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AND

COAL

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Any of our readers who can spare copies of the issue of the ENGINEERING AND MINING JOURNAL of February 11th, will confer a great favor by sending them to this office, where they will be duly paid for.

DAKOTA TIN MINES.

In another column Professor BLAKE disclaims responsibility for the statements of the Harney Peak Tin Mining Company, while expressing his confidence in the future of Dakota as a tin-producing district—precisely the position taken by the ENGINEERING AND MINING JOURNAL.

In 1887 this country imported $6,921,948 of tin in bars, blocks, pigs or grains, and 635,792,760 pounds, valued at $18,699,145, of tin plates, a total of more than 25½ million dollars. With what promises to be a rich tin district in Dakota, we confidently expect in a few years to produce all the tin we require for our home consumption and even to be able to export it; but it will be by working the tin mines and not by exploiting the London gold placers that we shall attain this much desired end.

A good deal of actual mining work will be done on the tin mines of Dakota this year, and already there are more than promises that some of the deposits are likely to develop into profitable mines.

It is even possible that should mining operations ever be carried on on the Harney Peak claims, some of the prospects, unlike the Etta, may afford paying quantities of the metal.

THE PANAMA CANAL FIASCO.

The readers of the ENGINEERING AND MINING JOURNAL are familiar with the facts concerning the Panama Canal—that gigantic fiasco that threatens financial ruin to France to gratify the vanity of one man. It has long been evident to every one in the profession that the sea level canal would never be completed, and it was certain that M. DE LESSEPS was perfectly aware that his repeated assertions concerning its completion were without foundation. Nevertheless, it seemed as though his influence over his countrymen would enable him to secure more still millions to sink in this bottomless pit.

He has now modified his plans and proposes a high level canal with locks. No one questions the possibility of completing this, given time and money enough, but there is not the least chance of its being accomplished in the time now mentioned.

Mr. PAUL LEROY-BEAULIEU in the *Economiste Français*, the leading financial journal of France, has always controverted the statements made as to the time and cost of making the great ditch, and in a recent number (Jan. 28) he again refers to this unhappy scheme as follows:

"We are constrained to return to that lamentable and disastrous enterprise of Panama, which, as we wrote here three years ago, threatens to cost France as much as the war indemnity paid to Germany, without any chance of serious pecuniary reward, and with the single economic effect of giving to American products an advantage over French products in the countries bordering on the Pacific.

"We take credit to ourselves for having for several years sought to enlighten the French public about this adventure, and for the articles we have published on the subject. On recalling their titles and contents, we find that we were not sufficiently pessimistic. When we wrote, for example, that the Panama Canal would cost at least three milliards, we were much below the truth; for the insignificance of the work during 1887 seems to demonstrate that for a sea-level canal, with the methods pursued by the company, and the interest on the loans, an estimate of five to six milliards is not exaggerated. We will speak later on of the expense of a canal with locks.

"We have the satisfaction that our efforts have not been entirely futile; in the sphere where we have direct access, that of the large and medium capitalist, there is none who believes in the future of the Panama Company."

Comparing this Panama enterprise of M. DE LESSEPS to the Russian campaign of NAPOLEON, it says:

"Just as it was possible for the greatest military genius of modern times, by wishing to multiply his enterprises, and by imagining that he had bound fortune to his person, to finish by being overthrown, so it was possible eight years ago, it was probable four years ago, and it is absolutely certain to-day, that M. de Lesseps is destined to the same final check. In the actual condition of the Panama Company's affairs, nothing can save him from it.

"Why, then, should the Government compromise itself by giving M. de Lesseps the *satisfecit* which he solicits? Why, when nothing obliges it, should it intervene morally to make the public believe that this Panama enterprise, which is sinking on all sides, has still some chance of safety? Why should it thus take a tardy part in an adventure which is not only a misfortune, but which, from a moral point of view, appears very suspicious—suspicious in its origin, in its prospectus, in its allegation of the famous Couvreux and Hersent treaty, invoked as a bait on the eve of the subscription and inexplicably abandoned the next day?"

* * *

"The demand for authority to issue lottery bonds is only a pretext. It is the governmental assent that is wanted to parade before the public. * * * The government authorization might, perhaps, by its moral effect, enable the company to postpone for three or six months the inevitable catastrophe. M. de Lesseps would have his 'hundred days,' as Napoleon had his, and that would be all; the end would be the same. * * *

"From the financial point of view—and that is the ruling one with French capitalists—the lock-canal project for Panama does not appear in any better light than the sea-level canal project. M. de Lesseps's new promises can be judged by the way in which his earlier ones were fulfilled. He has a treaty with M. Eiffel; unfortunately he had one eight years ago with MM. Couvreux and Hersent, who were to execute, for 512 million francs, the entire canal of Panama (see prospectus of issue and report to the general assembly, January 31, 1881); unfortunately, also, he had his treaty with 'the celebrated Anglo-Dutch contractors' for the Culebra, the centre of the isthmus, who in four years and a half were to finish the entire cutting, and, specifically, were to extract 610,000 cubic metres per month from the 1st of January, 1886, to the 1st of July, 1887. (See report to the general Assembly of July 29th, 1885.) The total extraction in the Culebra during 1886 was 608,000 cubic metres, and for the eight months of 1887, which have been reported, 580,000 cubic metres."

M. LEROY-BEAULIEU, after a careful examination of the present state of the canal, and of the work required under the modified plan, concludes as follows:

"So, for its canal with locks, the company will have need of at least five years, and at least 1565 new millions, which, added to the 1060 millions already collected and spent, will carry to 2 milliards 625 millions the cost of the lock canal."

These extracts fully agree with the position taken by the ENGINEERING AND MINING JOURNAL, and should effectually prevent the squandering of more money on that disgracefully managed enterprise. It is not the interest of any country to see vast sums of money squandered senselessly, if not criminally, in even useful enterprises, but America would gladly see the canal completed with foreign capital. Under the present management there is no prospect of this ever coming to pass, and industrious, frugal, and liberty-loving France may soon have need of so much money nearer home to preserve its national life that it must

necessarily throw off the enchantment of the unfaithful great engineer, and cease dumping its gold into Panama's fathomless pit.

In the *Economiste Français* of the 4th Feb, Mr. LEROY-BEAULIEU makes again a careful investigation of the sources of income of the canal, and concludes as follows his article, which has been translated in the *Evening Post*, of this city:

"A revenue of 30,000,000 to 35,000,000 francs is what the company may hope from its lock canal, and it needs at least 200,000,000 to pay interest on its bonds without taking anything for its stock. The briefest attentive examination of the statistics of commerce destroys the phantasmagoria of the *Bulletin* and of the company. It is not worth while to continue to ruin the French public at a dead loss.

"The company has but one resource to complete the work. Let it suppress entirely any interest on its shares; let it reduce its bond interest, pending construction, to 2½ per cent on the amount actually expended; let it make an appeal to the great civilized powers—America, England, Germany, France, etc.; let it ask from them for the money that is yet to be borrowed, a collective guarantee of 3 per cent interest. By a heroic reduction of its annual charges, by reforming its wasteful management, by abandoning the gigantic and ruinous humbug which it maintains in the press at the price of colossal drafts on its bankers, by being enabled to borrow money at 3 per cent, thanks to the collective guarantee of the powers, perhaps it may for a milliard or 1,100 millions, finish its lock canal, which, under existing conditions, would cost it at least a milliard and a half. The powers would have to provide for a collective guarantee of 30 to 35 millions. The net traffic might at first cover a third or a half of that sum, and later a large part of it. But if the powers are unwilling to provide their collective guarantee, then there is no need that France should drain herself to play Don Quixote and cleave mountains that are thousands of leagues away from her. Let the spending be stopped and this ruinous dream renounced."

Assuredly no government would now join in guaranteeing interest on the vast sums squandered by M. DE LESSEPS. No, much as we regret it, we can see nothing but absolute and total loss for the deluded people who have invested their money on his willful misrepresentations.

THE SOURCES AND VALUES OF THE RARER METALS.—III.

A distinguished French author has wittily remarked that the growth and freedom of a nation must necessarily alike depend upon its sources of potash, since that substance is not only an indispensable element of plant and animal food, but is an essential ingredient in the manufacture of gunpowder! Adopting this view, we may congratulate ourselves upon the fact that in addition to the silicates, carbonates and oxides of the metal, so abundant in many of our soils, we have exhaustless supplies of its nitrates and chlorides, either naturally deposited on the surface, or in the interior of the earth's crust, or held in solution by the water of the seas. Until 1807, potassium, the metallic base of potash, had remained undiscovered, but in that year the illustrious Davy succeeded, by means of a powerful electric current, in decomposing the three constituents of the alkali (KHO) into the metal, hydrogen, and oxygen. In its pure state it has a silvery and bright appearance, but is very soft; so much so, indeed, as to be easily cut with a knife at the ordinary temperature of the atmosphere.

At 0° Fahr. it is extremely brittle, but at 62·50° Fahr. it melts, and at a little less than red heat distils with a lovely greenish violet vapor. Exposed to the air it rapidly absorbs oxygen, and becomes converted into white, anhydrous potash (K_2O), while if it be cast upon water, each of its atoms drives off from that liquid an atom of its hydrogen, and combines with the remaining atom and the atom of oxygen to form potassium hydroxide (KHO). This reaction is so violent in its nature, and causes the development of such great heat, that the hydrogen ignites as it is expelled, and burns on the surface of the water with a lurid purpleish flame. The method hitherto prevalent, of manufacturing potassium on a commercial scale, and which—despite the ingenious invention of our countryman, Mr. H. CASTNER—continues to be the only one employed, consists in heating a mixture of charcoal and carbonate of potash in an iron retort. Under the influence of a very high temperature the oxygen of the potash combines with the charcoal to form carbon monoxide, which goes off as a vapor, while the volatile metallic base distils over, $K_2CO_3 + C_2 = 3CO + K_2$ (carbonate of potash + charcoal = carbonic oxide + potassium).

Its remarkable affinity for oxygen, the eagerness with which it decomposes water, the spontaneity of its combustion when exposed to the air, all demand that it should be stored either in rock oil or in naphtha, and it is also customary to distil it a second time to free it from all traces of a black and highly explosive substance which forms in the first retorts and has been the cause of many deplorable accidents and much loss of life.

Its name has been bestowed upon a group which, physically as well as in most chemical properties, entirely resemble it, and which includes sodium and the rarer metals lithium, rhubidium and cæsium, the three latter being all derived from the mineral silicate *lepidolite*. Lithium is obtained in a pure state by decomposing its chloride in the galvanic current, and if it possessed no other claim upon our attention, would still be remarkable for its specific gravity, which, being no higher than 0·590, distinguishes it as the lightest of all solid bodies known to science. Its salts have, to some slight extent, been recommended and used as medicinal agents, but like its two fellows, it has received no industrial application as a metal, and may, like them, be regarded as uninvestigated. It is, therefore, easy to explain why its value should be placed at $160 per ounce, and why, while rhubidium is estimated to be worth $3200 per pound, cæsium, on account of its still greater rarity, should be altogether denied the honor of an official market quotation.

The only really rare metal of the magnesium group is glucinum, which, if aristocratic associations go for any thing in the metallic world, is the most enviable of elementary bodies. It is found associated with silica and alumina in the *emerald* and the *beryl*, and in appearance and properties is supposed to bear a striking resemblance to aluminium. We say supposed, because in sober fact it may be described as non-existent, or, at any rate, as being such a *rara avis* that, bulk for bulk, it is more priceless than the largest and costliest of the jewels with which it is combined.

SILVER GROUP.

The rarest, and if not the most valuable certainly the costliest metal of the silver group is *thallium*, which was discovered by Crooke in 1861 while examining the spectrum obtained by holding in the flame of a Bunsen burner a portion of the flue-dust from a sulphuric acid works in which pyrites was being used as a source of sulphur. It is now only extracted in very small quantities from great masses of the flue-dust by treating the latter with boiling water and concentrated hydrochloric acid, converting the residue with sulphuric acid into thallous sulphate, decomposing the salt by zinc, and finally fusing the product into a compact mass in a current of coal gas.

In its external appearance, this metal, when freshly prepared, bears a striking resemblance to lead, but it quickly becomes tarnished by exposure to the air. When burnt in oxygen it gives forth a blue flame of surpassing beauty, and pyrotechnists have availed themselves of this quality to substitute it for barium in the manufacture of green fire. This is actually, and will probably ever remain, the only industrial form in which thallium will be employed, for, in spite of the comparatively low price at which it is sold ($3 per ounce), and the possibility of acquiring it in reasonably large quantities, a tolerably extended study of its properties has shown that while it easily alloys itself with other metals, it communicates to them no qualities of perceptible value, and invariably causes them to rapidly tarnish or oxidize when exposed to the air.

TIN GROUP.

Niobium and *tantalum* are the rarest members of the "*tin group*," and originate respectively in *columbite*—a hard, dark gray crystalline mineral found in Massachusetts—and the *tantalite* of Sweden. Neither of them has been discovered in any but the minutest quantity, and their extraction entails a most costly and laborious process, which has never been intelligently described, and is consequently still imperfectly understood. They both belong essentially to the "curiosities of metallurgy," and being quoted at the respective fancy prices of $130 and $145 per ounce, are undoubtedly destined to languish in their present obscurity until some later stage of the world's development.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Oasos Gold and Silver Mining Company of California.

A correspondent asks for information concerning the Oasos Gold and Silver Mining Company of Eldorado County, California, incorporated in 1876. Can any of our readers give us information concerning this company?

Dakota Tin.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The great "Tin deal" in London, which was reported "off," is, perhaps, being revived, judging from the shipment there of large specimen blocks of ore and other indications. Such specimens will serve to emphasize the fact that tin ore exists in large, and probably paying, quantities in the Black Hills and of unusually good quality, but they will not justify some of the statements which appeared in the "Prospectus of the Harney Peak (Dakota) Tin Company," of London, a copy of which has been submitted to me to ascertain whether, or not, it meets with my approbation. I desire it to be known that it does not. I disclaim any responsibility for it and had no part in, or knowledge of, its preparation. My responsibility regarding the dissemination of knowledge of the tin lodes does not extend beyond my written reports and papers, which I have no reason or desire to modify. There is tin ore in paying quantity in the Black Hills of Dakota, enough to justify the intelligent use of capital in development work, and the erection of a simple concentrating plant proportioned in capacity to the ore supply as developed, and not to the hopes and estimates of vendors and promotors. When capital is enlisted and expended in a just ratio to the work to be done, the friends of the establishment of the industry of tin mining and smelting in the United States may be encouraged to expect satisfactory results and not before.

WM. P. BLAKE.

