIR.—The east winze joint with Mexican was sunk and timbered 16 feet during the past week. East cross-cut joint with California has been lengthened by 39 feet the past week.

OVERMAN.—The north drift on the 2275 level has been extended 45 feet since last report; total length, 270 feet. The rock in the drift is very hard.

SIERRA NEVADA.—The raise on the 2300 level was completed last week, and the station on the 1700 level finished. Still repairing the north lateral drift on the 2400 level. The north lateral drift on the 2500 level has attained 869 feet in length; 48 feet added last week. The joint Union Consolidated east winze sunk and timbered 15 feet; total depth, 33 feet. Extracting 250 tons of ore per week. All work progresses well.

UNION CONSOLIDATED.—The joint Sierra Nevada winze has been driven downward and timbered 15 feet during the past week. The east cross-cut joint with Mexican has been extended 30 feet. No change in material passed through.

YELLOW JACKET.—Have timbered the Suro Tunnel drift south of the switch and straightened it at the point of connection. The station at the Suro Tunnel level has been enlarged so as to permit the use of the bailing tanks when the pumps are running. Every thing is completed ready for pumping, and are only waiting for the drain-boxes in the Suro Tunnel to be laid to commence. The tunnel folks are working all the men they can to advantage, and expect to be ready to receive the water next Tuesday.

NEWFOUNDLAND.

We condense the following from the correspondent of the Montreal Gazette, dated St. John's, Newfoundland, April 4th, 1881:

THE NEWFOUNDLAND CONSOLIDATED MINING COMPANY.—A new American company purchased the Betts's Cove and Little Bay mines, together with a large area of lands in which mineral deposits are proved to exist. The price given for the two mines—namely, Betts's Cove and Little Bay—was one million dollars. To these are added seven other mineral locations, with an area of 22 square miles. These are now either owned or leased by the company, and make, together with the previously acquired properties, a total of 27 square miles, or 17,280 acres. To purchase and work these extensive mining locations, the company proposes to raise a capital of three millions of dollars. When the railroad from St. John's to Hall's Bay is completed, the value of these mines will be greatly increased, as facilities for obtaining supplies, especially in winter, and for shipping smelted ore at St. John's, will lessen the cost of production and put the mines at all times in communication with the copper markets of the world. At present, communication is limited to the telegraph and an overland mail, carried on catamarans over the snow. The infusion of American energy and enterprise is exactly what is wanted in our rather stagnant community. The mercantile interests now opposed to these innovations will soon discover that they, in common with the rest of the community, will be benefited by our growing prosperity. At present, they are alarmed at the threatened changes, dreading a breaking up of the monopoly they have so long enjoyed of their old system of supplying the fishermen, and fearing a consequent rise in wages. The value of the mines now in the hands of the new American Company may be judged of from the fact that from 1874, when Betts's Cove mine was opened, till

1880, the total shipments of ore, according to the official returns, were 169,010 tons, the full market value of which was \$3,500,000. This return includes shipments from Little Bay mine, which was not opened till August, 1878, and also small amounts from South West Arm and Hall's Bay mines. In November, 1878, the balance-sheet showed 105,000 tons shipped, at the net value of \$850,000. The mining purchases have been made only after a careful scrutiny by experts sent here to examine and report on the property.

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:

Erection of a new Brick School Building at Portchester; for particulars address Board of Education, Portchester, N. Y.	April 18, 1881.
Building a Ground Chimney 150 feet high, 15 feet diameter, at Bergen Point, N. J. Full plans and specifications can be seen at the works of the Oxford Nickel and Copper Company, at Constable's Hook, Bergen Point, N. J.; also at 292 Pearl st., New York.	" 18, "
Furnishing 100 Loads of Virginia Pine Wood for the use of the Fire Department; Commissioners of the Fire Department, No. 367 Jay street, Brooklyn, N. Y.	" 20, "
Furnishing 600 Tons of Old Mine Lehigh Coal, stove size, for the use of the Fire Department; Commissioners of the Fire Department, 367 Jay street, Brooklyn, N. Y.	" 20, "
Building Club-house, two Grand Stands, and Stabling, on the Grounds of the Western Pennsylvania Agricultural State Fair and Park Association at Homewood Station, P. RR.; specifications can be seen at the office of E. M. Butz, Architect, 112 Federal street, Allegheny, Pa.; the right is reserved to reject any or all bids; Rody Patterson, Jr., Secretary, 117 Fourth avenue, Pittsburg, Pa.	" 20, "
Dredging in Connecticut River; specifications in regard to the work, and blank forms for proposals, and guarantee will be sent on application to this office; G. K. Warren, Lieut.-Col. Engineers, and Brevet Major-Gen. U.S.A., Engineer's Office, U.S.A., Newport, R. I.	" 20, "
Painting the Lamp Posts, Lanterns and Frames in the Metropolitan, Nassau, People's, and Citizens Gas-Light Companies District in the City of Brooklyn; Department of City Works, Municipal Department Building, Brooklyn, N. Y.	" 23, "
Improving Channels at Oswego Harbor, N. Y.; at Waddington Harbor, N. Y.; at Wilson Harbor, N. Y.; at Great Sodus Harbor, N. Y.; at Little Sodus Harbor, N. Y.; U. S. Engineer's Office, Oswego, N. Y.	" 25, "
Furnishing Coal and Ice for the use of the Department of Charities and Correction; Commissioners Department of Charities and Corrections, of Kings County, Brooklyn, N. Y.	" 26, "
Dredging in the Cape Fear River below Wilmington, N. C.; William P. Craighill, Lieutenant-Colonel of Engineers, U. S. Engineer's Office, 70 Saratoga street, Baltimore, Md.	" 26, "
Furnishing all the Postage-Stamp which the Post-Office Department may require for Public and Official Use during a period of four years, commencing on the 1st day of July, 1881. Blank forms of bids, with full specifications, will be furnished upon application to the Third Assistant Postmaster-General, Washington, D. C.; Thomas L. James, Postmaster-General, Post Office Department, Washington, D. C.	" 27, "
Furnishing and Delivering all the Cut Granite required for two Winding Stairways in the North Wing of the Building for State, War, and Navy Departments; Office of Building for State, War, and Navy Departments, Washington, D. C.	" 28, "
Erection of a Monument to mark the Birthplace of George Washington; Department of State, Washington, D. C.	May 1, "
Furnishing, Fitting and Delivering complete the Boilers for Hot Water and Steam, Tanks, Smoke-Stacks, Bath-Boilers, etc., required for the Heating Apparatus and Steam Supply of the North Wing of the Building for State, War, and Navy Departments; Office of Building for State, War, and Navy Departments, Washington, D. C.	" 2, "
Furnishing and Delivering and Putting in place all the Cast-Iron Frames, Casings, Trimmings, etc., for Doors and Windows, and Cast-Iron Washboards and Stair Kings required for the North Wing of the Building for State, War, and Navy Departments; Office of Building for State, War, and Navy Departments, Washington, D. C.	" 3, "
Furnishing Postal Cards for and during a period of four years, commencing on the 1st day of July, 1881. Blank forms of bids, with samples and full specifications, will be furnished upon application to the Third Assistant Postmaster-General, Washington, D. C.; Thomas L. James, Postmaster-General, Washington, D. C.	" 4, "
Raising, Cleaning, Painting, Replacing, and keeping in their proper positions all the Buoys now in the following localities, and such others as may be authorized, for one year from the 1st day of July next: Hudson River, between Albany and Troy; Hudson River, between New York and Albany; Lake Champlain; Pawtucket River; Fire Island Inlet, New York; New Inlet, south side of Long Island, N. Y.; Jones Inlet, south side of Long Island, N. Y.; Cable Island Inlet, south side of Long Island, N. Y.; Office of Lighthouse Inspector Third District, at Tompkinsville, N. Y.	" 11, "
Monument to be Erected in Rome for late Victor Emanuel II. First King of Italy; President of the Royal Commission, Cairo, and the Secretary of the Royal Commission, etc., Rome, Italy.	Sept. 21, "

Oregon Navigation Company.—A recent report states that this company intends to complete its lines this year—about 400 miles—as follows: The Columbia River line, from Portland to the Dalles; the line from Umatilla to Baker City, and from Walla-Walla to Colfax, with branches from Dayton to Pataha.

Reading & Chesapeake Railroad.—It is stated that this newly-organized company has contracted for building, equipping and completing its road from Reading to the Maryland boundary, and the branch from New Holland to Lancaster.

Texas & Pacific Railroad.—Recent reports show rapid progress has been made on the extension of this road, about 100 miles of track having been completed since last November. The road is now finished 223 miles west of Fort Worth, and the contract requires its construction to El Paso, about 600 miles west of Fort Worth, by the beginning of next year. At El Paso, connection is made with the Southern Pacific road.

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).

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, April 15.

The week under review only embraces five days, to-day being observed at all of the exchanges as a holiday; yet the sales aggregate 987,833 shares, as against 918,673 shares last week. Prices have been, almost without exception, firm or advancing. There is really a "boom" in mining stocks, and although it is not likely to be continuous throughout the spring, it indicates that there is a revival of interest in mining, and great activity may be looked for during the summer, if those interested in legitimate mining will use their efforts to singe all "wild-cats." A great deal of attention is being given to mining stocks by the regular patrons of the railroad share market, owing to the quietness and uncertainty prevailing in that market.

To help matters in the market, a "boom" has been started in San Francisco, with the result of a large business in the Comstock shares. The report also comes that the Bonanza firm has secured a control in Sutro Tunnel to the benefit of the tunnel and the Comstock mines in general. Reports from Silver Cliff announce the successful operation of the new Silver Cliff mill, and that the ore is being worked at a cost of \$3 per ton, and that from 77 to 85 per cent of the contents of the ore is being extracted. Should this report prove true, it will be a great thing for Colorado, and Silver Cliff particularly. It is said that the mines of this camp contain immense bodies of low-grade ores, which had not previously been successfully worked. Some of the Leadville stocks have received a liberal amount of manipulation. We are glad to see that what are known as the "fancies" are very much neglected and that the dealings have been in mines that have some merit, even though in many if not most cases they may be selling for more than they are worth.