MILL ROCK, NEW HAVEN, CONN., Feb. 15, 1888.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the issue, January 21st, of the ENGINEERING AND MINING JOURNAL, is an article by our friend Riotte, entitled "A New Assay-Ton."

After having read it I rubbed my eyes and read it again; but there it was, "A *new* American Assay-Ton." All I have to say is that I am one of Brother R.'s "'more previous' brethren." For years I have used the *grain* assay-ton, calling the one thousandth part of ten grains one assay-ounce. It never struck me as any thing worth particular mention. The importance ascribed to said ton by friend R. appeared rather ludicrous to me, so I straddled old Pegasus and "perpetrated" the accompanying "Knüttelverse" (doggerel). Should you think it worth while to publish them I would be pleased.

For many years I receive your paper regularly every week. I call it "your paper," because you were one of the fathers of the ENGINEERING AND MINING JOURNAL. I never fail to read it attentively, and to reap some *pabulum mentis* from it. In your fight with the unscrupulous speculators (*vulgo peculators*) you must have the sympathy of every fair-thinking man. Keep on, my friend, and strike to hit!

EUREKA, Nevada, Jan. 26, 1888. MAX MOELLER.

THE BOSTON MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

This meeting, which commenced on Tuesday, was well attended, and afforded much instruction as well as pleasure to those who took part in it

The Institute was welcomed to Boston by General Francis A. Walker, of the Massachusetts Institute of Technology, and recently head of the United States Census Department, President Egleston responding for the Institute.

The reading of papers was commenced by Mr. J. C. Bayles, who described the method of manufacture and advantages of spirally welded tubes, which his company is now manufacturing in sizes up to 20 inches diameter, and which it will be possible to make of any desired size and length. The welding is effected by hammering on an anvil block which has a reciprocating motion, and the heat is secured by a flame of water-gas and hydrocarbon gas. These pipes are destined to secure a wide use in the mining regions. The process is said to produce tubes at a lower cost than other methods and evidently makes a very perfect weld.

Mr. H. M. Howe mentioned the method of making tubes by soldering together the strips of metal which are wound spirally to form the tube, and expressed the opinion that this method may be found serviceable in making gun barrels and for other purposes requiring great strength. The higher cost would interfere with their general use in competition with the welded tubes.

After the adjournment of the meeting the visitors were entertained at supper as the guests of the local committee.

Wednesday, 22d, was devoted to the reading and discussion of papers. Mr. A. J. Hodges gave a very interesting description of the famous Cerro de Pasco silver mines of Peru, explaining the character of the deposit and the principal features of its formation, but omitting any mention of the value of the ores except in the case of a sample, which was shown.

Professor Emmons gave a very instructive and clear description of the formation of fissure veins, a paper which when published will well repay the study of engineers and will correct a good many erroneous theories and tend to reduce the risks in mining by giving a clearer insight into the mode of occurrence of ore deposits.

Mr. C. A. Ashburner read a paper on mine accidents, showing the proportions of deaths due to different classes of accidents; but a discussion of the paper seemed to develop a pretty general conviction that some better methods than those now adopted are necessary to secure any valuable comparisons.

A paper by Mr. R. P. Rothwell, on systems of mining in soft ore bodies, elicited considerable discussion, in which it was stated that the method proposed, namely, a modification of the old system used in the coal mines of the south of France, has in principle been used with great success at Longdale, Va., and in the Lehigh hematite ore deposits. This paper will be published in an early issue of this JOURNAL.

Captain O. E. Michaelis read a valuable paper on cast-steel guns, of which he is an ardent advocate.

The Husgafvel furnace, already described and illustrated (ENGINEERING AND MINING JOURNAL, February 4th), was the subject of a paper by Mr. F. L. Garrison.

Mr. Abbott described the new hot water distribution in Boston, where the company, of which he is engineer, has now about two miles of pipe laid. The paper was an extremely valuable one and will be given to our readers in an early issue. The water is distributed at a temperature of about 380° Fahr. and the loss in the distribution from all causes is about 3 per cent only. So perfect are the pipe connections that there is no leak in two miles. The pipes were tested individually at 6000 lbs. per square inch and the whole system at 1500 lbs. per square inch.

The work is a marvel of perfect work, and the results are of extreme importance. Many engineers were surprised at the statement that 75 horse-power is being delivered by this system of hot-water distribution through a copper pipe only one half inch diameter.

The banquet on Wednesday evening was very largely attended, and was one of the most brilliant in the matter of speeches of any of the long list of which the Institute has just reason to boast.

We shall commence next week placing on record the more important of the papers read.

Driven Wells Patent.—A decision was rendered in the United States Supreme Court on the 20th inst. upon the application for a rehearing of the case of William D. Andrews and others against George Hovey, which is widely known as "The driven well case." This court holds that the patent issued to Nelson W. Green in 1871 for an improvement in the method of constructing artesian wells, was invalid because the invention covered by it was in public use more than two years before Green applied for the patent. The court, after an exhaustive review of the whole case, adheres to its decision and denies the application for a rehearing. Opinion by Justice Blatchford.

THE POSSIBILITIES OF PORCELAIN MANUFACTURE.

Written for the Engineering and Mining Journal by A. D. Elbers.

From a commercial point of view the most promising prospects for the development and enlargement of the porcelain industry rest on the possibility of producing porcelain plates, dishes, cups and saucers which will be cheap enough to be used "for ordinary" at our meals, or, in other words, on the chances of bringing porcelain table-ware into closer competition with stone chinas. Inasmuch as their comparative fitness for common use depends primarily on the durability of the glazed surfaces, stone china gives the least satisfaction because it has a tendency to "craze" under ordinary conditions of usage, such as warming dinner plates, etc. Moreover, the bodies readily absorb fluids and soft fats through the glaze-cracks and allow these secretions to spread and accumulate *under* the glaze, from whence they cannot be removed by ablution. As far as the "crazing" is due to unequal expansion of the conjoined parts the defect can be avoided to a large extent by improving the compositions; but its occurrence is most frequently due to an inherent or constitutional defect, to the porosity of the bodies.

The glaze, in melting on the bodies, cannot conjoin as evenly nor as completely with them as if they were as dense as porcelain; on account of this want of continuity, in its contact with the body, it expands irregularly, and sooner or later cracks where the connection is weakest or interrupted. The "undefiled" usefulness of stone china is therefore of comparatively short duration, and as this shortcoming is apt to stick to the ware in spite of all further attempts at improving it, it is obvious that the demand for porcelain table-ware will increase rapidly if the price of the latter can be made to approach more nearly that of its cheaper rival.

The two most current grades of porcelain table-ware are the "soft" feldspar porcelain and hard porcelain. The body-compositions or pastes of both kinds consist in the main of clay, quartz and feldspar. The degree of translucency that can be imparted to the bodies depends on the proportion in which the quantity of feldspar and free silica stands to that of the clay proper or aluminum silicate. The feldspar imparts translucency at a lower temperature of firing, the quartz increases it in the measure in which the temperature is raised above that of the melting point of the feldspar, and thus the desired translucency can be obtained by more or less intense firing, according to the relative proportions of the vitrifying ingredients. But the respective compounds differ also in behavior and quality. The bodies that require the hardest firing endure or stand the fire better, become more homogeneous in it, and can be glazed with more fusible compositions of the same materials; and the bodies of those compositions that vitrify at a lower temperature have to be glazed with compositions which can only be rendered still more fusible than their own by the addition of other substances. Moreover, those body-compositions which can be rendered dense and translucent with a comparatively small proportion of vitrifying ingredients, and a correspondingly larger one of clay, are more easily formed and produce the most durable ware. The bodies of feldspar-porcelain have, as the name implies, a rather large proportion of feldspar, and, on account thereof, become very soft in the first or "biscuit" fire, the highest temperature of which borders on ordinary white heat. The "biscuit" which is thus produced is dense and more or less translucent; but it is of rather coarse texture, because the feldspar does not react sufficiently on the quartz at the temperature of its biscuit-fire. It is glaze-burned in the second or glaze-fire, the temperature of which is kept sufficiently low to prevent the bodies from resoftening in it. This method of glaze-burning is very economical, because it allows of "pinning" and "stilting" the ware in the "saggers," and of filling the latter to their utmost capacity. But in order to make the glaze "flow" or melt on the bodies at the lower temperature, it has to be of such easily fusible composition as to become very soft; it is therefore apt to wear off in actual use and to be less resisting to the action of fatty acids than may be desirable.

Hard porcelain has to become dense and translucent in the second fire; its biscuit-fire is much less intense than its glaze-fire, and the temperature of the latter is forced to full white heat, in which the ware shrinks considerably, and softens while the glaze melts on it, so that glaze and body become practically one mass. The biscuit can not be pinned or stilted for the glaze-fire because it becomes too soft in it; each article has to stand for itself, its base being broadly supported or in full contact with the floor on which it rests. The quantity of ware which can thus be placed in the saggers is much smaller than that which can be placed for glaze-burning soft porcelain, and the proportion of dead weight which has to be burned along with the ware is consequently much larger. But on account of this method of burning, glaze and body can be made nearly identical in composition. Hence hard porcelain table-ware never crazes, resists the file, and is in all other respects the most durable ceramic ware.

The highest temperatures that usually obtain, in the respective fires, compare about as follows:

	Biscuit-fire.	Glaze-fire.
Feldspar porcelain, degrees Fahrenheit	2,300	2,600
Hard porcelain, " "	2,000	2,700

From the foregoing it will be readily understood that a virtue is made of necessity in providing feldspar porcelain with a soft glaze, that all the characteristic properties of hard porcelain can only be produced in the same ware by burning it hardest in the glaze-fire, and that the cost of production is governed largely by the method of burning which has to be employed. In view of these conditions, decisive changes in the competitive position of porcelain can only be looked for in the direction of obtaining, on the one hand, more thorough re-actions in the usual burning of feldspar porcelain, and on the other of bringing about the re-actions of the hard porcelain glaze-fire at a lower temperature. This is only possible if a portion of the feldspar, in the usual compositions, can be re-placed with some other new ingredient that re-acts more energetically on the quartz, and with more of quartz and less of feldspar, produces as much or more translucency as the usual components do in the usual proportions. This ingredient should also render the other vitrifying components, or the compounds which it forms with them, somewhat less fluid or more pasty in melting, so that they can hold the clay particles, which they surround, together more firmly. These

conditions being secured, the feldspar porcelain bodies could be made thinner and less clumsy without running the danger of losing their proper shape in the biscuit-fire, their glaze could be made harder and more similar in composition to that of the bodies, and hard porcelain table-ware could be produced by biscuit-burning the bodies in the soft porcelain glaze-fire and by glaze-burning them in the soft porcelain biscuit-fire. These possibilities, and the new ingredient are not utopian, they are, in fact, easily demonstrable realities, which await the time of their recognition.

Refined slag is the new ingredient. One ton of it will cost about as much as two tons of feldspar. In order to understand how its use, at such a price, can cheapen the cost of feldspar-porcelain, it must be borne in mind that porcelain is not sold by weight, and that the larger quantity of ware which can be turned out of the same quantity of raw material, when refined slag and more of clay are used in the composition, more than repays for the increased cost of the latter. The ponderous hotel-china and all table-ware of similar massive proportions can be made considerably lighter, without increasing their fragility, if the respective compositions are improved, and the selling value of the finer sorts of ware usually increases with their lightness.

HOBOKEN, February, 1888

THE FORMATION OF COAL SEAMS.

By W. S. Gresley, Esq., F.G.S.*

My principal object in this paper is to bring forward evidence in opposition to the view now generally accepted that coal seams were formed from vegetation which grew on the spot. It seems to me that the growth *in situ* theory has been, or is still, held by the majority of those who have considered or written upon the question to be the right one, partly because the accumulation of the vegetable matter of coalbeds by drift-age appears to be totally beyond our comprehension, and partly (probably chiefly) because we have been told and led to believe that the underclays of coal seams contain the *Stigmariæ* which were the very roots of the trees the remains of which constitute the bulk of the coal. During an extensive experience in the midland districts in connection not only with coal mining, but also with the working of the underbeds, the fire clays, both underground and in opencast workings, I have had unusual opportunities of studying the relationship of the coal seams to the underbeds, their fossil contents, etc. The various points for consideration may be taken as under: (*a*) The relation of the fire-clays to the coal seams. (*b*). Mode of occurrence of *Stigmaria* in underbeds. (*c*). Erect fossil tree-stems with attached roots. (*d*). Lamination of coal beds. (*e*). The presence of boulders, etc., in the underclays. (*f*). The foreign bodies in coalbeds. (*g*). Marine fossils associated with coal seams, brine, etc. (*a*). It must not be concluded, because almost every coal seam rests upon a stratum partaking more or less of the nature of a fire-clay and enclosing *Stigmariæ* and other root-like fossils, that such beds do not occur in other positions in the coal measures, for the fact is that they very frequently occur lying immediately on the top of a coal seam, sometimes wholly removed from coal, or they may occur as very thin layers, often very irregular and locally distributed, entirely enveloped in the coal. The thickness of an under-clay bears no proportion whatever to that of the coal seam resting upon it. The thickest coalbeds often rest upon the thinnest clays, and the greatest development of fire-clay will be followed by the most meagre of coal seams.

I have also found it to be almost invariably the case that where underclays come in contact with coal seams there is a sharp dividing line, a true bedding-plane, between the two; we do not find the clay gradually changing upwards into coal, but the change from one to the other is most distinct—in fact the plane of stratification is often quite a smooth one. Precisely the same characteristic obtains in the case of laminæ of clay running through the body of a coal seam, *i. e.*, where coal and clay are interstratified. (*b.*) My experience is, that a considerable proportion of the underbeds do not contain *Stigmaria* roots at all; but that they seldom fail to reveal the presence of thin grass-like fossil markings, I admit. Very frequently the bed next below the underbed is crowded with *Stigmariæ*, though not more so towards the upper than in the lower part. In *Stigmaria* beds next but one below a coal seam I have noticed several examples of that fossil standing erect, in a manner showing them to have been in all probability independent organisms. But when *Stigmariæ* occur in the underclays the result of my investigations shows that they do not pass upwards into the coal. Only once or twice have I detected anything like such fossil roots running from the coal into the clay below (*A*), and therefore my conclusion is, that instances of this phenomenon are exceedingly rare. On referring to the writings of Binney Brown, Dawson, De la Beche, Green, Hawkshaw, Lesquereux, Logan, Lyell, Macfarlane, Nicholson, Williamson and others, I have failed to discover in them one single description of an actual *bona fide* erect fossil tree with its Stigmarian roots attached to it and imbedded in the underclay, whilst the stem entered or passed through the overlying coal seam. Now, surely if coalbeds have been formed from trees and other plants whose roots grew in or penetrated the underclays or so-called "old soils," unmistakable indications of their former existence ought to be present in great abundance; these roots must also have been more thickly matted together the nearer they approached the coal; and instead of their being, as there is, a most distinct break between the base of a coal seam and the underbed, we should expect to find the one gradually changing into the other, as is so frequently exemplified in the junction of a peat bed with the clay below it, where the roots can be clearly seen communicating with the vegetable mass above. Had instances of *Stigmaria* actually trending from the coal into the underbed been met with, we should undoubtedly have been long since furnished with exact particulars, locality, etc., of such discoveries (*B*). *Stigmaria ficoides*, then, so far as my investigations have gone, does not occur in the underclays as the fossil roots of trees, but rather, it would seem, as plants *sui generis*. (*c.*) It would seem that the very significant fact of erect fossil tree-stems, with *Stigmaria* roots attached *in situ* being of so exceedingly rare occurrence just they ought to be most common, namely, immediately below the bottom of a coal seam, must obviously upset the theory which has been based upon the inference that because coal is probably largely made up of the remains of forest trees whose roots are the *Stigmariæ*, it is almost proof positive that these trees grew on the spot, because we find the same kind of fossils in the underclays. When erect fossil stems or stools of trees are met with, they are generally either resting upon or at no great distance above the tops of coal-beds, though the largest and most perfect examples of such fossils have occurred in beds far removed from coal (*C*). The absence of them in the underclays is conclusive evidence that they very seldom if ever grew there; and the fact of their very rare occurrence in the coal itself further strengthens the argument against a growth-*in-situ* formation of coal, at all events from trees. And when we find, as we do, impressions of the bark of large trees upon the base of a coal seam next to the underclay, it is clear that the vegetable matter was transported from a distance. (*d.*) Does a vertical section of a coal seam afford any clue to the way in which it was accumulated? It seems to me that when we find that the structure, from top to bottom, is strictly a laminated one, that every layer, division, "bench" or what not, and every line or film observable in the "grain" of coal lies parallel to the plane of the seam, there is not a little of evidence that the coal-forming plants grew on the spot. Take a sample of coal from whatever locality you will, and from any part of any coal seam, and its characteristic grain or laminæ will be seen if carefully looked for. I have never yet in all my experience detected or heard of more than one or two upright forms of fossil stems (?) in coal; and I maintain that if trees grew in large quantities where the coal beds now are, their erect remains would have materially interfered with the parallelism of the coal as existing. That pre-existing interruptions in this universal lamination can have since been obliterated by pressure or by metaphorism seems highly improbable. The growth *in-situ* difficulty would also seem to be increased when we bear in mind that, (spreading over very large areas of some of our coal-fields measured by square miles in extent), there are conspicuous and comparatively thick layers of spore coal, consisting almost wholly of macrospores, every one of which lies horizontally. Where, it must be asked, are the remains of the stumps of the trees from whose branches these myriads of seeds or seed cases were shed? A satisfactory explanation of the cause or origin of the perfect lamination of coal, and of the phenomena of "partings" or distinct bedding planes by which so many seams of coal are divided and sub-divided, and of the insinuation of thin layers of clay into the seams has yet to be given. (*e.*) Occurring occasionally in some of the underclays in Leicestershire and South Derbyshire are well-worn boulders and pebbles of quartzite and quartz which have been transported from a distance.* But besides boulders and the fossil *Stigmariæ*, the fire-clays sometimes contain fragments of the stems of tree ferns, leaves and other plants of a peculiar nature; *Anthracosiæ* also have been noticed associated with *Stigmariæ* between two coal seams.† And thus it would appear that the underclays were probably not the old land-surfaces which supported the coal forests, but were true aqueous deposits. (*f.*) Actually imbedded in coal itself have been found numerous quartzite boulders very similar to those found in the under-clays, and these have turned up in many parts of England as well as on the continent. Other foreign bodies in coal seams consist of the remains of aquatic molluska, fish, etc.‡ (*g*). That marine conditions prevailed, if not during the accumulation of many of our coal-beds, certainly immediately afterwards, is clear from the abundance in the roof-shales of the seams of fossils which must have had a salt water habitat, and also from the fact that brine is so frequently met with in the pores of the coal itself.§ In conclusion, then, my contention is, that, notwithstanding all that has been written on the coal question, up to the present time no facts have been brought forward which can in any way show that the plants forming coal seams actually grew *in situ*, but that what evidence we do possess decidedly favors a drift or, at all events, an aqueous origin.

The Experiment of Burning Brick with Oil is being continued in the West. The latest process is said to be devised by D. Y. Purington, at his kilns, near Blue Island, Ill. To burn a kiln of 200,000 bricks he uses the crude, or waste oil, after the naphtha has been extracted. This oil is fed from a tank by a 2-inch pipe to very simple burners in the arches. The burning was complete in 60 hours. The oil cost 80 cents per barrel, but the quantity used is not stated. One man only was required to handle the fuel and the saving over the old method is estimated at "fully 33⅓ per cent."

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* Abridged from the *Quarterly Journal* of the Geological Society for November, 1887.

a. Spiry coal.
b. Thin layers of coal and dirt mixed.
c. Hard tough spire with spores.
d. Very thin layer of bright coal.
e. Parting of fossil charcoal.
f. Bright compact coal called "dice."
g. Thin layers of bright coal and partings of charcoal.
h. Tough, close-grained coal with thin laminæ of "dice."
i. Band largely composed of spores.
j. Bright compact coal with a few layers of fossil charcoal.
k. Very thin layers of spiry coal, etc.

NOTE.—The spores (macrospores) are shown magnified about five times. The vertical white lines are joints or fine cracks.

A At the fire-clay mines of Messrs. Enson & Co., on Ashby Wolds; also at Aldridge Colliery, Walsall, where I am informed that *stigmaria* penetrated a coal seam and extended into the floor below. The roots in this instance proceeded from an erect fossil stem standing upon a 3 foot bed of coal.—W. S. G.

B Moreover, even supposing for a moment that the roots of the coal-forest trees, etc., did really grow in the underbeds, by what possible subsequent process can all the carbon have become concentrated at one exact level, namely, where the clay ceases and the coal seam begins? Not a single example of a fossil tree (so far as I know), has ever been met with in which the roots were composed of clay or shale, and the stump of coal.

C I refer particularly to the "fossil trees" recently found at Clayton and at Bradford, Yorks.—W. S. G.

* In the underbed of the Coalburg seam in West Virginia, U. S. A., rounded quartz-boulders have been found.

† At Coleorton Colliery, near Ashby de la Zouch, the author found a shell between the "Lount Middle" and the "Lount Nether" coal seams.

‡ From the "Main," the "Cannel" and other seams of the Leicestershire coal-field.

§ The "Main" coal seam of Moira, in the Leicestershire coal-field.

BUILDING AND DECORATIVE STONES OF EYGPT.*

LIMESTONES.

The Egyptian quarries, which played an important part in the architectural history not only of Egypt but of the ancient Roman Empire, were nearly all on the east side of the Nile. The Pyramids being the most ancient and impressive remains, the author commenced by considering the material used in their construction. There had originally been seventy, of which twenty still existed. Much of the stone used was a nummulitic limestone, quarried on the spot in cubical blocks and built in steps. The triangular casing was a fine cream-colored magnesian limestone, quarried at Toora and Masarah, and all cut out of the solid rock to the size required. Except in a few lower ones recently unearthed, these stones had all been used to build modern Cairo. A fragment shown by Mr. Brindley, which had the vertical and horizontal joints (giving the angle correctly), showed the surface wear of 4000 years, with the original tooling of the joints. No stone could have worn better. The quarries immediately behind Thebes were of fine limestone, to which the Egyptians were very partial for sarcophagi and small sculptures, owing to the extreme fineness of the grain. It was like close chalk, only much harder and of warmer color, and occasionally contained brown flints.

SANDSTONES.

Next in importance sandstone had been mostly used for the building of temples. It was of a warm gray color with fine texture. The quarries, which were at Silsileh, consisted of extensive grottoes and open spaces, where the workmen had followed the best beds, cutting out the blocks with the greatest care and tooling them on the spot. They were then floated down the Nile on rafts. These stones were usually set dry, the finished faces afterwards being coated with stucco, in some cases hardened with albumen or gum to receive color decoration.

GRANITES.

The famous granite rocks of Syene formed part of the igneous range running parallel with the Red Sea. The ancient quarries were in the Eastern Desert about two miles from Assouan (the ancient Syene) and very extensive, but the deepest not exceeding 80 feet. In the first was the so-called unfinished obelisk, which was a dressed mass of rock attached on the bottom bed and back to the parent rock; the length was 95 feet and the width 11 feet. It had a series of transverse cuts on the top bed, indicating blocks for sarcophagi. Mr. Brindley had come to the conclusion that it was not an obelisk but a bed of stone, dressed by a gang of task-workmen or convicts, to be cut up into sarcophagi, and that it was work of the Roman period.

MONS CLAUDIANUS.

The gray granite "Lapis Psaronius" (spotted like a starling) had been extensively used in Rome for the Forum of Trajan and the monolith pillars of the Pantheon. The quarries, which appear to have been worked only by the Romans, were near the porphyry quarries between the Red Sea and the Nile, and ruins of workmen's huts, a temple of the Roman era, and monastic buildings of a later date still existed there. They appear to have been worked only by the Romans. Mr. Floyer, in a letter to the author, stated that pillars, 59 feet by 8 feet 6 inches diameter, accurately wrought, were still in the quarries. In history they were called the quarries of Mons Claudianus, but must have been worked previous to that period, as they had been used for the Pantheon.

DURABILITY OF GRANITES.

The granites and syenites of Egypt had not worn well, compared with some inferior stones. The decay was chiefly from the peeling off of the polished surface. Patches, a few feet square and about an inch in thickness, all loose and ready to drop off at the slightest touch, were to be seen. The great polished blocks in the Temple of the Sphinx appeared generally sound, but if tapped with the rule sounded hollow, and the obelisks at Karnac were peeling. It should, therefore, be remembered with regard to our Cleopatra's Needle that we had not received it sound.

IMPERIAL PORPHYRY.

The ancient Egyptians appeared never to have discovered their most beautiful stones; this had been done by the Romans, whose men of science had not neglected even places most difficult of access. For example, a noble red purple stone had been found on the summit of a desolate mountain 4000 feet high and 100 miles from habitations. A colony was established of thousands of workmen, who received their provisions from the Nile, stations being built, wells sunk, and huts erected on the route. This route Mr. Brindley and his wife had journeyed over on camels from Keneh for thirteen days, in order to visit the quarries. The Bedouins in whose charge they had been were most trustworthy, and far more intelligent than is generally credited, having been most useful in Mr. Brindley's researches. The quarries were on Gebel Duchar (the mountain of smoke), which rose abruptly out of the plain in the shape of a long horse-shoe; the valley between containing a small town, wells, and reservoirs, with a temple in pink granite of small dimensions. In addition to many ordinary roads and footpaths there existed the remains of two grand block roads, with piers at the sides for lowering stupendous blocks by means of ropes. The porphyry was in masses, some 120 feet wide, while many of the choicest varieties were only about 10 feet wide, and appeared to have been upheaved through a mass of granite and black shaley trap rock, the granite being burnt apparently through the heat of the porphyry. The whole mass appeared of fairly uniform texture, but some of the obstrusive parts were very different, being volcanic worn masses of variously tinted porphyry bowlders embedded in a purple felsite paste. This gloriously colored stone was the only one in the scale of color the Romans lacked, and it had never become a commercial material, having been Imperial from the first and worked only by and for the State. There still existed about 300

*Abstract of paper read by Mr. Brindley before the British Institute of Architects on the 20th Nov., in *British Architect*.

FIG. 2.

Coal-seam and Underclay with stigmariæ, as almost universally seen.

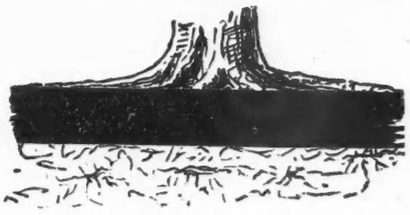

FIG. 5.

Coal seam, with a fossil tree-stump, and roots attached, upon it.

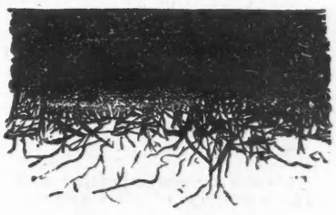

FIG. 6.

Illustrating the way in which the coal-forest tree-roots ought to be found in underclays, if the trees had grown on the spot.

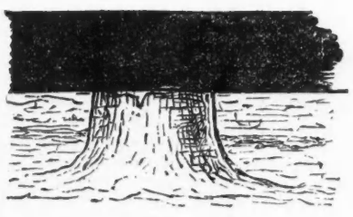

FIG. 3.

Coal 10 inches, into which the fossil in the underclay did not extend.

Underbed containing the stool of a tree, as seen in the roof of a fire-clay mine of Messrs. Ensor and Co., at Church Gresley, Co. Derby.

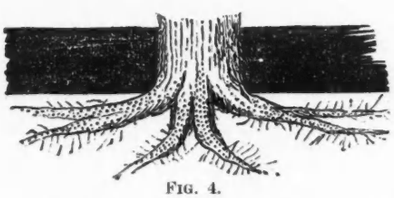

FIG. 4.

What is commonly seen in books, etc., but probably never in nature.

FIG. 1.

Stigmaria standing vertically in a fire-clay seam in the open-hole workings of Messrs. Knowles & Co., Wooden Box, near Burton-on-Trent.

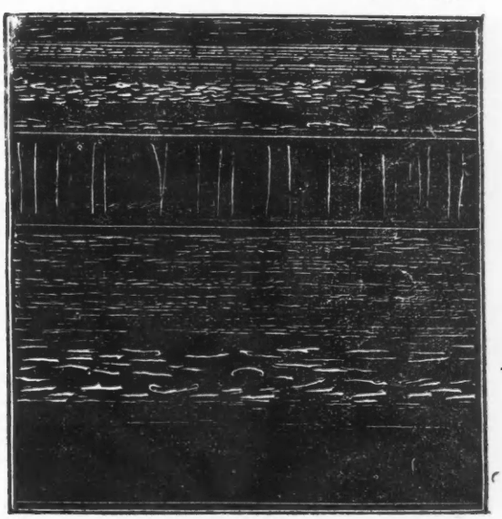

FIG. 7.

Vertical section of a portion of a coal seam showing the frequent and various alternations of structure very commonly met with.