Alice has been quiet and steady, the sales amounting to 700 shares at \$7.38@7.50. Amie has been quite active, with an inclination to strength; the sales amount to 60,100 shares at 47@53c. Barbee & Walker records sales of 1000 shares on Monday at \$3.25. Bassick was dealt in on Monday to the extent of 400 shares at \$11@10.50. Belle Isle was steady at 50c., with sales of 500 shares. Bodie has had a moderate business at steady prices, the sales aggregating 1300 shares at \$6.13@6.38. Breece has ranged between \$1.40@1.50, with sales of 1100 shares. California has been exceedingly active and advancing; the sales aggregate 11,425 shares at \$1.10@1.50. Caribou has been quiet and steady, the sales amounting to 300 shares at \$2@2.13. Cedar Tree has been moderately active and advancing, the sales amounting to 6550 shares at \$2.35@2.55. Chrysolite has been about steady under a small business, the sales amounting to but 3100 shares at \$6@6.38. Climax has been strong and fairly active, the sales amounting to 17,800 shares at 66@74c. Consolidated Virginia has been remarkably active and advancing; the sales aggregate 15,095 shares at \$1.95@2.30. Copper Knob records sale of a block of 1000 shares at 5c. on Saturday. Deadwood has only been dealt in to the extent of 10 shares at \$9. Dunkin has been about steady with sales of 1000 shares at \$1.55@1.70. Eureka, although quiet, has been exceedingly strong, the sales amounting to 180 shares at \$28@30.75. Father de Smet, under a business of 600 shares, has shown a slight weakness, having sold at \$11.25@10.50. Findley has been quiet at 29@31c., with sales of 1200 shares. Glass-Pendery has been active and about steady, the sales amounting to 13,800 shares at \$1.95@2.10. Gold Stripes has been quiet and steady, with sales of 300 shares at \$2.95@3. Gould & Curry has been dealt in to the extent of 300 shares at \$6.75@8. Grand Prize, although but moderately dealt in, has developed wonderful strength; the sales amount to 1025 shares at 50c.@1.05. Great Eastern has been a little weak, under a moderate business, the sales amounting to 27,900 shares at 25@22c. Green Mountain has had but a moderate business at well-maintained prices; the sales amount to 1900 shares, at \$7@6.50. Hibernia has been quite active and strong, the sales amounting to 115,500 shares at \$1.20@1.40. Horn-Silver has ranged between \$9@10.50, with sales of 1380 shares. Hukill has been steady and quiet, the sales aggregating 2730 shares at \$1.15@

\$1.25. Independence has been dealt in to the extent of 3405 shares at 25@15c. Indian Queen has been steady at \$2.60, with sales of 400 shares. Leadville has been quite active and strong, the sales aggregating 37,680 shares at \$1.10@1.80. Leeds has made its appearance again, with sales of 500 shares at 20c. Little Chief has been liberally dealt in at advancing prices; the sales amount to 15,100 shares at \$1.25@1.55. Little Pittsburg has about held its own under a business of 2590 shares at \$3.38@3.63. Moose has been quite active and exceedingly strong, the sales aggregating 25,900 shares at \$1.50@1.75. Navajo has been somewhat irregular under a very liberal business; the sales aggregate 30,100 shares at 99c.@1.35@1.10. On Saturday, 50 shares of Northern Belle sold at \$15.50; and yesterday 300 shares of North Belle Isle sold at 30c. Ontario has ranged between \$37@37½, with sales of 550 shares. Ophir only records a sale of 50 shares at \$7.50. Plumas has been quiet but strong, with sales of 1600 shares at \$1.60@1.90. Rising Sun has been dealt in to the extent of 750 shares at \$2@1.95; 700 shares of Robinson Consolidated sold on Tuesday at \$8@7.88. Sierra Nevada has been quite active and strong; the sales aggregate 1270 shares at \$10@16. Spring Valley has been quiet, with sales of 350 shares at \$2.75@3. Standard has been quiet and steady, the sales amounting to 1667 shares at \$24@24½. Starr-Grove has had a moderate business at advancing prices; the sales aggregate 2200 shares at \$6.50@7. Stormont has been one of the features of the week; the sales aggregate 32,440 shares at \$2.75@4. Yellow Jacket records a sale of 100 shares at \$5.50.

Alta-Montana has had a moderate business at about steady prices, the sales aggregating 6300 shares at \$2.15@2.25. American Flag has been very quiet and steady, the sales amounting to 1300 shares at 27@29c. Bald Mountain has been dealt in to the extent of 8000 shares at 8@6c. Barcelona has been a little weak under a moderate business; the sales amount to 11,600 shares at \$1.90@1.60. Big Pittsburg has been quite active and strong; the sales amount to 10,700 shares at \$3.50@3.80. Black Jack was dealt in on Saturday and Monday to the extent of 1200 shares at \$1.25. Bonanza Chief has been steady and quiet at 20c., with sales of 1000 shares. Boston Consolidated has been a little weak under a business of 6000 shares, the range of prices being 57@50c. Boulder Consolidated records sales of 7000 shares at 76@83c. Buckeye has been dealt in to the extent of 6500 shares at 15@17c. Bull-Domingo has been quite active, and shows a large advance; the sales aggregate 24,070 shares at \$2.15@3.50. Bulwer has been quiet but stronger; the sales amount to 1700 shares at \$2.20@2.50. By-and-By records sales of 800 shares at 25c. Calaveras has ranged between 22@19c., with sales of 16,100 shares. Caledonia, B. H., has had a moderate business at improving prices; the sales amount to 900 shares at \$1.90@2.65. Catskill has been irregular under a small business, the sales amounting to 1200 shares at \$6.75@7.88@7. Central Arizona has been neglected, the sales amounting to but 1100 shares at \$4.38@5. Cherokee has been quite active, and about steady; the sales amount to 11,500 shares at \$1.90@2.05. Cheyenne has been liberally dealt in at 69@81c., the sales aggregating 11,100 shares. Consolidated Imperial has been active and irregular, with sales of 10,690 shares at 17@25c. Consolidated Pacific has ranged between 75@79c., with sales of 1500 shares. Consolidated Pay Rock has been dealt in to the extent of 700 shares at \$1.55. Dahlenega records sales of 2400 shares at 7@8c. Dardanelles has been dealt in to the extent of 300 shares at \$7.25@7.38. Dunderberg records sales of 500 shares at 55@60c. Durango has had a moderate business at steady prices, the sales amounting to 13,100 shares at 15@16c. Gold Placer has been dealt in to the extent of 600 shares at 44@42c. Goodshaw has been quiet and steady, with sales of 1100 shares at 65@70c. Granville records sales of 2900 shares at 4@3c. Hortense has been weak but active, the sales amounting to 41,400 shares at 66@53c. Iron Silver, under a moderate business, has been steady, the sales aggregating 3700 shares at \$3.90@4. Lacrosse has had a moderate business at steady prices, the sales amounting to 6700 shares at 29@27c. Legal Tender, under a moderate business, has been strong, the sales amounting to 2400 shares at \$3@3.85. Lucerne has been dealt in to the

extent of 18,500 shares at 11@14c. Mariposa Preferred records sales of 1220 shares at \$6@8. The Common stock has been more active and irregular, the sales amounting to 8655 shares at \$6.50@4.88@6. Mexican was dealt in on Saturday to the extent of 200 shares at \$5. Mineral Creek has been quite active and, for a time, strong; the sales aggregate 31,200 shares at 85c.@1.10@99c. Miner Boy has been quiet and weak, with sales of 500 shares at \$1.70@1.40. Moose Silver has been strong, under a moderate business, the sales amounting to 1900 shares at \$1.80@1.95. North Standard has been quiet and steady, with sales of 2100 shares at 16@17c. Quicksilver Preferred shows a business of 3000 shares at \$68@65½; and Common, 3500 shares at \$19¼@16¼. Rappahannock has been quiet and steady, with sales of 3700 shares at 11@13c. Red Elephant records sales of 7100 shares at 30@27c. Silver Cliff has been exceedingly active and strong, the sales amounting to 34,596 shares at \$5.38@7. Silver Nugget, under a moderate business, has been irregular, the sales amounting to 3700 shares at 30@20c. The new stock has been more active and stronger, the sales amounting to 18,900 shares at 52@57c. South Bulwer records sales of 1000 shares at 18@20c. Sutro Tunnel has been exceedingly active and strong, the sales amounting to 125,015 shares at \$1.50@2.50. Tioga has ranged between 49@45c., with sales of 350 shares. Tuscarora records a business of 1100 shares at 10@13c. Unadilla has ranged between 14@13c., with sales of 3300 shares. Union Consolidated has been quiet but strong, the sales amounting to 420 shares at \$8.50@11.50. Vande-water has been active and steady, the sales amounting to 27,100 shares at 51@55c. Willshire has been steady, with a business of 2900 shares at \$1.45@1.50. Oriental Miller records sales of 16,700 shares at \$2.05@3. One hundred shares of State Line No. 2 sold at \$6. State Line Nos. 1 and 4 records sales of 3500 shares at \$1.75@1.55; State Line No. 1 records 1700 shares at \$1.75@1.80; No. 4, 400 shares at \$1.60@1.50, and Nos. 2 and 3, 1100 shares at \$6.@6.25. Kossuth shows a business of 1400 shares at 15@18c.

UNLISTED QUOTATIONS.

Mr. L. V. Deforest, No. 70 Broadway, under date of April 14th, 3 P.M., reports the current quotations of unlisted stocks as follows:

	Bid.	Offer'd		Bid.	Offer'd
Barcelona.....	\$1.75	....	Patagonia.....	....	.75
Breece.....	\$1.60	....	Plata Verde.....	....	2.50
Bald Mountain.....	.75	.06	Rico.....	....	.50
Carbonate Hill.....	.15	.25	Rocky.....	....	\$0.25
Con. Arizona.....	.60	.90	Sacramento.....	....	.25
Empire of Cal.....	1.70	....	Santa Cruz.....	....	.75
Empire, Utah.....	1.75	2.25	Sir Rod'k Dhu.....	....	.25
Freeland.....	2.00	2.75	Silver Nugget.....	....	....
Glass-Pendery.....	2.05	....	old.....	....	.30
Grand View.....	....	.65	Silver Nugget.....	....	....
Highland Chief.....	6.00	8.00	new.....	....	.50
Julian.....	....	1.25	Starr-Grove.....	....	.55
Lowland Chief.....	.25	....	State Line, Nos.....	....	....
Mack Morris.....	....	4.00	1 and 4.....	1.50	1.60
May Flower.....	....	.40	State Line, Nos.....	....	....
Native Silver.....	.10	.50	2 and 3.....	....	6.00
North Hite.....	....	.75	Trinity.....	....	1.50
O. K. & Winne- bago.....	....	\$1.00	Vandewater G.....	.52	.53

At a meeting held in this city last week, the directors authorized Mr. E. Gaujot, the superintendent of the Canada Consolidated Gold Mining Company's works, to make the necessary contracts for machinery, material, etc., for the completion of a mill to treat 125 tons of ore per day. He is now hard at work fulfilling the instructions of the board, that there may be no unnecessary delay.