THE FORMATION OF COAL SEAMS.

monolith porphyry pillars in Europe, and the stone was to be found in Asia as far as Baalbec and Palmyra. In all cases it still retained its freshness of color, proving beyond a doubt its durability. The Romans had evinced great partiality to porphyry for sarcophagi. That of Nero was the first mentioned, and the largest known to exist were those of Helena and Constantia, the mother and daughter of Constantine the Great, now in the Vatican. A room named the "Porphyrea" in the Imperial Palace at Constantinople had been lined with porphyry brought from Rome by Constantine; and in the reception hall of that palace there had been a large porphyry slab under a baldacchino, on which the Emperor stood at great festivals. What with Christian conquerors at Constantinople and Doge Dandolo little now remained. The most important monument erected by Constantine was the column 100 feet high, built with eight cylindrical pieces, each 11 feet long, and this was still standing, although damaged by fire and earthquake.

OPUS ALEXANDRIUM.

A great quantity of precious porphyry had been cut up for pavements in early Christian times. Some of the circular plaques were very large, one in S. Peter's being 8 feet 6 inches across. According to Dr. Schneider, Prince Charles of Prussia had formed the most famous collection of ancient porphyry works of art, including a colossal statue of Minerva, and a grand pavement of opus Alexandrium, brought from Ravenna. Amongst the works in porphyry in this country might be mentioned the plaques and pavement to the royal tombs in Westminster Abbey, and the pavement under "Becket's crown" at Canterbury. The South Kensington Museum contained some very beautiful examples of Renaissance and French work, and the British Museum some of the Byzantine period.

MARBLE VERDE AUGUSTUS.

This was a green serpentine, and was called by other names according to the variations of the markings. It had been used by the Eygptians for small figures and the Romans for articles of *vertu*. In the desert at Diu Station, there had been workshops for small articles in porphyry and this serpentine. Mr. Mitchell, the geologist, had found it in an adjoining mountain while making his interesting collection of rock specimens of the Red Sea formation, which is now part of the new museum at Cairo.

ORIENTAL ALABASTER.

The lapis onyx or marmo Arabicum of the ancients was called onyx owing to its semi-transparency, like the finger nails. A number of old quarries had been discovered, and those near Benis-ooef had been reworked for the great mosque of Mohammed Ali at Cairo. Alabaster was a favorite material with the Egyptians and Greeks, taking its name from the vessels for perfumed unguents called "alabastra," and was for domestic purposes and the interior decoration of temples, as well as for sculpture and sarcophagi. The grandest sarcophagus yet discovered was that in the Soane Museum. Egyptian alabaster was usually white and yellow, with occasional thin markings of red and purple. Alabaster had been used by the Romans and Greeks for every description of decorative work.

BRECCIA VERDE.

This was a very beautiful and rare marble conglomerate found only in Egypt. The general color was greenish, due to the quantity of green granite bowlders, in addition to which were pieces of porphyry, red jasper, green felspar, different kinds of slatey rock and serpentine; the whole being cemented together by a greenish silicious paste. The quarries had been known and worked by the ancient Egyptians and were situated at Hammamat. There was a considerable quantity in Rome and Constantinople obtained during the Roman occupation, and during the Renaissance period much old material had been cut up for ornamental purposes by the French and Italians.

THE VARIOUS ANATHITES.

Diorites, felsites, and all similar very hard stones, used for sculpture and mummy cases, were all dikes or intrusive veins formed in the igneous rocks at Syene and in the Eastern desert.

GEMS AND ORNAMENTAL STONES.

The Egyptians had been great lapidaries and used nearly every sort of gem stone known to us except the diamond, ruby, and sapphire. The emerald mines at Gebel Zabara had been worked from early times down to that of Mohammed Ali; the gold mines were at Gebel Allakee, south of Assouan, and copper was obtained near the porphyry quarries.

QUARRYING AND WORKING HARD STONES.

Mr. Brindley was of opinion that the Egyptian methods were precisely the same as our own were up to a few years ago, viz: heavy pick tools for scrubble dressing and making holes for wedges, the blocks being split with metal wedges; dressing masonry surfaces with large and small picks; then rubbing down with flat stone rubbers and sand; and finishing with bronze or copper rubbers and emery powder. The wedge holes, plentiful enough in the granite and porphyry quarries, were the same as ours. Some Egyptologists thought they had discovered the results of gem-stone drills and saws, by a few holes and slabs being striated, but a piece of granite (exhibited) bored with a copper tube and coarse emery powder produced the same result as found in Egypt, while Dr. Schliemann had told the author that he thought the stone hammer-heads of prehistoric times were bored with wood and emery powder.

The Sinking of the Cordillera of the Andes.—The Cordillera of the Andes has for some time been exhibiting a curious phenomenon. It results from observations made upon the altitudes of the most important points, that their height is gradually diminishing. Quito, which in 1745 was 9596 feet above the level of the sea, was only 9570 feet in 1803, 9567 in 1831, and scarcely 9520 in 1867. The altitude of Quito has therefore diminished by 76 feet in the space of 122 years. Another peak, the Pichincha, has diminished by 218 feet during the same period, and its crater has descended 425 feet in the last 25 years. That of Antisana has sunk 165 feet in 64 years.—*La Gazette Geographique.*

THE BRITISH MINING SHARE MARKET.

From our London Correspondent.

The feature of the mining market still continues to be the extraordinary price of tin and copper. Tin has been as high as £170 per ton. It has never before seen such a price in the history of the world. The Cornish mines are thriving under it. Dolcoath for 12 weeks working made a profit of £16,894 and divided amongst its shareholders £3 10s. per share. Levant mine has distributed £1 10s. for the quarter, but many of the other tin mines are still struggling to meet costs, and failing to do so are making calls. Wheal Agar made calls for 40 years before it paid its way, and now it is not only doing that, but declaring large dividends. I fancy on your side such a mine would have been abandoned long before the 40 years' wandering in the wilderness of calls had been accomplished. Is it strange that tin shares rise under such a condition of things as now prevails here? Not at all; and the mystery is not far to seek by those of your readers who have followed what I have previously said about the cost book system. Dolcoaths were £142 per share before the dividend was announced, and, as I write, they are £132.

THE SYNDICATE AT WORK.

Copper has been all the rage, and despite the fall in the metal to the extent of about £10 per ton, such mines as Rio Tinto, Mason & Barry, Cape Copper, Tharsis and Panulcillo maintain almost their highest quotations. The Tharsis Company, a most important concern, has joined the syndicate and Panulcillo will shortly follow. No manner of doubt is cast upon the ability of the syndicate to carry out their tremendous obligations. Rio Tinto is the premier copper mine of the world, and it is estimated that were copper £85 per ton, with its present output it would earn £1,221,570, or sufficient to pay 37 per cent upon its capital. A few months ago the shares were about £9 each, they are now over £20, and heavy sales from Paris last week were only able temporarily to depress them. The Cape Copper, a company that was saved by making a railway about nineteen miles in length from its mines to Port Nolloth, it is believed is making a profit of nearly £300,000 per annum. The new Quebrada, which hails from Venezuela, is an old established company, which has had many fluctuations but which is believed now to be in a position to pay 20 per cent upon its capital from an output of 4000 or 5000 tons of copper per annum. The ordinary shares have doubled in value since last November.

In the opinion of a writer in the *Times*, the price of copper for the next three years will be £80 per ton.

AMERICAN MINES.

The news from your side has been very scanty, but it is attributed to the bad weather in your Western States and Territories. Alturas has been the chief favorite, but despite the recently declared dividend of eighteenpence per £1 share the market shows a decline. This concern had rather bad antecedents at the start and has never taken the position in the market to which its remarkable returns would seem to entitle it.* No news has come from the Emma, the Flagstaff or any of the Utah mines, and for some weeks past considerable anxiety has been felt regarding them. Emma shares have dropped to five shillings, and Flagstaffs are at about thee same price, despite the benediction which Professor Vincent gives them to every one he chances to meet. There has been some inquiry for consolidated Esmeralda, Dickens, Custer, and Union Gold, but prices are all very low. On Friday last there was a demand for Denver on news of a reported improvement in the mine. Callao Bis, after rising to £3 per share—the par price is £1—fell, on the news of a poor crushing, to about £2. No doubt is felt that the company has the veritable Callao lode.

INDIAN MINES.

A bombshell has been thrown into this market by the unexpected resignation of Capt. B. D. Plummer, of the Mysore and Nundydroog mines. The agitation against his alleged dilatory method of proceeding has been growing in force and now he returns home in May. A good deal will be expected of his successor.

Indian shares declined on the receipt of the news about Captain Plummer, but they are recovering, and it is generally believed that a boom is not far off. The production of the Mysore mine is now at the rate of £141,000 in gold per annum. The crushing for January, just announced, was 1556 tons of quartz, producing 1447 ounces.

NEW VENTURES.

"The cry is still they come" with respect to new companies, but I doubt if they are getting their capital subscribed. Every new company that starts tends to weaken the old ones from the market point of view, so that a rush of this sort is by no means looked upon with favor. A plan has been recently adopted by promoters to avoid undue expense in advertising, to bring out the companies early in the week and close the lists before Saturday—the day on which the bulk of the so-called "financial" journals are published which are entirely unworthy of the name, being started sometimes in the interest of a speculative clique, and at others only intended to be run at the expense of the companies until their worthlessness is discovered. The opinions of the financial papers that have stood the test, say of a decade, may be accepted as of value; but those of sheets that are here to-day and gone to-morrow should be discarded as intended to mislead rather than to guide. At the same time promoters rather defeat themselves by adopting this expedient, for Saturday and Sunday are the days on which the public have most time to examine new prospectuses, and consider whether they should take shares.

LONDON, Feb. 13, 1888.

The use of electric motors on the street roads of New York seems to be assured, and the success of the Lykens Valley Coal Company's electric locomotive is attracting much attention among mining men. What is wanted in the mines is an economical storage battery motor that can go where it would be difficult to maintain conductors. By some means, the use of electricity for underground haulage is certain to receive a very wide application in our mines.

* The impression in this country is that the concern is more than doubtful and that the dividends are not earned.—ED. E. AND M. J.

New Magnesium Lamp.—M. F. Leclerq, Paris, is about to bring out a new magnesium lamp, which is intended to replace the cumbersome and uncertain lamp hitherto in use. In the old lamp there were two magnesium tapes fed by clockwork, which had to be rewound at frequent intervals. In the new arrangement there is only one tape, and it is claimed that the lamp will burn without adjustment for twenty-seven hours. Great improvements have also been made in the manufacture of magnesium, by which the cost of production has been considerably reduced. A firm in Antwerp is now selling magnesium at the rate of 1s. 10d., say 45 cents per pound.

The Gas Cost of a London Fog.—The *Gas World* publishes statistics relating to the gas supply to the metropolis during the prevalence of the fogs last week. From these it appears that the Gas Light and Coke Company, the premier gas company of the world, manufactured and sent out to its customers on Tuesday, Wednesday and Thursday 298,700,000 cubic feet, or 42,000,000 cubic feet above the quantity delivered on the corresponding days of last year. It may be interesting to know that the gross value of the total quantity, at 2s. 9d. per 1000 cubic feet, is upwards of £41,000, while the value of the excess alone is £5775. The Commercial Company sold 37,985,000 cubic feet on Monday, Tuesday, Wednesday and Thursday, as against 33,164,000 on the corresponding days of last year.

A new pyrometer, by E. H. Keiser, is described in the *Journal of the Chemical Society*. An air bulb made of hard glass or of metal, and having a long capillary neck, is connected by a narrow bore rubber tube with an inverted burette; this latter is placed in a wider tube containing water, and closed with a cork and stopcock at the bottom. The two halves of the apparatus having acquired the temperature of the room t, the water is adjusted to the zero mark and the apparatus connected together. The value of the constant c for the apparatus is determined by heating the bulb to 100 deg. C. and noting the increased volume of air V in the burette, and using the formula $t' = t + V/c - V/273 + t$. The bulb being then heated to any other temperature t' this may be calculated by the above formula. The author makes no correction for the moisture of the measured air, and takes no precautions as to the dryness or moistness of the air in the bulb.

Death Along the Panama Canal.—The Secretary of State has received an interesting report from the United States Consul, Thomas Adamson, at Panama, in regard to the condition of the Liberian laborers employed on the Panama Canal. The mortality among these laborers as reported by the canal company during the period from October 18th to December 31st last was 54, but this list includes only those who died in hospital at Panama. A deputation of the Liberians recently called on Mr. J. W. Adamson, Acting Consul at Colon, and implored him to devise means of sending them home. They represented that out of the 1000 Liberians who arrived at Panama on April 1st, 1887, 389 had died up to December 20th, being a death rate of over 53 per cent per annum among exceptionally healthy men accustomed to a hot and moist climate. Consul Adamson says their case is a hard one. They are to receive £2 a month or thereabout on the completion of their contract, and they can not leave their present employers without forfeiting the right to go home.

Advices received at the State Department from another source show that the Liberian Government will put a stop to further immigration to the isthmus.

Gelatinizing Nitro-Glycerine.—A process of gelatinizing nitro-glycerine with nitrated cellulose by means of an addition of picric acid, with a view to effect the gelatinizing without heating the nitro-glycerine to a high temperature and solidifying it at any degree at which it will, under ordinary conditions, remain in the liquid state, has been introduced by the Deutsche Sprengstoff Actiengesellschaft, of Hamburg. A quantity (up to, say, 10 per cent) of picric acid (trinitrophenol or trinitrophenic acid) is dissolved in the nitro-glycerine to be gelatinized. With such solution is mixed or incorporated finely pulverized or ground nitrated collodion cellulose in a quantity corresponding with the required consistency of the jelly. The process of gelatinizing is accelerated by frequent stirring or agitation of the mass. The quantity of picric acid to be added depends upon the quantity and quality of the nitrated cellulose employed, and upon the degree of consistency of the jelly to be obtained. The gelatinized process will be effected in a longer or shorter space of time according to the quality of the nitrated cellulose. The jelly thus produced serves as an explosive either pure or mixed with suitable additional substances.

The Movement of Loess by Water.—The following interesting observations with regard to the mobility of loess have been made by M. Potanin during his last journey through the region south of the Ordos. As wind steadily moves the shifting sands, so also water steadily moves the loess (a tertiary deposit on the Rhine) transporting it from higher to lower levels. The underground water which filtrates through the loess, begins by making in it a kind of cavern; then a circular crevice appears on the surface over the cavern, and a cylindrical vertical hollow, which soon becomes a deep well, is formed through the thickness of the upper layers of the loess. The whole surface of the loess deposits is dotted with such wells, very dangerous to cattle. By-and-bye the formerly cylindrical well begins to extend in the direction in which the underground water flows, and a narrow ravine grows until it joins the main valley. Then masses of loess continually fall down into the ravine, increasing its width. The fall of these masses is favored by the numerous crevices in the loess, and it is so frequent that natives warn foreigners not to approach the borders of a ravine. Of course the fallen masses are further dislocated by water, and the loss is thus steadily transported at a remarkable speed to lower levels.

Formation of Hydrogen Peroxide.—Dr. Franz Richarz, of Berlin, has recently published a paper upon "our knowledge of the mode of formation of the OH the $\frac{2}{3}$ at anode during the electrolysis of dilute sulphuric acid," in which he finally refutes the Traub theory by showing that the H_2O_2 is produced by the oxidation of water. According to his experiments the presence of small quantities of H_2O_2 in tolerably concentrated sulphuric acid simultaneously with S_2O_7 could be proved by the decolorizing of potassium permanganate $KMnO_4$) and by the yellow coloration of titanium dioxide (TiO_2). If a greater quantity of H_2O_2 be present it was susceptible of further demonstration, under the conditions stated, by the formation of perchromic acid. The S_2O_7 was determined by the oxidation of ferrous sulphate. The electrodes were placed in the legs of a U-tube; the anode was a thin platinum wire. With acid of strength exceeding 60 per cent, S_2O_7 and H_2O_2 showed themselves close to the anode after the current had been closed for a short period, while at the same time no trace of either was found near the cathode. After longer duration of the current the quantity of H_2O_2 at the anode became very considerable. But this only occurred when S_2O_7 had already shown its presence in the fluid. Dr. Richarz shows that the H_2O_2 discoverable at the anode owes its origin to a purely chemical process. In a quantity of acid of about 40 per cent strength, a considerable amount of S_2O_7 was produced by electrolysis. This liquid, which contained no H_2O^2, was brought up to a strength of about 70 per cent by the addition of pure H_2SO_4, avoiding rise of temperature. At this point H_2O_2 was suddenly formed in the liquid, quite as rapidly as during the electrolysis of 70 per cent acid. In sulphuric acid of this concentration S_2O_7 can not therefore exist without the formation in a short time of considerable quantities of H_2O_2, since atoms of active oxygen become separated from the S_2O_7, and oxidize H_2O to H_2O_2.

The White Lead Industry of Austria.—Mr. Jussen, United States Consul-General at Vienna, in a recent report, states that four different grades of white lead are known to the Austrian trade, Kremser white, Venetian white, Hamburg white, and Dutch white. The first bears this name because at some remote period an excellent quality of white lead was manufactured at Krems, an ancient city of Lower Austria, but none has been produced there for at least 150 years; but the best quality white lead still bears the name Kremserweiss. The same is the case with the Venetian white; the name, like Venetian red, has survived, although the industry has been dead for centuries. Kremser white contains a trace only of indigo, Venetian white contains equal parts of lead and baryta or blanc-fixe, Hamburg white contains one part of lead to two of baryta, while in the Dutch white there are three parts of baryta to one of lead. The raw material is obtained from the lead mines, the most important of which are situated in Villach and Bleiberg, in Carinthia. The price of Carinthia lead is 18fl. to 20fl. for 221½ lbs., and the average market price of white lead per 221½ lbs. is, Kremser white, 45fl.; Venetian, Hamburg and Dutch, about 32fl. The principal export of the manufactured white lead is from Trieste, Great Britain being the principal purchaser, and the United States the next. Austrian manufacturers and dealers claim that the process employed is superior to any other known process, and that only the purest sulphate of baryta is used for the purpose of producing the three lower qualities. Mr. Jussen believes that the Austrian process is a perfectly honest one, and that the adulterations with all sorts of cheap ingredients practiced in Germany are unknown in Austria. The process employed by the three great white lead manufacturers at Klagenfurt in producing Kremser white is a secret one, and Mr. Jussen's inquiries on the subject from one of the manufacturers only led to the reply that the process consisted of "a system of chambers developed by an experience of many years."

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

PATENTS GRANTED FEBRUARY 21ST, 1888.

378,083. Apparatus for Toughening Steel Rails. John Coffin, Johnstown, Pa., Assignor to the Cambria Iron Co., same place.
378,095. Apparatus for the Manufacture of Gas. Alexander C. Humphreys, Philadelphia, Pa., Assignor to the United Gas Improvement Co.
378,097. Apparatus for Heating Retorts and Muffles. August Klönne, Dortmund, Prussia, Germany.
378,106. Friction Feed Mechanism for Iron-Planers. Franklin Phillips, Newark, N. J.
378,136. Process of Producing Aluminum. James S. Howard, Springfield, Mass., and Frederick M. Hill, Brooklyn, N. Y., Assignor, by Mesne Assignments, to the Aluminum Product Co., of New York.
378,139. Chain for Conveyers. Benjamin A. Legg, Columbus, Ohio, Assignor to the Lechner Manufacturing Co., same place.
378,150. Pipe-Coupling. Archibald H. Rowand, Allegheny, Pa.
378,170. Governor for Steam-Engines. John S. Marshall, Imlay City, Mich.
378,173. Drive-Chain. Benjamin Oborn, Marion, Assignor to Joseph Andrew Jeffrey, Columbus, Ohio.
378,209. Rolls for Rolling Girder-Rails. Arthur J. Moxham, Johnstown, Pa.
378,210. Rolls for Rolling Girder-Rails. Arthur J. Moxham, Johnstown, Pa.
378,211. Rolls for Rolling Flangeless Center-Bearing Rails. Arthur J. Moxham, Johnstown, Pa.
378,229. Driving-Belt. Fenelon B. Brock, Washington, D. C., Assignor to Charles A. Schieren, Brooklyn, N. Y.
378,230. Process of Treating Liquids in Vacuum Pans. Paul Casamajor, Brooklyn, N. Y.; Louise J. Casamajor, Executrix of said Paul Casamajor, deceased.
378,234. Pipe-Well Coupling. Matthew T. Chapman, Aurora, Ill.
378,246. Refining Canadian and Similar Petroleum Oils. Herman Frasch, London, Ontario, Canada.
378,252. Machine for Making Chain. Julius Kinder, Brooklyn, N. Y., Assignor to the Solid Link Chain Manufacturing Company, of New York.
378,278. Combining Metals with Aluminum. William A. Baldwin, Chicago, Ill., Assignor of one fourth to Ammi A. Thomas, J. Clement Smith, and James J. Sheehy, all of Washington, D. C.
378,280. Metallic Railway-Tie and Fastening therefor. Frank L. Barrows, Milwaukee, Wis.
378,281. team-Injector. Louis M. Berry, Reading, Pa.
378,283. Means for Detecting Leakage from Gas-Mains. Samuel R. Brick, Stapleton, N. Y.
378,289. Sulphuric-Acid Distributing Apparatus. Francis W. Chappell, Baltimore, Md.
378,328. Petroleum-Motor. Victor List and Jacob Kosakoff, Moscow, Russia, Assignors of one third to Georg Adolf List, same place.
378,330. Indicator for Oil Tanks. Frank S. Mason, Cambridge, Mass.
378,331. Lubricating Composition. David L. McKitrick, Baton Rouge, La.
378,336. Valve Mechanism for Air-Compressors. Edwin Reynolds, Milwaukee, Wis.
378,342. Pressure Regulator and Cut-Off. William D. Thomas, Pittsburg, Pa., Assignor of one half to T. B. Atterbury, same place.
378,348. Amalgamator. Joseph Wilkins, Baltimore, Md.
378,371. Ore-Feeder. Edward C. Loftus, Oakland, Cal.
378,372. Boiler-Covering. Charles B. Manville, Milwaukee, Wis.
378,395. Process of Treating Peat. Salomon Heimann, New York, Assignor of two thirds to Frank L. Pommer, Stapleton, and Albert E. Hasbfield, Brooklyn, N. Y.

THE METALLURGY OF STEEL.*

By Henry M. Howe.

(*Continued from page* 129.)

Returning now to figure 10, in which we have already plotted at p^1 the equilibrium which the last paragraph states was obtained at bright redness with 30·9% of carbonic acid, we may plot in it as p^6 the equilibrium obtained just below whiteness between iron oxide with 5·1% of oxygen and a mixture of 89·2% of carbonic oxide with 10 of carbonic acid (No. 24, Table 65), interpreting "just below whiteness" as about 1160° C.

If now we were to determine the different percentages of oxygen which iron oxide must hold at each of several temperatures in order to remain in equilibrium with a mixture of say equal volumes of carbonic acid and oxide, and plot corresponding points, a curve would be formed which we may term the 50% carbonic acid equilibrium curve: similar curves might be plotted for equilibrium with other proportions of carbonic acid. As the temperature rises above bright redness the tendency of oxygen to leave carbonic acid for iron increases; hence the proportion of oxygen which iron oxide must contain in order to resist this tendency in presence of a given mixture of gases, and to stand in equilibrium with them, must also rise. Hence these equilibrium curves rise as we pass to the right from redness, somewhat as sketched. Indeed, it is clear that the 30·9% curve must rise somewhat rapidly from p^1 to clear the 10% curve at p^6, though perhaps less abruptly than in the sketch, for we have seen that p^1 may be plotted too low.

Searching carefully I find little to locate these curves to the left of bright redness: that little, however, indicates that while the curves do not reverse and rise as we pass to the left, they probably fall much less suddenly than between 1,200° and 900° C. No. 25, Table 65, shows that at 417° C. the 4% carbonic acid curve is at least as high as p^5, which implies that the 30·9% curve must flatten in passing from 900° to 417° C. No. 7, Table 65, proves that the 50° curve does not pass higher than p^7 at 417° C., hence that it does not rise, but probably falls as the temperature descends from 900° to 417° C. No. 28, in which pure carbonic oxide confers about five times as much oxygen on spongy iron at 417° as in any of the experiments at redness, at first suggests that between these points the tendency of oxygen to leave carbon for iron, or the relative affiinity of iron for oxygen, falls with rising temperature, *i. e.* that a given percentage of carbonic acid stands in equilibrium with a higher oxide of iron at the low than at the higher temperature, and thus that our equilibrium curves rise as the temperature falls from 900° to 417°, instead of descending as sketched. But this is fallacious: at these low temperatures carbonic acid is rapidly generated, as will be shortly shown: the large deposition of carbon recorded in No. 28 shows how much carbonic acid must have been formed: this, not the low temperature, is probably the direct cause of the greater absorption of oxygen by the iron.

§ 184. Influence of the Proportion of Iron to Carbon on the Conditions of Equilibrium.—Clearly a small quantity of carbonic oxide or acid or both can but slightly alter the degree of oxidation of iron, for, when but a little oxygen has been transferred a mixture of these gases is reached which is enert towards the existing compound of iron and oxygen. Nor, conversely, can a small surface of iron or of its oxide greatly affect the proportion of carbonic oxide to acid. Thus Dumas found (No. 16, Table 65) that carbonic acid was so imperfectly reduced in passing over iron turnings that the issuing gas held at least 31·8% by volume of carbonic acid and sometimes as much as 41·86%: for the iron became so oxidized, at least superficially, that it was inert on this mixture of gases. On increasing the exposed surface by filling the interstices with iron filings the proportion of carbonic acid fell to from 16·39 to 36·66% (No. 17 and 18, idem); while when Bell passed this gas at snail-pace over spongy iron, which offers still more surface, the first issuing portions were almost completely reduced, holding but 4% of carbonic acid.[b] (No. 25, Table 65.)

A sufficient excess of surface of iron, such as is offered when a minute quantity of gas is evolved in a solidifying ingot, would probably not only completely reduce carbonic acid to carbonic oxide, but might even completely deoxidize the latter gas by reaction, absorbing both its carbon and oxygen.

§ 185. Carbon Impregnation.—While oxidizing iron and reducing its oxides, carbonic oxide simultaneously impregnates them with carbon, probably at all temperatures above 200° C., but most rapidly between 400° and 450°: at and above bright redness permanent deposition almost ceases. Carbon is deposited on metallic iron containing at most a trace of oxygen, on ferric oxide which has lost but 1·36% of its initial oxygen, and which contains no iron in the metallic state, and on all intermediate compounds: the deposition usually progresses with deoxidation, but in no fixed ratio. It is far more rapid with a swift than with a slow current of gas. The carbon deposits now in blotches, now uniformly; here bursting the iron oxide into powder, there without changing its form.[c] On iron oxide 808 parts of carbon, and on metallic iron 158 parts, per 100 of metal, have been deposited.[d] The reactions may be:

(1) $Fe + xCO = FeO_x + xC$,
(4) $FeO_x + yCO = FeO_{x-y} + yCO_2$.
(5) $FeO_x + yCO = FeO_{x+y} + yC$,
(6) $2CO = C + CO_2$.

Under altered conditions, and especially at higher temperatures, deposited carbon is oxidized by carbonic acid and iron oxide, thus:—

(7) $CO_2 + C = 2CO$,
(8) $FeO_{x+y} + yC = FeO_x + yCO$.

The action of carbonic acid probably begins at about 417° C.: that of iron oxide certainly begins at or perhaps even below 265° C.[f] (Table 63). A mixture of 60% by volume of carbonic oxide with 40 of carbonic acid still deposits a little carbon, but the presence of 50% of carbonic acid completely arrests the deposition, or at least the permanent deposition of carbon.[g] This, coupled with the fact that carbon is permanently deposited on almost pure ferric oxide, suggests that the oxygen of this substance attacks deposited carbon less energetically than carbonic acid does.

The tendencies to deposit carbon and to reoxidize the carbon thus deposited exist simultaneously, and one or the other action takes place till equilibrium between them

[a] Comptes Rendus, LXXV., p. 511: Watt's Dict. Chem., 2d Supp., p. 260.
[b] Journ. Iron and St. Inst., 1871, I., p. 108.
[c] Bell, idem, p. 135.
[d] Idem, p. 162.
[e] Idem, p. 198.
Idem, pp. 137–8.
[g] Idem, pp. 140, et seq.

is reached.[a] But, in general, the higher the temperature and the larger the proportion of oxygen (free or combined) present the stronger, relatively speaking, is the tendency to oxidize the deposited carbon.

To the deposition of carbon in the blast furnace we probably owe not only much of the carbon of the cast-iron[b] but also the removal of the last 1% of the initial oxygen, which carbonic oxide alone is powerless to expel.[c]

Carbon is also deposited by carbonic oxide on nickel and cobalt and their oxides at all temperatures between 417° C. and low redness, with simultaneous partial oxidation of the metals and reduction of their oxides, but not on spongy platinum, copper, or lead, nor on the oxides of zinc, tin, manganese or chromium, nor on asbestos, pumice-stone[d] or other inert substance. It is true that carbonic oxide is also decomposed by heat alone at a very high temperature,[e] its constituents combining when the temperature again declines: but in the presence of iron, nickel, cobalt and their oxides it is decomposed at a relatively low temperature, and its elements do not recombine during slow cooling.