The company has recently engaged Mr. A. J. Charleton, an English mining engineer, as assistant superintendent. Previous to his departure from England, and under the instructions of the company's consulting engineer, Mr. Charleton made a careful investigation of the treatment of arsenic as practiced at the largest works in England. In a report to the directors he shows that the large amount of arsenic contained in the ore will not be a disadvantage, but in fact a source of considerable profit to the company, while at the same time offering no obstacle to the treatment of the ore for gold.

OFFICIAL LETTERS.

Big Pittsburg—The superintendent, under date of April 13th, says:

A personal examination of Big Pittsburg shows that a level has been opened from the shaft at a depth of 128 feet, north forty feet and east twenty feet to the Hibernia line. An uprise from this level, raised thirty-five feet, cut

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 (April 9, April 11, April 12, April 13, April 14, April 15), 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 (April 9, April 11, April 12, April 13, April 14, April 15), SALES.

G. Gold. Silver, s. 1, 1/2. C. Copper. *Non-Assessable. † The Deadwood mine paid in dividends, previous to the consolidation, \$275,000. Total shares sold during the week, 987,833.

ten feet of very rich ore. A drift on the Hibernia line twenty-five feet in length shows a body ten feet thick of ore averaging 800 ounces of silver to the ton. A cross-cut running west of the junction with the Matchless exposes the same ore-body. This single drift, for a distance of thirty feet, produced over \$50,000. The showing in the mine is great. A chloride streak in both Big Pittsburg and Hibernia eight inches thick returns \$10,000 to the ton. The value of Big Pittsburg depends on future developments to the west.

Boulder Consolidated (Colorado).—April 11th, the superintendent telegraphs :

Cut 2½-foot vein good ore this morning in cross-cut from main shaft on the 200-foot level.

Dardanelles Consolidated Gravel Mining Co.—The superintendent writes, under date of April 4th, as follows :

Every thing is going on very well at the mine. Our water is all being utilized in good gravel. So far, we have been washing off the gravel mostly, and so have not put much gold in the flumes and undercurrents, as we will from this time on. However, it has been paying well for top gravel, for on washing up a flume that had to be repaired we obtained \$3059. This argues well for the future clean-ups of the season. Our running expenses are now very light, as every thing is in good order. Indications are good for another storm, and a consequent lengthening of the water season.

Father de Smet.—The superintendent's report for week ending March 29th is as follows :

Ore extracted from first level, 1500 tons; second level, 484 tons; ore milled for same period, 1960 tons. The work on the mine for same period was as follows: Lower tunnel connecting Eureka with McGinty winze, advanced 6 feet; widening lower tunnel, connecting Eureka and McGinty winze to a double track, advanced 18 feet; contract on sill floor, McGinty chamber, advanced one set; rise from middle chamber, first level to surface, advanced 7 feet.

Gold Stripe.—The superintendent of the Gold Stripe mine reports that the mine has never shown better than at present. The connection with the ore-body in the Goodwin mine adds extensive reserves of ore of an extra quality. The Lawrence ledge is opening out well, and gives promising indications of a large body of ore. The McIntyre chute has been furnishing a full supply of average ore for months past, and the stopes show large reserves. Important and extensive development is actively carried on. The mill is running full time, with an abundant supply of ore.

Green Mountain.—The superintendent reports the cross drifts in No. 5 tunnel running to the walls through fine ore. The ledge shows great size and excellent quality. The output of ore from the stopes of present working chute continues large. Unavoidable breaks in the ditch caused a loss during the month of a week's running time of the mill, thereby decreasing production. The breaks have been repaired, and every thing running well and on full time.

Indian Queen.—The superintendent reports by letter dated April 4th :

Every thing working satisfactorily. The mine is looking well. We are running a south level into the Hickey property recently purchased by the company. The face of drift shows a large vein of low-grade ore, which is very liable to change into good milling ore. During March, the mill worked 166 47-100 tons of ore; assayed value was \$109.90 per ton; amalgamated to 93 per cent; total value, \$17,014.39.

Leadville Consolidated.—The superintendent reports, April 4th, that the sixth level of the Carbonate or Leadville claim has been advanced 8 feet on the Little Giant ground, developing a 15-inch vein of very good mineral. Men have also been at work on the ninth level running a prospecting drift toward the Little Giant. The old Leadville workings between the second and third levels continue to improve, and promise a good deal of ore. In prospecting in unexplored ground on the south side of the south incline, a 1-foot vein was recently struck, assaying from 50 to 337 ounces silver per ton. The general outlook of the Carbonate claim is much more encouraging. The report says: Finding good ore so soon in the sixth level, where I expected to run the level 45 feet in baron ground before reaching a known ore-body in Giant, is certainly very gratifying. Taken altogether, the situation is promising for both Carbonate and Giant. A balance of 16½ tons of the March product of the Carbonate showed an assay value of 206 ounces silver per ton.

Old Dominion Copper Company.—This mine, which is located in the Globe District, Arizona, has lately been brought on this market. The superintendent reports, under date of April 3d, that every thing looks encouraging at the mine. Three assays made April 3d yielded 40, 46, and 50 per cent copper, respectively. These samples were a good average of eight feet of the ledge; how much wider the ledge may be can not be told until a cross-cut has been run. Near the surface, stringers of good ore run parallel with the solid ledge for 75 feet, and between them is ledge-matter.

Standard Consolidated.—For the week ending April 2d, the superintendent reports :

Extracted and shipped to the mills, 1334 tons of ore from the 300, 385, 500, and 550-foot levels; average pulp-essay for the week, \$26.31; crude bullion received, 3610 ounces; amount shipped to company, \$33,636.13. There is no change to report in the appearance of the stopes. The 385-foot level is furnishing the usual amount of ore, and the vein continues to look well, showing from 10 to 20 feet of clean ore. On the 550-foot level, the vein is about 15 feet wide, and is also looking well.

DIVIDENDS.

The Green Mountain Gold Mining Company yesterday declared a dividend (No. 22) of 7½ cents per share, payable April 25th. Transfer-books close on the 18th, and reopen on the 28th.

The Western or Contention mine has declared a dividend of 75 cents a share, or \$75,000, this month.

The Silver King Mining Company has declared a dividend of 25 cents per share.

The Deadwood-Terra Mining Company, of Dakota, announces its regular dividend (for March) of 25 cents per share, payable by Wells, Fargo & Co., on the 20th inst. Transfer-books close on the 15th.

The Osceola Copper Mining Company has declared a dividend of \$1.50 per share, or \$75,000 on its capital stock.

The Imperial Mining Company, of Colorado, announces that it will guarantee a 5 per cent dividend on the par value of all its treasury stock sold for five years from date of sale. These dividends will be paid semi-annually, and the amount necessary to pay them will be deposited with the Farmers' Loan and Trust Company of this city, which is the register of transfers for the company.

Dividend No. 32 (for March), of 30 cents per share, has been declared by the Homestake Mining Company, of Dakota, payable at office of Wells, Fargo & Co., 65 Broadway, on the 25th inst. Transfers close on the 20th.

The Pennsylvania Steel Company announces a dividend of 6 per cent.

SAN FRANCISCO MINING STOCK QUOTATIONS.
Daily Range of Prices for the Week.

NAME OF COMPANY	CLOSING QUOTATIONS.						Open- ing, April 15.
	April 8.	April 9.	April 11.	April 12.	April 13.	April 14.	
Alpha.....	3	4½	4½	3¾	4½	4½	.....
Alta.....	3½	3¾	3¾	3	3	3	.....
Argenta.....	.....	.....	.....	.....	.....	.....	.....
Bechtel.....	.....	.....	.....	.....	.....	19-32	.....
Belcher.....	2¼	2½	2½	2¼	2¼	2½	.....
Belle Isle.....	.....	.....	.....	.....	.....	.....	.....
Belvidere.....	.....	.....	.....	.....	.....	.....	.....
Best & Bel.....	9	9½	10½	9½	10	9½	.....
Bodie.....	.....	6	6½	6½	6½	6½	.....
Bullion.....	.....	1½	1½	1½	1½	1½	.....
Bullwer.....	2	.....	.....	2½	2½	3	.....
California.....	1	1½	1½	1½	1½	1½	.....
Chollar.....	.....	3	3	2¾	2¾	3	.....
Con. Imp.....	.....	.....	.....	.....	.....	.....	.....
Con. Pacific.....	.....	.....	.....	.....	.....	.....	.....
Con. Va.....	2	2	2½	2½	2½	2½	.....
Crown Point.....	1½	1½	2½	2¾	1½	1½	.....
Eureka Con.....	27	.....	28	.....	30	30	.....
Exchequer.....	1¼	1½	1½	1¼	1½	1½	.....
Goodshaw.....	.....	.....	.....	.....	.....	.....	.....
Grand Cur.....	5½	6½	6½	5½	6½	6½	.....
Grand Prize.....	.....	.....	9-16	.....	9-16	6½	.....
Hale & Nor.....	4	5½	6	5	5½	5½	.....
Mar. White.....	3-32	.....	.....	.....	5-32	.....	.....
Mexican.....	5½	6½	5½	.....	6½	7½	.....
Mono.....	13-16	15-16	1	1	1	.....	.....
North Belle.....	15	15	15½	16½	17½	17½	.....
Noonday.....	1¾	1¾	1¾	1¾	1¾	1¾	.....
Ophir.....	4	6½	7¾	6½	7	7½	.....
Oro.....	27-32	29-32	4	3½	27-32	27-32	.....
Overman.....	1½	1½	1½	1½	1½	1½	.....
Potosi.....	3	3¾	3¾	2½	3¼	3¼	.....
Savage.....	2½	3¼	3¼	3	3¼	3¾	.....
Scorpion.....	.....	.....	.....	.....	.....	.....	.....
Sierra Nev.....	9½	11½	16	13	15½	15½	.....
Silver King.....	24½	23¾	24	24	23¾	23¾	.....
So. Bulwer.....	.....	.....	.....	.....	.....	.....	.....
Stoga.....	.....	.....	.....	.....	.....	.....	.....
Tip Top.....	4¼	4	.....	.....	4	4	.....
Tuscarora.....	.....	.....	.....	.....	.....	.....	.....
Union Con.....	8½	9½	11	9½	10½	11½	.....
Wales.....	1¼	1¼	1¼	1¼	1½	1½	.....
Yel. Jacket.....	3½	4½	5¼	6½	5	5	.....

REVIEW OF THE SAN FRANCISCO MARKET.