I will now indicate a little more fully the evidence on which some of these statements are based: it is derived almost wholly from Bell's famous researches.

That carbon deposition is the rule between not the exception between 200° C. and dull redness is indicated by the experiments of Table 65.

The influence of temperature is illustrated by Table 65, Nos. 11, 13 and 15; 19 and 21; and 27 to 36; and better by Table 66, and is indicated graphically in figure 10. Mark in Table 66 how Cleveland ore received but 1·85% of carbon in 20·5 hours at 213° C., and no less than 86·13% in a shorter time at a higher temperature: and how at bright redness carbon deposition was so nearly arrested that but 0·3% was deposited in 4·5 hours. Note how spongy iron, which took up 20·3% and 158% of carbon at about 417°, acquired but 0·3% at bright redness. Gruner too found that carbon deposition ceased if the temperature rose to redness.[f]

TABLE 66.—INFLUENCE OF TEMPERATURE AND STRUCTURE ON CARBON IMPREGNATION.[a]

Temperature C.	Carbon deposited by carbonic oxide per 100 of metallic iron.							
	On Cleveland ore.	Hours exposed to CO.	On Lancashire[g]	Hrs. exposed to CO.	On Fe_2O_3 on pumice.	Hrs. exposed to CO.	On iron sponge.	Hrs. exposed to CO.
	% C.		% C.		% C.		% C.	
213 to 221	1·85	20·5						
415 ±	4·686	7·5	65·38@581	7·5	770@808	9	158	9
	0·3	7·			60@271	6	20·3	4·5
Higher but not red	86·13	12						
Red to bright red	2·3	21					0·30	4
Very bright red	0·3	4·5						

a Condensed from Bell, idem, pp. 130 to 162.

Though carbon deposits much more slowly at 213° than at 417° C., it is quite possible that as much might eventually deposit at the former as at the latter temperatures, granted time and carbonic oxide enough. This, however, would imply that there was a limit to the amount of carbon which can be absorbed, and it is not clear that there is any such limit: deposition may go on indefinitely.

A. *The Deposition of Carbon on Metallic Iron* is illustrated by Nos. 27 to 39 in Table 65. That the presence of metallic iron is not necessary to this deposition is shown by the fact that Cleveland ore absorbed 0·11% of carbon when it had lost but 2·84 of oxygen per 100 of ferric oxide (9·48% of its total oxygen). Here, and in another case in which 1·69% of carbon was absorbed, the absence of metallic iron was directly proved by attacking the ore with iodine and cold water, which dissolved no iron, though it readily dissolves any which is in the metallic state.[g]

Though carbon deposits rapidly on iron sponge (Nos. 27 and 29, Table 65), it deposits very slowly on compact iron (Nos. 38–9, idem). In § 188, B, instances are given in which at most but little decomposition of carbonic oxide can have occurred when this gas was exposed to hot compact iron. Gruner found that perfectly pure dry carbonic oxide deposited carbon on ferrous oxide, but hardly at all on metallic iron: if mixed with a little carbonic acid however it deposited carbon on metallic iron as well.[f] Bell's carbonic oxide too should have been pure, for it was prepared from ferrocyanide of potassium, was passed through potash and nitrate of silver, and produced no turbidity in lime water (op. cit. p. 97).

B. *The Influence of Carbonic Acid* on carbon impregnation is readily traced in Table 65. Here when less than 25% of carbonic acid is present the deposition of carbon is usually recorded, its absence never: when more than 33% of this gas is present the absence of deposited carbon is frequently recorded, its presence never. In various other experiments Bell never observed carbon deposition from gas containing as much as 50% of carbonic acid: when 25·6 and 33% of this gas with 76 and 67% of carbonic oxide respectively was present, some forms of oxide of iron received carbon, others did not. While blast furnace gases which, excluding their nitrogen, consisted of 29·6% of carbonic acid with 70·4% of carbonic oxide, deposited on Cleveland ore from trace to 1·28 parts of carbon per 100 of iron, those with 16% of carbonic acid deposited from 1·96 to 3·11% of carbon in from one hour to four days.[h]

C. *That deposited carbon is attacked by iron oxide at* 249° *to* 265° C. was proved by Bell. Iron oxide, previously partly reduced and richly impregnated with carbon by ignition in carbonic oxide, was heated to this temperature in a sealed tube filled with nitrogen, when carbonic acid and oxide were evolved.[i]

D. *That it is attacked by carbonic acid at about* 417° is probable, for at this temperature this gas rapidly attacks soft and sometimes slightly affects hard coke.[j] But deposited carbon in Cleveland iron ore, whose iron had been removed by digestion in acid and which therefore held only carbon and gangue, was not acted on by carbonic acid at 260° C.[k]

(TO BE CONTINUED.)

NOTE.—The publishers of the ENGINEERING AND MINING JOURNAL will thank the readers of this article if they will promptly call attention to any inaccuracies they may observe in it.

[a] It is probably more accurate to say that both reactions occur simultaneously, one outstripping the other till equilibrium is attained, after which they just balance each other.

Idem, p. 189.

[c] Idem, p. 182.

Idem, pp. 172 to 183.

[e] Deville, Leçons sur la Dissociation.

Watts, Dict. Chem., 2d Supp., p. 259, from Comptes Rend., LXXIII., 281.

[g] Bell, op. cit., pp. 105, 167, expts. 358–9.

[h] Op. cit., pp. 140 to 143 and 154.

[i] Idem, pp. 137–8. expts. 241 2.

[j] Idem, p. 193, expt. 446, 1871, II., p. 331, expts. 708–9.

[k] Idem, 1871, II., pp. 330–1, expts. 706–7.

PERSONALS.

Mr. Frederic F. Chisolm, mining engineer of Denver, Colo., has gone to New Mexico on professional business.

Mr. Wm. H. Morrow, for many years connected with the Baldwin Locomotive Works, died at Philadelphia on the 20th inst.

Mr. J. Rogers Maxwell has been elected President of the Lehigh & Wilkes-Barre Coal Company, to succeed Mr. Wm. H. Tillinghast.

Mr. S. J. Vivian has been appointed manager of the Kohinoor and Donaldson Mining Company, of Idaho Springs, Colo., in place of Mr. Alfred Rickard.

Mr. A. R. Thompson, Secretary of the Hale & Norcross and Savage mining companies at Virginia City, Nev., has resigned, and the vacancy has been filled by Mr. Clayton Belknap.

The term of office of Mr. T. B. Bancroft, Chief Inpector of Mines for Ohio, will soon expire. The many friends of Mr. Bancroft will be pleased to learn that he has been offered by one of the largest and most important mine operators in this State a very responsible and remunerative position which he will probably accept.

Col. Ensign Bennett died at his home in Buffalo on the 21st inst., aged fifty-six years. Colonel Bennett was superintendent of construction of some of the big Western railroads, prominent among them being the Illinois Central. Later he was made president of the Brazil Block Coal Company at Brazil, Ind. His last work of construction was the Genesee Valley Canal Railroad from Olean to Rochester, N. Y., which was completed in the month of January, 1883. In May of that year Colonel Bennett came to Buffalo to take charge of the coal interests of the Buffalo, New York & Philadelphia Company, and was made general manager of the three companies, the Fairmont, the Northwestern, and the Buffalo. He was connected with this company at the time of his death.

Mr. George H. Corliss, the distinguished mechanical engineer, died from paralysis of the heart on the 29th inst. at Providence, R. I., aged seventy years. Mr Corliss was born at Easton, N. Y., in 1817. He first showed mechanical skill in temporarily rebuilding a bridge that had been washed away by a freshet, after it had been decided that such a structure was impracticable. He afterward constructed a machine for stitching leather, before the invention of the original Howe sewing machine. He moved to Providence in 1844, and in 1846 he began to develop improvements in steam engines, for which he received letters patent in 1849. By these improvements uniformity of motion was secured by the method of connecting the governor with the cut-off. In 1856 the Corliss Steam Engine Company was incorporated. Mr. Corliss had received awards for his inventions at the exhibitions at Paris in 1867 and at Vienna in 1873, and was given the Rumford medal by the American Academy of Arts and Sciences in 1870. In 1872 he was appointed Centennial Commissioner for Rhode Island, and was one of the Executive Committee of seven to whom was intrusted the responsibility of the preliminary work. In January, 1875, he submitted plans for a single engine of 1400 horse power to move all the machinery in the exhibition. Mr. Corliss spent $10,000 upon it above the appropriation for building it. Mr. Bartholdi, in his report to the French Government, said it belonged to the category of the works of art. Mr. Corliss invented many other ingenious devices, among which is a machine for cutting the cogs of bevel wheels. The Institute of France gave him in 1873 the Montyon prize for that year, the highest honor for mechanical achievements. He made no exhibit, but the prize was awarded him because the foreign engine builders who made exhibits claimed that they were of the Corliss type. In February, 1886, the King of Belgium made him an officer of the Order of Leopold. Mr. Corliss was highly esteemed in this city and State, and could have received almost any political honor which he would accept.

FURNACE, MILL, AND FACTORY.

The Meech Aluminum Company has been organized at Chicago, Ill., with a capital stock of $1,000.000; incorporators, H. B. Meech, W. R. Meech, F. H. Long.

The Union Steel Company, of Chicago, Ill., after being closed down for three months, will be ready to put the steel-works and rail-mill in operation by the 15th of March.

The Sharpneck Rock Drill Company has been incorporated at Leadville, Col., with a capital of $100.000. The incorporators are E. L. Sharpneck, J. C. Blake and W. G. Shedd.

The Glendon Iron Company, Glendon, Pa., on the 20th inst. finished blowing out its No. 3 furnace, and on the 21st inst. commenced blowing out No. 5, leaving but one stack in operation.

The Alabama Rolling Mill Company, Birmingham, Ala., is going to issue $50,000 bonds to put in special machinery to manufacture cotton ties, light hoops, bands, etc. The plant will probably be enlarged during the coming summer by the addition of a plate and sheet mill.

The Western Nail Mill Company, Belleville, Ill., on the 18th inst., confessed judgment for $50,000 in favor of the First National Bank and the Belleville Savings Bank. The plant of the company is estimated to be worth $200,000, but owing to a depression in the market, in consequence of which the mill was unable to run without loss, it has been shut down for several months.

The work of boring the great steel gun cast by the Pittsburg Steel Casting Company, Pittsburg, Pa., to which we referred in our issue of January 21st, has been completed. It will now be "turned off" on the outside, after which the annealing process will be commenced. This will take three weeks. The gun will then be sent to Washington to be tested. The workmen claim that "the steel is perfect."

The Phosphor-Bronze Smelting Company, Limited, of Philadelphia, Pa., states that, owing to the continued high prices of copper and tin, all prices and discounts heretofore quoted on phosphor-bronze manufactured goods are withdrawn. The company has been enabled to continue former prices and discounts to its customers up to the present time, by reason of heavy purchases of materials made prior to the recent advance.

The new furnace of the Pulaski Iron Company, at Pulaski, Va., has gone into blast. It is of modern design, having a stack 75 feet high by 17 feet bosh, equipped with three Whitwell hot-blast fire-brick stoves, 60 feet by 20 feet each, and two big blowing engines, and will probably make 150 tons of iron per day. In addition to the furnace, the company owns its own ore mines in the Cripple Creek mineral region, near the furnace, on the line of the Norfolk & Western Railroad.

The Paducah Iron Company has been organized at Paducah, Ky., with a capital stock of $250,000. The officers are as follows: President, Thomas Howard, St. Louis; Vice-President, W. W. Powell, Paducah; Treasurer, Rufus J. Lackland, St. Louis; Secretary, Hugh Mulholland; Superintendent, Thomas J. Scott. The company will erect a blast furnace of 200 tons capacity, the citizens of Paducah having donated the site for the same. It is expected to be ready to commence operations by September 1st next.

The Pennsylvania Salt Manufacturing Company, whose extensive works are located at Natrona, Pa., near Pittsburg, has recently moved into its new and commodious offices, No. 115 Chestnut street, Philadelphia. This company was incorporated in 1850, and has now some thirty-five acres under roof. Among the list of chemicals manufactured by them are alum, soda, concentrated lye, acids, blue vitriol, and refined salt cake. The smelting and refining branch is complete in every detail. The company use natural gas, and is prepaired with its facilities to offer the highest prices for argentiferous and auriferous copper ores, mattes, etc., and special terms for ores rich in sulphur.

Messrs. Graff, Bennett & Co., the well-known iron manufacturers, of Pittsburg, Pa., have made an assignment to P. H. Miller. It is said that the failure has been brought about by the extension of the firm's plant to a greater extent than their condition warranted. As near as can be learned, the liabilities are $1,200,000, with assets amounting to about $800,000. About three years ago the firm asked for an extension; they were given five years' time, and, it is said, they have so far succeeded in paying about two-thirds of the $1,280,000 then due. Later reports state that it is the prevailing belief in financial circles that the business is to be wound up and the firm dissolved. There is, however, not much cause for uneasiness, considering the amount of liabilities, as the assets are generally believed to be much larger than stated.

CONTRACTING NOTES.

Contracts open will be found on page xix. New contracts this week. No. 773. Sewers; No 774, Steam Boiler; No. 775, Electric Light Plant; No. 776, Water-Works; No. 777, Water-Works; No 778, Dredging; No. 779, Water Tank Pipe; No. 780, Pumping Engine; No. 781, Chemicals, Chemical and Electrical Apparatus.

The Roanoke Rolling Mill Company, Roanoke, Va., is in the market for machinery.

Mr. A. Armstrong, Tryon City, N. C., is in the market for revolving coal and gravel screens.

Mr. T. S. Moorhead, Jacksonville, Fla., wishes to correspond with manufacturers of special machinery for grinding and pulverizing phosphates.

The Swindell Construction Company, of Pittsburg, Pa., has been awarded the contract for a regenerative gas coupling furnace from the Syracuse Tube Company, of Syracuse, N. Y.

LABOR AND WAGES.

The reduction in the price of coke will cause a 10 per cent reduction in the wages of the coke workers in the Connellsville region, Pa. A meeting will be held at Connellsville Saturday to consider the acceptance of the reduction.

The Philadelphia & Reading Railroad Employés Convention held on the 23d, considered the effect of the settlement of the miners' strike on that of the railroaders, and adjourned without coming to any definite conclusion as to what should be done. It is stated that there was an overbalancing tendency to keep the strike on until some satisfactory settlement could be obtained. The convention meet again on the 24th inst.