The San Francisco list is gradually strengthening. An immense business there is reported, and we again chronicle a decided advance throughout. Sierra Nevada closed yesterday at \$15½, Union Consolidated \$11½, and nearly all the rest in the same proportion. Eureka Consolidated, however, shows exceptional strength, closing at \$30 per share. This advance is probably due to the encouraging developments in the new strike recently reported in this mine. It is thought by many that the advance in the Comstocks is purely the result of manipulation, and probably there is some truth in this; on the other hand, the

recent developments in the Sutro Tunnel, and the fact that many of the prominent mines are beginning to utilize it, must exert a favorable influence on the market. The *Alta California*, for example, in a recent issue, says :

It is proposed to penetrate the bowels of Mount Davidson by the Sutro Tunnel; drifts are also being projected from the upper workings of other mines to explore the western country, and we give the following item, taken from the *Enterprise*, as showing that good results do follow some of the prospecting drifts: The tunnel, which for some years past has been running from American Ravine to tap the ledge in the Lord of Lorne mine, American Flat, cut through the east wall of the vein itself, at a point 300 feet below the surface. Green chloride, assaying well in silver, and soft brown casing material, giving assays of gold, were cut into, and the company will soon know more about their ledge than they have found out in the eight or ten years they have been working it. They claim to have the main Comstock, and that it is about two hundred and fifty feet wide at that point.

A cable from London says that the McCalmonts have sold their interest in Sutro to an American syndicate. A dispatch from San Francisco says there has been unusual activity in Sutro Tunnel.

SAN FRANCISCO, April 11.—The assessments delinquent in April amount to \$1,068,400. Of this, Nevada mines call for \$885,400.

Coal Stocks.

NEW YORK, Friday Evening, April 15.

These stocks have not attracted much attention during the week past, and there have been no features specially worthy of note. Prices have varied but little, but closed yesterday a little weaker. The bulk of the business in this market has been absorbed by Delaware, Lackawanna & Western, which has had sales of 148,670 shares, at \$120¼@ \$118½. Delaware & Hudson has been dull and steady, recording sales of 15,093 shares, at \$111½@ \$109½. The annual meeting of the stockholders of this company for the election of officers will be held on May 10th. On sales of 72,297 shares, New Jersey Central has declined from \$101¼ to \$99½. Reading has been active, the sales in this market amounting to 46,930 shares. The decision of the Court regarding the late election of officers of this company, unfavorably affected the stock, which dropped to \$59, subsequently recovering to \$62¼ and closing at \$61.

Constant reports come of decisions by and arguments before courts, appeals, etc., in relation to the Reading Railroad and Mr. Gowen; but he still holds his position, and the indications favor his doing so until the next annual meeting.

A decree affirming the legality of the late election of officers of the Philadelphia & Reading Railroad was made on Saturday last by the Court of Common Pleas of Philadelphia. This approves the election of the McCalmont ticket, which is as follows: Frank S. Bond, President; George F. Tyler, Samuel R. Shipley, John S. Newbold, Edward T. Steel, Charles Parrish, and John Lowber Welsh, managers; Samuel Bradford, Treasurer; and Edward L. Kinsey, Secretary. As the decree does not embody the injunction restraining Mr. Gowen and others from interfering with the newly-elected officers, counsel for President Bond and his board of managers will make application at once to the United States Circuit Court for an injunction, and Mr. Gowen will take an appeal from the decision of the Common Pleas to the Supreme Court of the State.

After the court's decree had been certified, Mr. Dallas made out the certificate of election to the officers declared elected by the court, and Judge McKennan informed them that he would receive their application when a pending case had closed. Mr. Bond was instructed in the mean time to take no action to assert his rights until Judge McKennan expressed an opinion on the subject, counsel setting forth the facts of the election, the refusal of the receivers to permit the board of managers to hold meetings at the office of the company, and asking for the recognition of Frank S. Bond as president, George F. Tyler, Samuel B. Shipley, John S. Newbold, Edward T. Steel, Charles Parrish, and John Lowber Welsh as managers, Samuel Bradford as treasurer, and Edward L. Kingsley as secretary of the Philadelphia & Reading Railroad Company. The petition was filed and the court directed that the hearing take place to-morrow.

The receiver of the Central Railroad of New Jersey

COAL STOCKS.

Table with columns for Name of Company, Capital Stock, Shares (No., Par Val., Last Dividend), Rate per Annum, Quotations of New York stocks (April 9-15), and Sales. Includes companies like Am. Coal Co., Col. C. & I., Ches. & O. RR, etc.

*Of the sales of this stock, 49,285 shares were sold at the Philadelphia Stock Exchange, and 46,930 shares at the New York Stock Exchange. Total Sales 400,680.

has made the following report to the New Jersey Legislature for the year 1880:

Financial report table with columns for Item and Amount. Categories include Capital stock, Income bonds, First mortgage bonds, Consolidated mortgage bonds, Newark & New York Railroad bonds, etc.

Philadelphia.

THE NATIONAL MINING EXCHANGE.

Our review for the stocks comprised in this list extends from April 9th to the closing of the market on Wednesday, the 13th inst. In the annexed table we give the opening, highest, lowest, and closing prices of stocks dealt in at the National Mining Exchange.

An informal conference of the members of both mining exchanges was held yesterday afternoon, at which the feasibility of a consolidation of the two boards was discussed. A friendly spirit was manifested and a committee

of conference, consisting of Messrs. George White, S. White, Jr., and David Loewen, of the Philadelphia, and Messrs. Hirschfeld, Moxey, and Stuart, of the National, was appointed to prepare a plan of union to be submitted to the two exchanges.

The Times of April 12th observes with reference to the Mining Annex.

The Mining Annex of the Philadelphia Stock Exchange was opened yesterday in one of the worst-ventilated basements in this city. We have now three mining exchanges, and there is not sufficient business to support two. In New York there are two. The members of the Stock Exchange in that city, not having time in their own exchange to attend to mining business, were permitted to join the New York Mining Stock Exchange, and that became a success—the other a failure.

The transactions during the four days' business comprised in the following table aggregate 379,205 shares, and evidently the interest in mining investments is rapidly growing in Philadelphia.

Table showing transactions during the four days' business (April 9-13). Columns include Name of Company, Opening April 9, Highest during week, Lowest during week, Closing April 13, and Total shares sold.

Total number of shares sold..... 379,205

Copper and Silver Stocks.

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

The market for the past week has not come quite up to the expectations of buyers, and although there has not been much of a decline in the principal copper stocks, the market has ruled dull and inactive, with very little disposition to operate in the speculative list. The silver stocks

continue to be in good demand, and prices are very firm for both dividend-paying and speculative. At the Mining Exchange, a fair amount of business has been transacted, with Empire as the leading card, although several other specialties have been quite active.

Calumet & Hecla has ruled very firm at \$244 1/4 @ \$245. The announcement of the usual quarterly dividend of \$5 per share has had no effect on the market.

Central declined on a sale of 50 shares from \$32 @ \$28. We hear of no reason for the decline.

Copper Falls declined from \$10 @ 3/4 on sale of 100 shares only.

Franklin has been quite active, with sales at \$12 1/4 @ \$13, closing at \$12 @ \$12 1/2.

Pewabic neglected, sale of 10 shares only at \$16 1/4.

Quincy in the early dealings was quite strong at \$55, but weakened with the rest of the market, and to-day sold at \$33 1/4. There is but little stock to be had at these figures.

Oseola very steady at \$35 @ \$35 1/4.

Atlantic firm at \$12 1/4 @ \$12 3/4.

The balance of the market was dull and featureless. We note sales of Allouez at \$3, Douglas at \$4, Huron at \$3 1/4 @ \$4, National \$1, Ridge \$4, Star \$1, Washington 3/4, Brunswick Antimony \$17 @ \$18.

In silver stocks, Catalpa continues to lead at the regular Stock Exchange, sales of which aggregate over 9000 shares at \$2 1/2 @ \$2 3/4. The reports from the mine are of a very encouraging character, and it bids fair to be regular dividend-paying stock.

Crescent has also been quite active at \$15 1/2 @ \$17.

Contentment dull at \$2 3/4.

Harshaw quiet, sales at \$11 @ \$11 1/4.

Silver Islet advanced from \$25 @ \$20, closing \$28.

Duncan Silver dull at \$3 1/4 @ \$3 3/4.

Sullivan & Waukeag dropped from \$5 1/2 @ \$4 1/4. On the report of an assessment this afternoon, it was in better demand at \$4 1/2 @ \$3 1/4, with sales at the latter price.

Bonanza Development steady at \$3.

Empire sold at \$1 @ \$1 1/2.

3 P.M.—At the Board this afternoon, there was very little doing, and no special change to note.

At the Mining and Stock Exchange, Empire Mining and Milling Company continues to take the lead—the opening price, about 96 @ 97c., was the lowest for the week; the highest being \$1.20, which was reached yesterday. To-day it declined at first call to \$1.08, and this afternoon to \$1.04; closing, \$1.03 bid; sales aggregate for the week about 40,000 shares. Milton Mining and Milling, of Maine, was also largely dealt in, and declined from \$1.25 @ 90c., closing to-day in better demand at \$1.15 @ \$1.20. Twin Lead, also a Maine stock, has been quite prominent with sales from \$1.15 @ \$1.25.

Other specialties have been more or less active, and the market has afforded good opportunities for making turns, which has been availed of in many instances at a good round profit.

Boston Mining Stocks.

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 April 13th.

Table showing synopsis of transactions in mining stocks. Columns include Name of Company, Opening, Highest, Lowest, Closing, and Sales. Includes Allouez, Arizona Queen, Atlantic, etc.

c. Copper. s. Silver.

BULLION MARKET.

NEW YORK, Friday Evening, April 15.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK, PER OZ.

Table showing daily range of silver in London and New York. Columns include Date, London (Pence, Cents), and New York (Pence, Cents).

An advance of the India exchange has caused a fractional rise in silver abroad. This with a slight

since January 31st, 1880, when they stood at 54,417 tons and bars at £73.

April 1st. Chili Bars £61@£61½ cash, the market closing steady with fair demand for cash stuff at £61@£61½, according to brand.

Australian dull; Wallaroo, £71; Burra, £67; English rather firm; Tough Cake, £64½@£65; Select Ingot, £66½@£68; India Sheets, £69½@£71; Yellow Metal Sheets, 5¼@5½s. per lb.

Messrs. Richardson & Co., of Swansea, in their monthly circular, under date Swansea, April 1st, give the total stocks of foreign copper produce remaining unsold there at that date as follows: Copper ore, 3349 tons; Regulus, 2207 tons; Copper, 10,810 tons; Precipitate, 564 tons, representing about 13,000 tons fine copper. We quote Ores and Regulus, 12s. 6d. @ 12s. 9d. per unit; Chili Bars, g. o. bs., £61@£61 10s. They say: We have not much to report by way of variation in prices of Bars during the past month, though in the early part of it there was a slight fall, which has since been recovered. There was a rumor, a few days ago, of some large transactions in Lota Bars, but if correct, particulars have not been made public, except that the quantity is about 3000 tons, part here and part afloat.

STATISTICS OF COPPER—LONDON, LIVERPOOL, SWANSEA, AND FRANCE.