Representatives of the Brick Manufacturers' Protective Association and their employés, on the 23d inst., reached an agreement on the question of wages and yard regulations for the approaching season. With a few exceptions, the wages schedule is the same as last year. The regulations provide for the recognition of the Order of Knights of Labor, but permit the employment of men without reference to their connection with that organization; the settling of disputes by arbitration, and payment of wages at least once in two weeks.

GENERAL MINING NEWS.

DELAWARE, LACKAWANNA & WESTERN RAILROAD.—The annual report presented at the stockholders' meeting on the 21st, shows cash on hand, $1,084,082. The accounts receivable amounted to $7,892,389, against accounts payable of $6,854,403, leaving $1,037,985 surplus from current accounts of the bills payable. There has been paid $4,057,031 since the balance sheet was made up. The total surplus to date amounts to $12,815,966. The company transported 8,363,343 tons of coal during the year. The following officers and directors were elected: President, Samuel Sloan; Secretary, Fred. F. Chambers; Treasurer, Frederick H. Gribbens; Managers—John J. Blair, George Bliss, Percy R. Pyne, Wilson G. Hunt, Elias S. Higgins, Benjamin G. Clarke, Jay Gould, Sidney Dillon, Russell Sage, Edgar S. Auchincloss, Andrew T. McClintock, Gardner R. Colby, William H. Appleton, and W. W. Astor.

TENNESSEE COAL, IRON AND RAILROAD COMPANY.—All the mines of this company are in full operation. The new plant of 125 coke-ovens at the Pratt mines, near Birmingham, has been started, and work on them will be pushed. It is altogether probable the new battery of coke-ovens just completed will soon be lit up, and the coke stocked at the new furnace plant. Work is going forward rapidly at the new furnaces. The stack house is nearly up. The D or No. 4 furnace will be the first put in blast.

ALABAMA.

TUSCALOOSA COUNTY.

TUSCALOOSA COAL, COKE AND TRANSPORTATION COMPANY.—The Tuscaloosa Coal, Iron and Land Company has just closed contract with a party of New Orleans and New York capitalists to establish at Tuscaloosa a company to be known as the Tuscaloosa Coal, Coke and Transportation Company, with a capital of about $500,000. The business will be to mine, manufacture coke, and operate barge lines on the Warrior River.

ARIZONA.

PIMA COUNTY.

The custom smelter erected at Tucson by Mr. R. H. Paul is now ready to receive ores of all classes.

LOCOMOTIVE MINING COMPANY.—The prospects of the company, whose property is situated in the Quijoota District, are said to be good. A mill is greatly needed, and it is probable that one will shortly be erected.

PINAL COUNTY.

J. D. REYMERT COMPANY.—By an agreement with the company Judge J. D. Walker now assumes the absolute management and control of the mines and mill at De Noon and will hereafter conduct them in his own name. During the past few months he has had the temporary management of the property and the results obtained are said to have been very satisfactory. Changes and additions to the mill are contemplated, and if the water supply develops as well as the present indications promise, the capacity of the mill will be increased.

YAVAPAI COUNTY.

UNITED VERDE.—This copper mine has been leased to Mr. W. A. Clarke, of Butte, for three years. The mine will be started at once.

ARKANSAS.

Our special correspondent writes us that there is great activity in mining matters around Hot Springs. A 20-ton mill is now erected, machinery all on the ground for a reduction mill, which will use the Waitz electric process. This mill is expected to be in operation March 10th, at South Hot Springs. Colonel Majors and Colonel Grey, of Chicago, are erecting a plant of 100 tons capacity, which will start up at first with a capacity of 40 tons per day. They have a large force on the ground at work, machinery all bought in Chicago, and paid for. This mill will be erected at Hot Springs.

The Phœnix Gold and Silver Mining Company has collapsed without making an effort to hold its property. The stock of this company, as will be remembered by our readers, was listed at the Consolidated Stock and Petroleum Exchange in this city in July, 1887, at $2.30, when we said: "Our advices and the official statements of the company give no encouragement whatever to even reckless gamblers to invest in this stock." And so it goes in every case where the ENGINEERING AND MINING JOURNAL denounces a mining scheme, the result justifies its action, and those who do not heed it lose their money.

GARLAND COUNTY.

JONESTOWN MINING AND MILLING COMPANY.—This company is erecting a smelting plant of a capacity of twenty tons near Hot Springs.

CALIFORNIA.

INYO COUNTY.

DARK HORSE.—The mine, near Bishop Creek, has been sold. The ore is low grade but there is said to be

an immense amount of it. It is easily mined. The mine is to be worked on an extensive scale and a large mill is to be built.

MONO COUNTY.

BODIE CONSOLIDATED MINING COMPANY.—Mr. George Ives, managing director of this company, has given the following explanation why it has been necessary for the directors to levy an assessment of 50 cents per share when there is a large sum of money in the treasury. He says that although there is about $20,000 on hand the expenses of the mine have been so increased by the deep workings in the Lent shaft that that sum will be exhausted by the time that it will take to collect the assessment. Therefore it was levied in order that the company might not be in debt at the expiration of that time, and might have the necessary money on hand to provide for future expenses.

BULWER CONSOLIDATED MINING COMPANY.—The superintendent's report for the week ended the 11th inst. states: We are making an upraise, on the 200 foot level, jointly with Standard Consolidated Mining Company, to determine whether an east streak from the main foot-wall ledge has its apex in Bulwer or Standard ground. The mill is to be started this week to crush what ore we have on hand.

STANDARD CONSOLIDATED GOLD MINING COMPANY.—The superintendent's report for the week ended the 11th inst. states: The upraises on ledges near the Bulwer line continue to pitch east or further within the Standard ground. The January statement shows: January 1st, balance cash on hand, $89,656.99; bullion product bar No. 629, $10,609.70; bullion product bar No. 630, $15,632.45; total, $115,899.14. Dividend No. 71, $10,000; expenses, $16,917.44; total, $26,-917.44. February 1st, 1888, balance cash on hand, $88,981.70. Shipments for the first two weeks in February amounted to $12,891. At the annual meeting the following directors were elected for the ensuing year: Augustus Petitbone, A. P. Brayton, John Mason, Tom C. Grant, P. N. Lilienthal, of California, Joseph Tate, W. H. Oscanyan, of New York City.

NEVADA COUNTY.

BRUNSWICK GOLD MINING COMPANY.—Report from this company's property are favorable; the ore improves with depth. The 300 level, which was the deepest workings of the old company, has been passed through by the shaft. In this level drifting will be done. The force at the mine will be increased soon, when stoping will be in order. The mill will start up shortly.

COE MINING COMPANY.—Owing to financial difficulties work was suspended some time ago. The lease on the property expired in January, and in accordance with its terms, all improvements have reverted to the Coe Company. These improvements represent, among other things, hoisting and pumping works of sufficient capacity to enable operations to a depth of 800 feet. The shaft is now a little more than 500 feet in depth. Two San Francisco syndicates are negotiating for the property—one to bond and the other to purchase—and it is thought that an arrangement will shortly be effected with one or the other.

GRASS VALLEY GOLD MINING COMPANY.—The name of this company recently incorporated in New York has been changed to the Oro Flats Gold Mining Company, as it was discovered that an incorporation under the above name already existed in California. Work on the property will be inaugurated about April.

COLORADO.

CLEAR CREEK COUNTY.

MAYFLOWER.—This mine, which at one time was owned by the Mayflower Consolidated Gold and Silver Mining Company, was sold, owing to financial difficulties, to the present owners, who have since pushed development work vigorously, and have just erected and started up a mill of a daily capacity of fifty tons. The mill was designed by Mr. H. C. Holthoff, and the machinery furnished by Mr. R. J. Cory, of Denver.

LAKE COUNTY.

We take the following from the Leadville *Herald-Democrat*:

Most of the smelters are heavily stocked with argentiferous iron ore, and with the uncertain condition of the Leadville smelting industry, it is now next to impossible to sell any iron, even of the most desirable quality. A bid of 45 cents per ounce of silver was made last week for a contract for some of the best iron produced in Leadville and was refused.

ANTIOCH.—The new stamp mill, in White's Gulch, has commenced running, and so far appears to be doing excellent work. The mill is crushing about 100 tons of ore daily.

DUNKIN MINING COMPANY.—From the 12th of January to the 14th of February, inclusive, the manager of this company has sent the sum of $62,000 to Boston, which is the largest amount ever produced in one month in the whole history of the Dunkin Company. The ore upon which this profit was made was taken almost entirely from the No. 4 shaft, in the north end of the property. The company is now contemplating sinking the No. 3 shaft deeper, for the purpose of opening a second contact. The No. 3 shaft is now down 390 feet.

EVENING STAR MINING COMPANY.—The company is not at present producing any iron ore, owing to the small demand for it. The lessees of the mine are now working in some of the bodies of the low-grade ore standing in the east end of the property. This ore is of very low grade in silver, but carries enough lead to be mined and sold at a profit, with the present rates for smelting.

PITKIN COUNTY.

The shipments of ore from Aspen for the week ended the 17th inst. amounted to 1638 tons; 946 tons of this amount was sent over the Colorado Midland Railroad, and 692 tons over the Denver & Rio Grande Railroad. Leadville got 697 tons of it and Denver 941 tons.

The United States District Court has given permission to the owners of the Durant to extend their level drift through and beyond the west line of the Aspen, with the owners of which property they are at suit, and to also extend the Visino tunnel westward through the Aspen to a point of meeting with the drift. The effect of this permission by the court will be to enable the Durant owners to demonstrate whether, as they claim, the vein of which they have the apex, extends on through the Aspen, or whether it does not. The Visino tunnel, at one end of the Durant, runs parallel with the end lines of both it and the Aspen. The drift commences at the other end of the Durant and extends diagonally through it and the Aspen. What is developed by the combination of these two workings will to a great extent decide, it is said, the suit to be tried in May.

BAY STATE.—W. F. Patrick, of Leadville, has purchased one eighth interest in this mine for $15,000. Mr. Patrick, his brother, L. L. Patrick, and S. L. Morris have been working the property under bond and lease.

BONNYBEL.—Judge Hallett, of the United States District Court, has refused the application on the part of George M. Daniels, a former half owner in this mine at Aspen, for an injunction and appointment of a receiver for the property.

SUMMIT COUNTY.

LITTLE MOUNTAIN.—A contract has been made with Denver parties for the erection of a thirty-ton concentrating mill for this mine at Breckenridge.

DAKOTA.

Considerable work is being done at the coal mines in western Dakota. This year for the first time, a good deal of coal is being mined for shipment at New Salem—twenty-seven miles west of Mandan. The shippers from this point have the disadvantage of having to haul their coal to the cars by team. Notwithstanding this, they manage to compete in price with the miners who put their product directly on to the cars. The price, per ton, delivered, for liguite in Mandan is $3.25. The mine belonging to the Northwestern Grain and Fuel Company, at Sims, does an extensive business

LAWRENCE COUNTY.

DEADWOOD SMELTING COMPANY.—The company will begin the building of reduction-works at Deadwood in the spring under the direction of Mr. R. D. Clark.

IDAHO.

ALTURAS COUNTY.

ALBA MINING COMPANY.—The Rising Sun mine, the property of this company, upon which work was resumed in January—as mentioned in our issue of the 14th of that month—is making a favorable showing. The tunnel has since been driven about 20 feet, and the ore-vein is now nearly a foot in width.

BOISE & NAMPA COMPANY.—This company has been organized with the following officers: Gen. J. F. Curtis, of Boston, President; Col. E. S. Nettleton, Vice-Presiden and General Manager, and J. A. McGhee, of Nampa, Secretary. The company is now perfecting arrangements for the construction of the most extensive and irrigating canal yet originated in this territory. The plan contemplates the construction of a canal 30 feet wide on the bottom, 5 feet deep, and, when completed, 80 miles in length. It will take water out of the Boise River, 5 miles above Boise City, and lead to Snake River. A plateau of rich, nearly level agricultural land, about 300,000 acres in extent, can be supplied by this canal. It is also intended to supply water for working rich placer mines on Snake River. The practicability of carrying out this extensive plan has been fully looked into by the well-known engineer, Colonel Nettleton, and favorably reported upon. The greater part of the land to be watered by this canal is still open to homesteaders and pre emptors, but, it is said, is now being rapidly taken up.

BULLION-OPHIR.—A bond has been given on this group of mines until June 1st to Craig Chambers, of Salt Lake City. Eighteen men are at work on the property now, and the number will shortly be increased. The main bullion vein had been cut by the raise from the Durango tunnel, which is now 1,900 feet long; that is, the length of the adit from the surface or "mouth," on Bullion-Ophir ground, to the present face of the breast, is 1900 feet.

CAMAS NO. 2.—The property is bonded to San Francisco parties until May 1st next. If the sale falls through it is the intention of Judge Doniphan to put in a sufficient number of Golden Gate concentrators to take the entire tonnage of the stamps, and to work the property on a lease in partnership with his brother, Colonel Doniphan, of St. Joe, Mo.

PHILADELPHIA & IDAHO SMELTING COMPANY.—The works of this company at Ketchum, the North Star and American Eagle mines, on the East Fork of Wood River, and the Silver Star group, in Smoky, and the Irvine group, on Warm Springs Creek—all of which are worked by the company—have been "shut down." This was done in obedience to an order of injunction obtained in Philadelphia by stockholders of the old Philadelphia Mining and Smelting Company, who claim interests in the properties mentioned.

TIP-TOP.—The sale of this group of gold-bearing claims, in Western Alturas, to English parties, for $100,000, is reported.

ILLINOIS.

CONSOLIDATED COAL COMPANY.—The company has abandoned its mine at Heinrichtown and removed the machinery to other mines belonging to the company.

MACON COUNTY.

Stock to the amount of $50,000 has been subscribed to sink a new coal shaft at the western limits of Decatur.

M'LEAN COUNTY.

The stock to the amount of $20,000 for sinking a coal shaft in Chenoa has all been taken.

KANSAS.

OSAGE COUNTY.

OSAGE CARBON COMPANY.—It is reported from Osage City that this company, which is part of the Atchison, Topeka & Santa Fe Company, has just purchased an additional 7000 acres of coal land near Osage City. This makes over 20,000 acres of coal land which the company has purchased in Osage City at a cost of over half a million dollars.

MARYLAND.

CUMBERLAND AND ELK LICK COAL COMPANY.—The reports for 1887 show that the coal mined amounted to 65,228 tons, of which 30,142 tons were manufactured into coke. The profits for the year were $23,506.77. The company now has 75 coke ovens, having built 25 additional ovens during the past year. Nearly half the output was manufactured into coke.