	Mar. 1 to Mar. 31.		
	Imports.	Deliveries.	
Fine foreign, chiefly Australian	1,034	136	
Chili } Bars and Ingots.....	1,256	1,542	
Chili } In Ores and Regulus...	52	210	
Totals, England.....	2,342	1,908	
Fine foreign, chiefly American.....	Nil	58	
Chili Bars, Ingots, and Barilla.....	1,140	3,308	
	3,482	5,274	
	Stocks.		
	Mar. 31.	Feb. 28.	
Fine foreign, chiefly Australian	8,723	7,845	
Chili } Bars and Ingots.....	31,434	31,770	
Chili } In Ores and Regulus...	907	1,065	
Totals, England.....	41,114	40,680	
Fine foreign, chiefly American.....	322	380	
Chili Bars, Ingots, and Barilla.....	3,398	5,566	
Chili, chartered } Mail.....	44,834	46,626	
and afloat } Telegram.....	8,545	7,548	
	900	3,300	
	54,279	57,474	
Chili G. O. Bs.....	£61¼	£61¼	
Wallaroo Cake.....	72	72	
	Jan. 1 to Mar. 31.		
	1881.	1880.	1879.
Imports } Chili.....	7,634	11,823	12,016
Imports } Other foreign.....	2,613	1,985	3,940
	10,247	13,808	15,956
Deliveries } Chili.....	10,247	12,077	10,664
Deliveries } Other foreign.....	1,107	1,968	3,494
	11,931	14,045	14,158

Tin.—There is a fair jobbing trade. Prices for large lines somewhat nominal and ranging from 20¼@20½c., according to brand.

Our English advices by mail include April 1st. March 28th. Pending Banca sale of 30th inst., there is no disposition to operate. Small sales have been effected from 88½s. up to 88s. for cash, partly immediate payment and on net average. Final quotations were 88½@88s.½; buyers at lowest for sharp cash.

March 29th. Deliveries of tin in Holland are telegraphed at 449 tons Banca, 397 tons Billiton. Pending Banca sale to-morrow, the London market fairly maintains its position, with sales Australian and Straits at 88@88½s. sharp cash, 88¼s. fourteen days prompt, with a little three-months' metal at 89¼s. per cwt.

March 30th. The Banca sale of 23,400 slabs went off at an average of 53¼fl., equal to 88½s. in warehouse, Holland; the prices paid ranged from 53@53¼fl. Here quotations have been strong, though the transactions were but moderate, and we note only some 70@80 tons Straits and Australian at 88½@88¼s. sharp cash, 88½s. with usual 14 days.

March 31st. London stocks are given as 8880 tons; imports of the month, 2119 tons, of which 288 tons in transit for America, and deliveries 1108 tons. Australian and Straits reports not yet known. Sales to-day, the bulk of which for sharp cash, from 88½@88¾s.; fourteen days to one month, from 88½@88¾s., and three months at 89¼s. Closing sales for cash were 88¼@88s.½.

April 1st. A good trade, and values a trifle higher, at 88½@88s.½, sharp cash to ordinary 14 days; and forward prompts, 89@89½s., according to time,

sellers allowing brokerage off the highest figure. Total stocks of metal here and in Holland are 12,067 tons, against 11,819 tons on 31st March, last year, price being then 85½s., so that, in addition to the direct supplies to Europe, the bulk of the metal returned from America (about 650 tons) has also been consumed.

STATISTICS OF FOREIGN TIN IN LONDON AND HOLLAND.

	March 1 to 31.		
	Imports.	Deliveries.	
Australian and Straits.....	1,988	1,078	London.
Banca (ex sale).....	732	450	Holland.
Billiton.....	420	400	
Total.....	3,120	1,928	
In transit—Straits, 262 tons;			
Australian, 26 tons.....	288	288	
Total.....	3,408	2,216	
	Stocks.		
	Mar. 31.	Feb. 28.	
Australian and Straits.....	8,878	7,988	London.
Banca (ex sale).....	1,451	1,169	Holland.
Billiton.....	1,738	1,718	
Total.....	12,067	10,875	
Approximate quan-			
tity afloat, as esti- } Austr'n. 1,600	1,900		
mated from tele- } Straits... 450	900		
gram..... } Billiton.. 1,100	1,600		
Total.....	15,275		
Australian and Straits.....	£86½	£88	
	January 1 to March 31.		
	1881.	1880.	1879.
Sales of Banca by Trading Co.....	1,304	1,304	1,339
Imports—Billiton.....	770	548	907
" Straits.....	2,856	410	1,751
" Australian.....	2,576	3,265	2,092
T. tal brought to market...	7,506	5,315	6,089
Actual deliveries of foreign.....	5,518	5,052	4,813
In transit—Straits and Australian.....	1,147	2,869	476
	March.		
	Imports.	Approximate shipments.	
Australian.....	1,052	775	
Straits.....	916	450	
Total.....	1,968	1,225	

Tin Plates.—The market is fairly strong but quiet, excepting for futures, which are strongly held, at better prices. We quote per box as follows: Charcoal tins, Melyn @£6. Charcoal Roofing, Dean grade, \$5½ for 14 x 20, and \$11@£11¼ for 20 x 28; Allaway grade, \$5½@£5½ for 14 x 20, and \$10¼@£10¼ for 20 x 28. Coke Roofing B. V. grade, \$5 for 14 x 20, and \$10 for 20 x 28. Coke tins, A. B. grade, IC, \$5½@£5½; B. V. grade, \$5@£5.05; ICW, \$4¼ for 14 x 20.

Messrs. Robert Crooks & Co., of Liverpool, under date of March 31st, say of tin and terne plates: Matters continued much as last reported until within the last two days, when vigorous buying in charcoal, tin and terne has pushed prices up. Makers are, for the first named, refusing offers of 1s. over prices they would have been glad enough to get last week. The demand is so considerable, it appears likely they will get what they ask. In terne, especially the cheaper sorts, large business has been done, and those of the works who don't decline to quote hold firmly for nearly the same advance as tins. Coke tin, B. V. grade, are still obtainable out of stock at 15s.

Pig-Lead is quiet but firm; there is no business of any consequence, excepting in small lots. The market may be said to be featureless. We quote market somewhat nominal at 4'85c. The shipments over the St. Louis & San Francisco Railroad for week ending April 7th were 125 tons.

Spelter and Zinc.—Both are without feature: the former we quote nominal at 5@5½c., and the latter at 7c. The Age of Steel, under date of St. Louis, April 9th, says:

Spelter continues very dull, there having occurred no transactions in the article during the week that we could hear of.

Antimony.—Nothing doing; prices nominal and unchanged. We quote Cookson's at 14½c.; Hallett's and Johnson's at 14½c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 15.

There has been but very little business done since our last, and this continued quietness is having a depressing effect. The consumption is very large, but at the same time the production has reached immense proportions. Considerable iron will be moved on the opening of navigation, and further purchases will probably be made after that time. The consumption is very large, with every indication that it will continue and probably increase.

American Pig.—There have been no transactions

worthy of note. The leading makers are showing no weakness, but there are concessions being offered by weaker concerns and from second hands. We quote No. 1 Foundry at \$25; No. 2 Foundry, \$22@£22¼; and Forge, \$20¼@£21.

Scotch Pig.—The arrivals have been but moderate since our last, and have mostly gone into consumption. Glasgow prices are weaker. Freights, except in occasional instances, are unchanged. A sale of 500 tons of Eglinton on private terms is reported. We quote Eglinton at \$21; Coltness, \$21¼; Glengarnock, \$22¼@£23; Gartsherrie, \$23; Summerlee, \$23@£23½. A sale of 2000 tons of Bessemer iron at \$24.75 delivered at Hoboken is reported.

Messrs. John E. Swan & Brothers, of Glasgow, under date of April 1st, report 121 furnaces in blast, as against 114 at the same time last year. The quantity of iron in Connal & Co.'s stores was 538,981 tons, an increase of 3351 tons for the week. The shipments show a decrease since Christmas of 79,257 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 5599 tons. The following were the quotations of the leading brands of No. 1 pig-iron: Gartsherrie, 58s.; Coltness, 59s.; Langloan, 58s. 6d.; Summerlee, 57s. 6d.; Carnbroe, 55s.; Glengarnock, 55s.; Eglinton, 49s. Middlesbrough pig-iron was quoted as follows, f. o. b.: No. 1 Foundry, 48s.; No. 2, 41s.; No. 3, 39s.; No. 4, 38s. 6d.; No. 4 Forge, 38s.

Rails.—There is nothing doing in these, although there is a fair inquiry. We quote English steel at \$62@£64 here, and American at \$63@£65 at mill. English iron rails in store here are quoted at \$47, and American at mills at \$48@£50.

Old Rails.—A sale of a lot of 270 tons of Ts. at \$26½, ex ship here, is reported, and 1000 tons of D. Hs. at Philadelphia at \$28½. We quote Ts. at \$27 and D. Hs. at \$28@£28½.

Wrought Scrap.—Without business, we quote at \$30.

We publish the following letters from our regular correspondents:

Baltimore.	April 11.		
[Specially reported by R. C. HOFFMAN & Co.]			
The iron market continues quiet, while the large consumption of pig-iron going on keeps prices firm for good grades, which are well kept up. We quote as follows:			
Balt. Char. ..	\$38.00@£40.00	Mot. and Wh.	\$18.00@£19.00
Va. " ..	38.00@ 40.00	Cl. C. B. Bl'om	60.00@ 62.00
Anth. No. 1..	25.00@ 26.00	" Billets	"@ "
" " 2..	23.00@ 24.00	Refined Bl'm	58.00@ 55.00
" " 3..	20.00@ 22.00		

Cincinnati. April 13.
[Specially reported by JACOB TRABER & Co.]

The demand for pig-iron continues moderate, but prices remain firm at our quotations.

	Four mos.
No. 1 Hanging Rock Charcoal Pig-Iron.....	\$27.00@£27.50
No. 2 " " " " " " " " " " " "	26.00@ 26.50
No. 1 Tennessee " " " " " " " " " " " "	26.00@ 26.50
No. 1 Hanging Rock Coke " " " " " " " " " " " "	24.50@ 25.00
No. 2 " " " " " " " " " " " "	22.50@ 23.50
No. 1 Jackson Co. Stone Coal " " " " " " " " " " " "	21.00@ 24.00
H. R. C. B. Car-Wheels, all Nos.....	40.00@ 42.00
Southern C. B. Car-Wheels, all Nos.....	37.00@ 38.00
Virginia " " " " " " " " " " " "	39.00@ 40.00

Columbus, O. April 13.
[Specially reported by KING, GILBERT & WARNER.]

There has been a very good demand for pig-iron during the past week. Prices remain unchanged. We quote as follows:

FOUNDRY IRONS.	
No. 1 Hanging Rock Charcoal.....	\$27.00@£27.50
" 2 " " " " " " " " " " " "	26.00@ 26.50
" 1 Hocking Valley.....	23.50@ 24.00
" 2 " " " " " " " " " " " "	22.50@ 23.00
" 1 American Scotch.....	22.50@ 23.00
" 1 Glasgow.....	22.50@ 24.00
" 1 Jackson County.....	22.50@ 23.00
" 2 " " " " " " " " " " " "	21.50@ 22.00
" 1 Silver Gray.....	21.50@ 22.00
" 2 " " " " " " " " " " " "	20.00@ 21.00

MILL IRONS.	
Gray neutral.....	21.00@ 22.00
Mottled and white neutral.....	19.00@ 20.00
Gray cold-short.....	20.00@ 21.00
Mottled and white cold-short.....	18.00@ 19.00

Louisville. April 12.
[Specially reported by GEORGE H. HULL & Co.]

The market is very firm, and good orders from consumers

are steadily being booked. There is no change from our last prices, which are for cash as follows:

Table with columns for No. 1 and No. 2 prices for FOUNDRY IRONS, including items like Hanging Rock Charcoal and Southern Charcoal.

"Amer. Scotch" \$23.00@24 | Silver Gray \$19.00@22.00 Scotch Iron 25.00@26

Table with columns for No. 1 and No. 2 prices for MILL IRONS, including items like No. 1 Charcoal and No. 1 Stc'l & Coke.

Table with columns for prices for CAR-WHEEL AND MALLEABLE IRONS, including items like Hanging Rock, cold blast and Alabama and Georgia, cold blast.

Pittsburg, April 12.

[Specially reported by A. H. CHILDS.]

The dullness which has prevailed in this market for some weeks past still continues unabated, and the natural result thereof is seen in lower prices and greater anxiety to sell.

The poorest qualities suffer most, and are pressed on the market without much being accomplished beyond a further weakening of price, and confirming buyers in their determination to hold off as long as possible, and await further developments.

The situation is one of peculiar hardship for the furnacemen, as there seems to be no possibility of reducing the cost of manufacture, the whole tendency, indeed, for some time past being the other way. Quotations are:

Table with columns for 4 mos. and prices for No. 1 F dry, No. 2, and Gray Forge.

Richmond, April 8.

[Specially reported by ASA SNYDER.]

Our foundries and mills are consuming pig and scrap-iron in quantities unprecedented in the history of this market. Quotations unchanged.

Table listing prices for various iron products including Scotch Pig-Iron, Amer. Scotch Pig-Iron, Best Charcoal Wheel Iron, Old Rails, Old Wheels, Wrought Scrap No. 1, Cast Machinery Scrap, Richmond Refined Bar Iron, Horseshoes (Tredegar), Mule-shoes, and Virginia Coke Pig-Iron.

St. Louis, April 9.

[Specially reported by HOFFER, PLUMB & Co.]

Business continues to be confined to small lots. Prices are nominally unchanged.

Table with columns for prices for HOT BLAST CHARCOAL, including Missouri and Southern.

Table with columns for prices for COKE AND COAL, including Missouri and Ohio.

Table with columns for prices for MILL IRONS, including Missouri and Ohio.

Table with columns for prices for CAR-WHEEL AND MALLEABLE IRONS, including Missouri and Ohio.

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

LONDON, E. C., March 31.

STEEL RAILS.—£6 5s. @ £6 10s. per ton for sections, 50 lbs. per yard and upward, is asked by makers, according to the state of their order-books. Some purchases were reported on the basis of £6 per ton f. o. b.; this immediately brought over c. i. f. orders at a corresponding price, but we could not place them.

IRON RAILS.—Continue nominally at £5 7s. 6d. per ton for sections 40 lbs. per yard and over, but no business is doing in them.

BAR IRON.—£5 2s. 6d. @ £5 5s. per ton. OLD RAILS.—Are dull; buyers offer 75s. c. i. f. for flanges; but for the present more money is asked.

HEAVY WROUGHT SCRAP-IRON.—Nominally 67s. 6d. @ 70s. per ton, f. o. b., weight and quality approved at time of shipment.

OLD RAILWAY LEAF SPRING STEEL.—£5 5s. @ £5 10s., nominally; nothing offering.

OLD CAST-IRON RAILWAY CHAIRS.—43 @ 45s. per ton. STEEL BLOOMS, 7" x 7" AND UPWARD.—£5 15s. @ £6 per ton.

ESSEMER PIG-IRON, Nos. 1, 2, AND 3.—60 @ 65s. per ton, according to brand.

SCOTCH PIG-IRON.—For the moment, a better tone prevails; from 48s. 3d @ 48s. 6d. cash.

MIDDLESBROUGH PIG-IRON, No. 3.—Strong market at 38s. 6d. @ 39s.

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to April 15th, 1881.

Large table showing freight rates for various ports including Philadelphia, Baltimore, and Elizabethport, with columns for From Philadelphia, From Baltimore, and From Elizabethport.

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

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 15.

Anthracite.

There has been an increase of business during the past week, and an improvement in prices. Some of the companies are unable to meet the demands made upon them for certain sizes, and there is a weak movement in favor of working full time next week, but we do not expect that this will be agreed to. Although there is an improvement, as stated above, it is but a small one, and the market is still far from being in a healthy condition, even under the curtailment. The coal companies have continuously been making efforts to put their market in shape, and then, as soon as that was done, have taken some action that either demoralized or jeopardized it. This influence is among the companies now, but we think the chances of its seriously influencing the situation are less this year than heretofore.

The Western Association had a meeting in this city yesterday, at which prices were reduced from 55 to 60c. per ton with the view of encouraging steady shipments throughout the season. Prices will be advanced from time to time until the reduction that is now

made will be more than overcome. The outlook for a very large business with the West is very encouraging. It will probably take very much more coal than ever before in the history of the trade, and there is nothing to indicate that the demands will not increase at a very rapid rate.

We see nothing to indicate that the coal companies will not work in comparative harmony this year, and fairly maintain prices. Complete good faith would be a surprise to all those familiar with the trade; but there is nothing to show that the present arrangements will not be as well carried out as any previous ones. The public is showing a little more confidence in the combination; but there is still a very strong feeling that something will occur to unsettle prices. There is a feeling among the producers that their policy should be so pronounced as to inspire confidence with the public. There is one prominent influence at work that must in time bring about a disruption of the combination, and that is the rapid increase of the productive capacity of the mines. This is the result of combination and abnormal prices for coal. It is a safe rule that combinations will in time come to grief; but they have a certain life, and it is a matter for the calculation of those interested to determine the length of this life. Before a disruption, prices may be maintained for one, two, or more years, and even be advanced, so that those who require coal may find it to their advantage to buy considerable coal now at the prevailing prices, even though they feel certain that they can buy it six months or a year hence at one or two dollars per ton less.

Bituminous.

There is but a limited business doing in this class of coal, and prices are in some cases pretty low. The committee of the Board of Public Works of the State of Maryland will meet at Cumberland to-day in reference to the connection between the George's Creek & Cumberland RR. and the Baltimore & Ohio RR.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ending April 9th, and years from January 1st:

Table showing coal production statistics for 1881 and 1880, broken down by region (Wyoming, Lehigh, Schuylkill, Sullivan) and total production, with columns for Week and Year.

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 showing total same time in 1876, 1877, 1878, 1879, and 1880.

* This report was not received this week. † This report is not full.

Belvidere-Delaware Railroad Report for the week ending April 9th:

Table showing coal shipment statistics for Coal for shipment at Coal Port (Trenton) and Coal for shipment at South Amboy, with columns for Week, Year 1881, and Year 1880.

The decrease in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania Railroad amounts to 6313 tons, as compared with the corresponding period in 1880.

The Production of Bituminous Coal for the week ending March 26th was as follows:

Tons of 2000 lbs., unless otherwise designated.	Week.	Year.
<i>Cumberland Region, Md.</i>	Tons.	432,353
*Tons of 2240 lbs.	39,832	
<i>Barclay Region, Pa.</i>		
*Barclay RR., tons of 2240 lbs.	9,681	127,547
<i>Broad Top Region, Pa.</i>		
*Huntingdon & Broad Top RR.	63,356	
East Broad Top	1,477	17,389
<i>Clearfield Region, Pa.</i>		
Snow Shoe	1,657	16,316
Tyronne and Clearfield	52,030	470,296
<i>Allegheny Region, Pa.</i>		
Pennsylvania RR.	5,211	66,532
<i>Pittsburg Region, Pa.</i>		
West Penn RR.	6,383	82,572
Southwest Penn. RR.	509	9,263
Penn. & Westmoreland gas-coal, Pa.		
RR.	18,029	216,344
Pennsylvania RR.	10,586	148,973

The Production of Coke for the week ending March 26th, and year from Jan. 1st:

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Allegheny Region)	1,977	24,164
West Penn RR.	2,578	22,633
Southwest Penn. RR.	27,557	361,657
Penn. & Westmoreland Region, Pa. RR.	3,241	52,130
Pittsburg, Penn. RR.	14,837	100,760
Snow Shoe (Clearfield Region)	242	2,052
Total	50,432	562,306

The Coke Trade of Western Pennsylvania.

We condense from the *Pittsburg Telegraph* the following valuable facts in regard to the coke trade in Western Pennsylvania contains two regions utterly unlike in character. In the northwestern portion of the commonwealth is the coke region. In the southwest is the coke region, just now the scene of great activity. The activity in the iron trade, the "blowing in" of furnaces long cold, the building of new foundries, and the growth of the smelting trade in the far West and elsewhere have all contributed to the present state of energy displayed by the coke-making trade of the Connellsville regions of Pennsylvania. Though the price just now is barely one half that obtained during the spasmodic advance of a year or so ago, yet it seems sufficient to not only keep every oven of the region in active operation, but to start work which will result in the completion of nearly 2000 ovens more. From Mr. John F. Dravo and others the following facts were obtained. The use of coke in blast-furnaces dates back only to 1850, when the firm of Graff, Bennett & Co., of this city, first used the article with success. Previous to that time the "block" coal of Ohio, and charcoal, were used in the reduction of ore in blast-furnaces. Coke had been made in the Connellsville region some ten years before the time mentioned; but as there was no communication with this city except by river, coke was sent past our furnaces and used at Cincinnati and elsewhere along the river in foundry-furnaces only. Gradually, however, as the merits of this fuel became known and railroad transportation became possible, the coke industry began a growth which has to-day attained most important proportions. The peculiarity of the business lies in the fact that the vein of soft coal from which the Connellsville coke is made is of a restricted, well-defined area, and is only found in the Pennsylvania regions in a workable vein 10 feet thick. The same properties, it is true, are claimed for the Colorado coal, but as yet the deposit is not known as a rival to the Pennsylvania vein. This deposit of coal crops out at its northern edge at Blairsville, Indiana County, and is traced as far as its southern outcrop, at Morgantown, West Va. The eastern and western limits are from two to four miles apart, and the coal fit for coking comprises eight feet of the total depth of 18 inches, the air supply is cut off almost entirely, and the heat of the surrounding fire-brick, left from its previous charge, converts the coal into coke in 36 hours. Extra hard, or 72-hour coke, is the product of a charge which has remained in the ovens over Saturday, Sunday, and Monday. The capacity of each oven in the region is given at 100 to 120 bushels every alternate day, or 350 bushels per week, the total number of ovens being in round numbers 6000. Their combined production is readily found to be 2,100,000 bushels per week. This output is, however, restricted by the want of cars, many firms shipping only a few days each week. But making all allowances for this and other causes, the total product of the coke in the regions for the present year will be something enormous. Pittsburg coke finds ready sale on the shores of Lake Champlain, in Canada, in New York, Philadelphia, Baltimore, Chicago, all parts of Ohio, St. Louis, Omaha, and other widely distant points. Its chief merits are the following: Proportion of fixed carbon, great strength, openness of texture, and freedom from sulphur. An analysis shows the following component parts:

Bitumen and moisture	52
Ash	6.44
Fixed carbon	89.80
Sulphur	.24
Total	100.00

To operate the 6000 ovens of the region requires the services of an army of 4000 men and boys, and each oven represents in capital invested in lands, ovens, machinery, etc., the sum of \$500. This gives \$3,000,000 as at present so invested. Coke lands are worth, when the vein is favorably located, from \$800 to \$500 [per acre]. As showing what the railroads' share of the coke production must be, it is only necessary to state that for the fifty miles of transportation between the coke regions and this city (Pittsburg) the freight is \$1.16 per ton; to Chicago, \$3.50 per ton; to New York, \$4 per ton. Twelve tons make a car-load, and no one can limit a car loading coke on it, and it does not require a car

of special build to hold it, and at these rates cars are now so scarce as to seriously disturb the filling of contracts by many shippers, shipments being only possible three days in a week. A feature of the coke-making trade lies in the fact that every twenty-four hours 100,000,000 cubic feet of gas is wasted from the ovens. It is this product of combustion which a Pittsburg corporation proposes to bring to the city in a 24-inch main, and thus heat our residences and operate our puddling and heating furnaces.

Alleged Undervaluation of Iron Imported into Canada.

The *Bulletin of the American Iron and Steel Association* of April 6th says: In connection with recent publications relative to an alleged undervaluation of iron imported into Canada by the firm of Clarke, Reeves & Co., we are authorized to state that the merchant appraisers at Ottawa, to whom the question was referred, disagreed in their conclusions. One of them, Mr. John Taylor, of Montreal, a business man of high repute, and agent in Canada of the Edge Moor Iron Company, in a well-digested report, fully sustained the rate at which the iron had been entered. The other appraiser, a Mr. Fleck, recommended an increase in the valuation. The arbitrator under the Canadian statute, in such cases, was the collector of customs, who receives a percentage of the amount of any penalty exacted as the result of an additional duty imposed. His report coincided with that of Mr. Fleck. (It is a significant circumstance that, within a week after public notice of the action of this officer, the Dominion Parliament repealed the provision above mentioned.) From the decision of a tribunal thus constituted, Clarke, Reeves & Co. have appealed to the Treasury Board, a council composed of the Ministers of Customs, Justice, Finance, and Inland Revenue, where, it is safe to assume, their case will receive a fair and impartial consideration. The evidence upon which the adverse decision is claimed to have been based, and which will now be subjected to a quasi-judicial scrutiny, has been examined by eminent counsel, who have advised the firm that it fully sustains the valuation at which it entered the iron for duty.

Railroad News.

Atchison, Topeka & Santa Fe Railroad.—The annual report states that the gross earnings were \$8,556,975, and operating expenses and taxes, \$4,343,055, leaving a balance of \$4,213,770. Other deductions for expenses, including seven and a half per cent in dividends, fixed charges, rentals, etc., aggregated \$3,272,053, leaving a surplus of \$941,716. The president's report states that there has been spent, however, on construction, including \$1,325,760.49 for new rolling stock, the sum of \$1,801,025.31, and that, in order to provide funds for this and other outlays (largely exceeding the balance of the equipment fund raised in 1879), necessitated by the vigorous extension of the lines in Kansas and New Mexico, the directors issued \$2,242,400 of stock to the stockholders at par. The capital stock was further increased by the purchase or exchange of the capital stock of various connecting roads. Moreover, holders of \$3,257,500 of consolidated mortgage bonds availed themselves of the option to convert those bonds into stock. This road, with its branches, is about 365 13-100 miles long. From the recently formed connection at Deming with the Southern Pacific, a large business is expected from California and the mining districts of Arizona. The Atlantic and Pacific Railroad, of which the Atchison and Topeka Company owns one half the stock, has been pushed 100 miles west from Albuquerque, and will open up during this year the northern counties of Arizona.

Central Railroad of New Jersey.—The report of the receiver, for the year 1880, made to the Legislature of that State, shows the operations of the main line to have been as follows:

Earnings	\$5,306,970
Expenses	3,161,748
Balance net earnings	\$2,145,222

The gross earnings of all roads operated by the Central Railroad, of New Jersey, for the year were \$9,085,300

Denver & Rio Grande Railroad.—The *Herald* says that this road has been doing big work in extending its lines through the mountains during the past year. From March 1st, 1880, to March 31st, 1881, the following amount of work has been done: On the Leadville extension, 103 miles; from Leadville to Robinson Camp, 18 1/2 miles; to Malta, near Tennessee Pass, 10 miles; South Arkansas to Mayville, 12 miles; Ponca Springs to Ponca Sawmill, 5 miles; from Cañon City toward Silver Cliff, 12 miles; from Alamosa toward Silverton, 107 miles; from Antonito to Espanola, 93 miles; to stone quarries and coal mines, 4 miles; total, 367 1/2 miles. The contractors are at present engaged in grading on the following lines: From Chama to Silverton, 45 miles; Cañon City to Silver Cliff, 32 miles; Ponca Sawmill to Gunnison City, 65 miles. The contractors, as soon as spring opens, will begin grading on several other lines. Workmen are now engaged in laying track on the Silver Cliff extension. It is the intention of the officials of the Denver & Rio Grande to lay 500 miles of road during 1881, if they can procure a sufficient amount of labor. Should 10,000 laborers apply for work, the officials say they could give them employment at once, which would certainly last one year, and the probabilities are that continuous employment could be received for two years at least. The need of laborers is felt very much in Colorado, New Mexico, and some parts of Texas, where there is extensive railroad building going on.

Newcastle & Franklin Railroad.—Under an order of court, the Newcastle & Franklin Railroad, extending thirty-six miles from Newcastle to Stonewall, Pa., was sold at the first-named place April 13th. It was bought by friends of the Buffalo, Pittsburg & Western Railroad Company, by which it will be leased when reorganized. The purchase price was about \$750,000, and the road has been paying about 6 per cent annually on that amount. Many advantages will accrue to the Buffalo, Pittsburg & Western by this acquisition. It opens up extensive iron-works on the line of the Newcastle & Franklin, and will give largely increased coal tonnage from the Mercer County fields. It will afford the Wabash system a short Eastern route, with easy grades, and, by an expected extension to Oil City, bring the Buffalo, Pittsburg & Western within fifty miles of Pittsburg.

New Somerset Cambria Railroad.—The directors have elected J. B. Washington President, to succeed Charles Donnelly. They also increased the capital stock from \$100,000 to \$500,000, and authorized the issue of \$400,000 worth of traffic bonds, bearing 5 per cent interest and running twenty years. Most of these bonds will be absorbed by the men who sold the material to the company, the Cambria Iron-Works being the chief purchaser.

Pittsburg Southern Railroad.—The incorporators of the West Virginia division of the Pittsburg Southern Railway met in Wheeling, West Va., April 14th. The subscription books were opened and \$900,000 of the capital stock of \$1,000,000 was subscribed, mostly by the Pittsburg stockholders. The stockholders held a meeting after the meeting of the incorporators, and elected a board of directors, and the board organized by electing James McCabe, of Pittsburg, President, and J. W. Rowland, of Philadelphia, Secretary. The principal office of the company was fixed at Pittsburg. The road extends from Pittsburg to Charleston, S. C. For the present, however, the objective point is the iron ore and coal fields of the eastern part of West Virginia, and the James River Valley of Virginia. Work will be begun on the road early in the summer.

Railroad Discriminations.—The Cleveland, Columbus, Cincinnati & Indianapolis Railroad Company and the Cleveland, Tuscarawas Valley & Wheeling Railroad Company have been sued in Cincinnati by M. T. Thompson & Co., for \$27,500 damages for alleged discriminations in freight on coal in favor of Rhodes & Co., of Cleveland, and other large coal dealers. Thompson claims that the above railroad companies charged them at the rate of 35 cents per ton more for transportation than they did others.

Rochester & Pittsburg Railroad.—As now organized, the capital stock of the company is only \$3,000,000, and its mortgage debt \$1,300,000. The company has also issued \$1,870,000 of 6 per cent in come bonds. The line of road now in operation extends from Rochester to Salamanca on the Erie road, a distance of 108 miles. The line is to be further extended from Rochester to Lake Ontario, when it will connect with the recently organized Boston, Hoosac Tunnel & Western Railroad and a line of boats on Lake Ontario. From Salamanca, the road is to be extended to Red-bank to a connection with the Pennsylvania system of railroads and the coal and oil regions of Western Pennsylvania. The road will no doubt control a very large traffic.

The Allegheny Valley Railroad.—The annual meeting of the stockholders of the Allegheny Valley Railroad was held at Pittsburg, April 12th. The old board of directors was re-elected as follows: John Scott, Pittsburg; George B. Roberts, Philadelphia; D. A. Stewart, Pittsburg; A. J. Cassatt, Philadelphia; B. F. Jones, Pittsburg; James P. Green, H. M. Phillips, Edmund Smith, J. N. Du Barry, Philadelphia. President Scott's report showed that the earnings for 1880 were \$1,919,528.70; expenses, \$1,087,226.72, or 56 64-100 per cent of the earnings. The increase in earnings over 1879 was \$174,211.93, of which \$119,146.97 was from freight and \$47,409.01 from passengers.

Virginia, Kentucky & Ohio Railroad.—The directors of the Virginia, Kentucky & Ohio, a new company formed to build the Southwestern Virginia division of the Richmond & Southwestern Railroad, have elected Samuel Leese, President; C. T. Smith, Vice-President; Charles E. Palmer, Treasurer; C. D. Boyd, Secretary, and G. C. Wharton, Chief-Engineer. A proposition has been made to connect this road with the Richmond & Allegheny at the confluence of Craig's Creek and James River in Botetourt County. Already 200 miles of its line have been let to contract in Kentucky, between Louisville and Pound Gap. The United States Commercial Company (chartered by the last Legislature), which has contracted to construct the Richmond & Southwestern in its entirety, and equip it, will build and equip the link and branches named, the conditions being, so far as the Southwest is concerned, that the company traversed and the people along the line of road shall take \$300,000 of stock in the aggregate in county bonds and money, and shall give say 150,000 acres of land for capital stock also.

DIVIDENDS.

SAN FRANCISCO, April 14, 1881.

THE FATHER DE SMET CONSOLIDATED GOLD MINING COMPANY has declared Dividend No. 11, of twenty-five cents per share, payable at the office of LAIDLAW & CO., 14 Wall street, May 2d. Transfer-books will close on the 21st instant, and reopen on the 3d of May. H. DEAS, Secretary.

NEW YORK, April 2, 1881.

THE STANDARD CONSOLIDATED MINING COMPANY to-day declared its regular monthly dividend of SEVENTY-FIVE CENTS PER SHARE, payable April 12th, 1881, at the agency of the Bank of Nevada, No. 62 Wall Street, New York. Transfer-books close on April 5th and open on the 13th inst. M. R. COOK, Vice-President.

THE INDIAN QUEEN MINING AND MILLING COMPANY.

DIVIDEND NOTICE.

A monthly dividend from the net earnings of the mine for March (No. 11), of 2 1/2 per cent upon the par value of the stock, will be paid April 19th, 1881, at the office of company, No. 7 Exchange Place, Boston, Mass. The transfer-books will close on the 15th inst. an open on the 20th inst. C. C. LANE, Secy. MICAH DYER, JR., Treasurer.

OFFICE OF THE HOMESTAKE MINING CO., No. 18 Wall street.

DIVIDEND NO. 32.

NEW YORK, April 13, 1881.

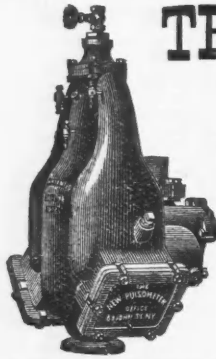
The regular monthly dividend of THIRTY CENTS PER SHARE has been declared for March, payable at the office of the transfer agents, Wells, Fargo & Co., 65 Broadway, on the 25th inst. Transfers close on the 20th inst. H. B. PARSONS, Assistant Secretary.

OFFICE OF THE DEADWOOD-TERRA MINING CO., 18 Wall street.

DIVIDEND NO. 5.

NEW YORK, April 9, 1881.

The monthly dividend of TWENTY-FIVE CENTS PER SHARE has been declared for March, payable at the office of the transfer agents, Wells, Fargo & Co., 65 Broadway, on the 20th inst. Transfer-books close on this 15th inst. H. B. PARSONS, Secretary.



THE NEW PULSOMETER, CHEAP, ECONOMICAL, EFFICIENT.

BRATTLEBORO', VERMONT, JAN. 25, 1881.

PULSOMETER STEAM PUMP CO.:

GENTLEMEN: After thirty days' trial, I am very much pleased with the No. 3 composition New Pulsometer, and am ready to pay for the same. I have pumped liquor at 180 degrees a number of times, and it worked well. This is from 30 to 40 degrees hotter than I have occasion to pump, as a rule. I find that its capacity is more than is claimed for it in your book. On the whole, I believe it to be the best pump for a TANNERY run by steam that I ever saw.

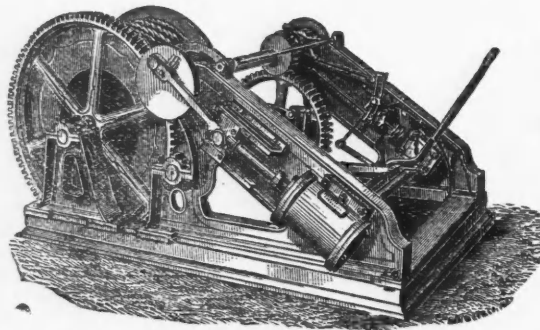
Yours truly,
S. H. WARREN.

For book giving many letters like the above, full description, and prices of the New Pulsometer, address

PULSOMETER STEAM PUMP CO.,
83 JOHN STREET, NEW YORK.

BRANCH OFFICES: Chicago, 193 Lake Street, H. F. CASWELL.
Boston, 73 Kilby Street, S. B. EVERETT

IMPROVED INCLINED DOUBLE CYLINDER LINK-MOTION



REVERSIBLE Hoisting - Engine,

WITH
COMPOUND GEARING
AND SAFETY BRAKES,
Especially adapted to
MINING PURPOSES.

READ THE FOLLOWING TESTIMONY:

I have no hesitation in stating that it is the best Hoisting-Engine we have ever used.

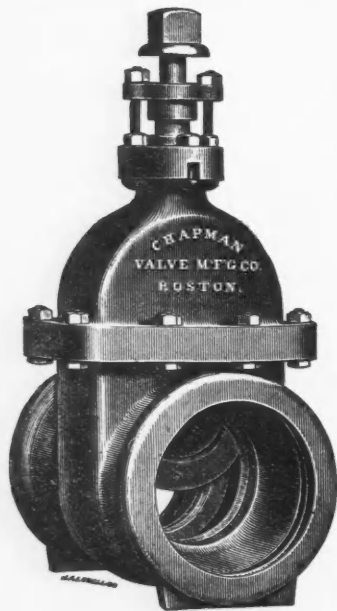
JAMES E. CLAYTON,
Manager of the Ore Knob Copper Co., Conrad Hill Gold and Copper Co.

We consider them the best on our works, for durability and economy. L. R. McCABE & BRO.,
Gunpowder Water-Works.

Manufactured by

STEVENSON & PLUNKETT,

45 N. Holliday Street, Baltimore, Md.



CHAPMAN VALVE MANUFACTURING COMPANY

MANUFACTURERS OF

Steam, Gas and Water Valves and Gates.

FIRE HYDRANTS

WITH POSITIVE DRIP.

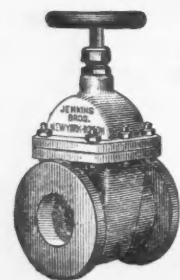
All Valves and Hydrants furnished with

Babbitt Metal Seats and Non-Corrosive Working Parts.

WORKS AT INDIAN ORCHARD, MASS.

Boston Office, 77 Kilby St. New York Office, 28 Platt St.

ALL WORK GUARANTEED.



THE BEST IS THE CHEAPEST.

Jenkins' Patent Valves,

Gate, Globe, Angle, Check and Cross, have no Ground Joints or Lead Seats. Warranted Tight for Steam, Gas or Water.

JENKINS' PATENT PACKING,

IN SHEETS, GASKETS, RINGS AND WASHERS.

DOES NOT ROT OR BURN OUT.

Send for prices.

JENKINS BROS., New York and Boston.

SPECIAL NOTICES.

10,000 SHARES FIRST-CLASS MINING STOCK FOR SALE.—The undersigned offers at 50c. per share, in lots to suit, 5000 shares of stock in each of the Patagonia and Santa Cruz Silver Mining Companies. Directors—H. H. Honore, Jr., of Honore & Grant; Ferdinand Ward, of Grant & Ward; Ulysses S. Grant, Jr., General Thomas Ewing, J. Henry Work, of Davies, Work, McNamee & Hilton.

These mines are situated in the famous Patagonia District and rank among the first mines of Arizona.

The Patagonia is largely developed and has an immense amount of ore in sight.

Smelting-furnaces and hoisting-works are now being erected on the Patagonia, and large dividends can be expected soon after completion of these improvements.

Parties inclined to invest in first-class mining shares are advised to investigate this opportunity.

For further particulars apply to

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RARE OPPORTUNITY FOR SAFE INVESTMENT.

A THOROUGHLY DEVELOPED MINE, with unusual advantages for working, showing immense bodies of very high-grade ore in the stopes, which has already yielded large returns, with much water and timber rights, in a rich mineral region, is offered at much less than its determined value. It will be placed only in the hands of capitalists able and willing to continue its working in a business-like manner, without stock speculation. For further information, address THEO. B. COMSTOCK (formerly Professor of Geology in the Cornell University), 61 Broadway, Room 35, New York City.

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In the heart of the city, consisting of 65,000 square feet of land, with buildings thereon, namely, large machine shop, large foundry, erecting shop, blacksmith shop, pattern shop, building for storing patterns, etc., etc. The buildings can be adapted to almost any manufacturing purposes. Apply to

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AUCTION SALE.—THE REDWOOD LEAD-MINING AND SMELTING COMPANY will sell at public auction, at the inn known as "Ladue's Stone Hotel," situate in the village of Redwood, in the town of Alexandria, Jefferson County, State of New York, on Wednesday, May 4th, 1881, at 12 o'clock noon, all the mineral and mineral rights of said company, the same being located in the towns of Alexandria and Theresa, in said county, and acquired by deed executed to said company by James H. Morry and Mary J., his wife, dated May 4th, 1865; recorded in the clerk's office of said county in book 159 of deeds, page 561, etc., on the 23d day of May, 1865.

By order of the Board of Trustees of said Company.

RICHARD HECKSCHER,

LOUIS B. WRIGHT,

H. B. SHEPARD.

Committee.

OFFICE OF THE COMPANY, 63 WILLIAM STREET, NEW YORK, April 4, 1881.

DIVIDENDS.

OFFICE OF THE GREEN MOUNTAIN GOLD MINING CO. of California, No. 18 Wall street, DIVIDEND NO. 22.

New York, April 14, 1881.
The Board of Trustees have this day declared a dividend of

SEVEN AND A HALF CENTS PER SHARE for the month of March, on the capital stock of this company, payable on the 25th inst.

Transfer-books close on the 18th, and reopen on the 28th of April.
J. JAY PARDEE, Secretary.

OFFICE OF THE STARR-GROVE MINING COMPANY, No. 2 Nassau street, corner Wall street New York, March 16th, 1881.

DIVIDEND No. 5.

The Board of Trustees have this day declared the regular monthly dividend of \$20,000, being ONE PER CENT ON THE CAPITAL STOCK of the Company, or TEN CENTS PER SHARE, payable on the 31st inst., at this office.

The transfer-books will be closed from the 25th to the 31st inclusive.
JOHN R. BOTHWELL, Secretary.
WM. S. CLARKE, President.