MARYLAND COAL COMPANY.—At the annual meeting Mr. Henry Loveridge was re-elected President. The only change in the directory was the election of Mr. Henry Janes in place of Mr. James Havemeyer. The annual report of the company shows a net profit, after deducting interest on bonds and all other charges, of about $75,000.

MEXICO.

BADIRAGUATO GOLD MINING AND MILLING COMPANY.—This company, after a prolonged struggle, has finally decided to suspend work, and from present indications it is hardly probable that it will ever be resumed again by the present owners. An expert from San Francisco, who has been making a test run on 250 tons of ore from the mine, has demonstrated the fact that it is practically worthless, but $1.45 per ton being obtained, while the tailings showed a saving of but 50 cents in gold. The mine is located near Guaymus, in the State of Linolla, and was originally stocked at $5,000,000. The highest the stock ever sold was, it is said, $3.75 per share. The last price quoted is 1½ cents.

LA LUZ.—The engrossing subject of interest at Pachuca, says the Mexican *Financier*, is the taking possession of this mine part of the property of the Maravillas Company, by the same parties from whom the mine was originally transferred to the Maravillas Company. The La Luz mine is estimated to be worth $2,000,000 at a low valuation, and, since the Maravillas Company obtained possession, it has yielded, according to one estimate, $3,000,000. No event in Pachuca mining annals has ever excited more attention than this, and there is much excitement over the matter in mining and legal circles. It is reported that the Maravillas Company has already taken steps to regain the mine.

MICHIGAN.

Our special correspondent sends us the following: This week an expert is on the range in the interest of some Michigan millionaires, to examine and report upon the Superior gold shaft. If his report is favorable, a sale of the option and lease will be made, the figures or amount to be paid running up into the tens of thousands of dollars. A peculiarity of the expected sale is, that no one is allowed to drill, blast or pick upon the vein matter at all; simply look and nothing more. The shaft where this extraordinary rich bunch of gold quartz is found, is only about 20 feet deep. The vein proper is 4 feet wide at this point, but the exceeding rich portion is only 6 to 8 inches wide and runs across the shaft from north to south. This is all that is known regarding the matter; the blast that uncovered this phenomenal discovery being all the work done by any one upon the deposit. On the surface, however, the vein has been uncovered east for 2,000 feet, and three shafts sunk upon it at intervals, the deepest of which is 70 feet, and out of each of which came the same quartz vein matter, yielding gold from zero up to $1200 per ton.

On the west a series of test pits for 800 feet show the same vein holding good and strong, with no apparent change in aspect. The work done east is on the so-called Michigan Gold Company's tract, that on the west belongs to the Superior Company. A noted distinction between this quartz vein and that of the Ropes, which is only 2½ miles east and a half mile north, is that the Superior vein runs along in diorite, both walls being the same. It is encased for a few inches in soft, decomposed chlorite and talcose matter. The Ropes is in a serpentine range with walls of chlorite slate, and a difference is seen between the two walls. What effect this has, if any, upon the probable richness, strength and life of the two veins is a matter of question. Mr. S. S. Robinson, superintendent of the Iron Silver Mining Company of Colorado, is the expert mentioned above. A pumping plant run by a 20-inch turbine wheel has been placed at a dam thrown across the Carp River some 5000 feet away from the Ropes mine to supply the new stamp with water. Six-inch pipe will convey the water from here to the mill; the pipe is laid in the ground just below the frost limit and follows the sinuosities of the surface. Some rich rock is

now going through the mill and more of the same kind is uncovered in the mine; a good report can be expected for this month.

The Calumet fire has reached the surface in the vicinity of No. 1 shaft. All is red hot there now, showing that the extent and fierceness of the flames have been greater than at first reported.

Stock piles at the iron ore mines are not as large as usual this spring, but more ground has been opened up and prepared for stoping, on the arrival of the first boat, than ever before. Quiet but energetic work has been going on all winter in this direction at all of the Bessemer ore producing shafts.

Dock work at the various ports on the lake is being pushed with vigor, and May 1st will see great improvement in the shipping capacity over last year. There will be no delay arising from lack of boats, cars, or dockage this season.

Great growth is noticed in the brownstone industry, the quarries at Portage, Entry, and Marquette working and expanding more each year. Several varieties of stone are gotten out in these quarries, lying above each other. No attention has yet been paid to the granite and serpentine building stone, great quantities of all known varieties lying along the range most any where.

The Hancock Iron Company has been organized on the N ½, Sec. 16, T. 47, R. 31 by a syndicate of "copper-bottomed" gentlemen of Houghton County. This is northwest of Republic and exactly south of the Beaufort mine, some five miles being directly in the magnetic iron range.

COPPER MINES.

ADVENTURE COPPER COMPANY.—In consequence of the recent advance in the price of copper, many properties which have been idle for a long time have started up. We are advised that there is scarcely a possibility that work will be resumed by this company until some reorganization is perfected, towards which no steps have yet been taken or are immediately contemplated. No work has been done on the company's property for fifteen years.

COPPER FALLS MINING COMPANY.—One head of stamps in the mill has started and a second one will follow as soon as it can be got in running order. It is the intention of the management to run the four heads just as soon as the fuel on hand will allow it. As considerable work has been done at the mine it is thought there will be no difficulty in keeping the four heads of stamps running.

TAMARACK MINING COMPANY.—The directors held a meeting at Boston on the 23d inst., and discussed the plan of forming a new company for the development of a part of the property. The new enterprise is to be known as Tamarack, Jr., and rights to subscribe for the stock will be issued to stockholders of the old or senior Tamarack. The directors did not agree upon the particulars of the plan at this meeting, and adjournment was taken to Saturday. The original idea contemplated the issue of 50,000 shares of stock, 10,000 shares to remain in the treasury, 20,000 shares to be given to Tamarack stockholders as a dividend and 20,000 shares to be given to Tamarack stockholders for $20 per share, thus giving $400,000 with which to develop the new mine and carry on the work until the lode was struck, say three years hence. The distribution of the new stock would be pro rata, or at the rate of one share of new to every two shares of old Tamarack. In other words, the Tamarack stockholder would, if he exercised his right to subscribe, pay $20 for one share and have one share given him as a dividend, making the actual cost of his new stock $10 per share.

In order to keep the control of this new enterprise with the Tamarack people who originate it, it had been proposed to have payments for the new or Tamarack, Jr., stock made at the rate of $5 annually for four years, at the end of which time the other 20,000 shares, or the stock dividend, was to be distributed. This project met with disapproval and was abandoned. The result of the discussion of the matter to-day has been to make it probable that the new company will be started in this way: Fifty thousand shares will be issued, 10,000 shares of which will remain in the treasury, and the remaining 40,000 shares will be offered to Tamarack stockholders at $10 per share. That is, the right will issue to holders of Tamarack stock to subscribe pro rata, which is share for share for Tamarack, Jr., stock at $10 per share. Thus the stock dividend feature is abandoned, and the "plum" becomes a "right." Captain Daniels believes that Tamarack, Jr., has a fine outlook. The company will raise the $400,000 to open the Tamarack, Jr., by selling the stock to the Tamarack, Sr., stockholders direct. The plan outlined is not adopted yet, but is the latest suggestion, and probably will be, subject, of course, to modification and arrangement of particulars.

IRON MINES.

LAKE ANGELINE MINING COMPANY.—A correspondent sends us the following. These mines recently sent 2700 tons of ore to the Isabella furnace, which yielded in phos. 0·013, 0·011, 0·007, 0·008, 0·012, with the same number of iron determinations, the average of which was 68.34 per cent metallic iron, an ore that cannot be excelled in this country, and better than the celebrated "Newbed" of Port Henry.

QUINNESEC.—The Penn Iron Company has suspended operations at this mine, which has "pinched" out. The mine is one of the oldest mines in the Menominee District, and was formerly one of the most important properties on the range, says the *Ispeming Iron Ore*. It was opened in 1877, and begun shipping the year following. It was one of the mines sold by the Menominee Mining Company to the Penn Iron Company six years ago. Its total output has been 281,074 tons. Three years ago the mine was abandoned, but a subsequent examination by Captain Olliver resulted in a partial resumption of mining work, the ore taken out since, however, coming from the pillars, floors, and from behind the lagging. Efforts to find a new deposit of ore on the property have been unsuccessful.

MONTANA.

DEER LODGE COUNTY.

GRANITE MOUNTAIN MINING COMPANY.—This company has purchased property on Boulder Creek for which it is reported to have paid $65,000.

JEFFERSON COUNTY.

The sampling and reduction works at Boulder are about ready for the business of buying ores.

AMAZON MINING AND SMELTING COMPANY.—The works of this company at Boulder have resumed operations.

LEWIS & CLARK COUNTY.

MONTANA COMPANY, LIMITED.—Official advices report that the production for January amounted to $125,200, and the working expenses for the month to $55,800.

WINSCOTT MINING COMPANY.—Work is to be resumed in this company's property. Operations were suspended in November (see ENGINEERING AND MINING JOURNAL, November 19th, 1887), owing to financial difficulties. A ten-stamp mill is now being built by Messrs. Fraser & Chalmers

SILVER BOW COUNTY.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The deed filed for record at Butte in reference to the sale of the Clark Colusa mine and other claims to this company, referred to in our last issue, shows that the property conveyed is a part of what is called the Colusa lode claim. Also all of that portion of the Liquidator and Modoc Extension claims conveyed to W. A. Clark by Geoffrey Lavell and others in 1883. Also half interest in 190 feet of the west part of the Discovery claim, half of claims One, Two, Three, and Four west from Discovery claim, according to the original location thereof in and upon the Gambetta lode claim, comprising in all an undivided half interest in 990 feet of said lode claim. Also a half interest in the Piccolo. Also the west 850 feet, and the east 350 feet of the Mountain Chief. All improvements, etc., go with the interests named, excepting the Gambetta hoist, a small dwelling and stable on the Gambetta, and ores and minerals on the various dumps. The deed also includes several parcels of land, aggregating about ten acres, together with the concentrating, calcining, and smelting plant, and other buildings situated thereon. The consideration named in the deed is $150,000.

NEVADA.

ELKO COUNTY.

COMMONWEALTH MINING COMPANY.—Work has been discontinued in the north drift, 100-foot level, as the ore has pitched out of the drift. East drift, same level, is exposing fine ore along the bottom. A west drift has been started in ore, and run 8 feet, the ore being about 3½ feet wide. Average car sample returns $249 per ton, the first class being taken out before sampling, and stored in the mine. No. 1 drift, 150-foot level, has been extended 40 feet. Upraise has encountered a clay seam, and beyond it high grade ore. No. 3 drift, to prospect the ore cut by the shaft below the 100-foot level, has been started. Every thing requires timbering, otherwise better progress would be made.

ESMERALDA COUNTY.

HOLMES MINING COMPANY.—At the annual meeting the old Board of Directors was re-elected, consisting of R. E. Wilson, W. S. Hobart, W. E. Sell, A. W. Rose, Jr., and C. T. Bridge. At a subsequent meeting Ramon E. Wilson was appointed President, W. E. Sell Vice-President, and Charles E. Elliott Secretary. No work was done in the mine during the past year, and none will be done until the price of silver improves, when the large quantities of medium grade ore in this mine can be worked at a profit and dividends resumed.

ORMSBY COUNTY.

CARBONDALE.—This mine in Lake District, about thirty miles from Carson, has been sold to the Bartlett Company, an English company in San Francisco. The terms are $15,000 May 1st, 1888, and if the company wishes to hold the mine, $15,000 May 1st, 1889. If the second payment is not made it reverts to the original owners.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle*:

CONSOLIDATED CALIFORNIA VIRGINIA & MINING COMPANY.—During January there was worked at the Morgan, California and Eureka mills 12,552 tons of ore, yielding bullion of the gross value of $358,597.16. The average yield of all the ore in bullion was $28.56 per ton. The expenses for the month amounted to $197,119.71, and included $87,864 for the reduction of ore, $12,552 for royalties to the Sutro Tunnel Company, $48,483.50 for salaries and wages, $35,300.50 for mine supplies, $3125.09 for transportation and hauling of ores, and $7590.02 for the purchase of ore from the Ophir Company.

OPHIR MINING COMPANY.—During the month of January this company received $7590.02 for ore sold to the Consolidated California & Virginia Mining Company, and this sum went far toward paying the expenses of the mine. The ore came from the workings around the winze down from the 1300 to the 1465 foot level. A large quantity still remains there and in addition to this, the upraise (No. 2) above the 1465 level, near the south line of the mine, has passed through 20 feet of ore which is said to average $50 per ton.

SAVAGE MINING COMPANY.—A bullion shipment at $8500—the first on February account—has been received at San Francisco from this mine. The product in January amounted to $39,000, of which 40 per cent was gold.

NEW JERSEY.

MERCER COUNTY.

The discovery of coal near Ewing is reported. Professor George Cook, the State geologist, asserts that it is impossible for coal to be found in that section.

NEW MEXICO.

SOCORRO COUNTY.

PEACOCK MINING COMPANY.—At a recent meeting of the company it was decided to bond the property for five years for $50,000, the bonds to be of the denomination of $25 and $100, with coupons attached, and bearing interest at 6 per cent per annum.

PENNSYLVANIA.

COAL

The coal tonnage of the Lehigh & Susquehanna Railroad and the Lehigh Canal was 5,148,224, of which 2,674,557 tons came from the Wyoming region and 1,175,534 tons from the Mauch Chunk region. The production of the coal property, owing to the miners' strike, shows a large decrease for the first time since 1880, the total product being 711,138 tons, which is smaller than that of any other year since 1880.

LEHIGH COAL AND NAVIGATION COMPANY.—The report for 1887 shows that the company's revenue was $1,803,186, of which $1,497,589 was derived from the Lehigh & Susquehanna Railroad, $35,595 from the Panther Creek Railroad, $10,363 from the Lehigh Canal, $15,275 from the Delaware Division Canal, and $148,452 from profit on Lehigh coal. The surplus for the year was $512,069. After the payment of two dividends of $1 a share each, amounting to $509,362, the credit to the dividend fund at the close of the year was $2,707.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to February 18th:

	1888 Gallons	1887. Gallons.
From Boston	303,152	950,095
Philadelphia	8,795,227	13,632,188
Baltimore	599,909	1,172,698
Perth Amboy	2,177,791	1,005,465
New York	40,651,210	42,913,207
Total exports	52,527,289	60,273,653

WEST VIRGINIA.

TUCKER COUNTY.

Messrs. H. G. Davis & Bro., of Piedmont, have coke-ovens in operation at and near Thomas, and intend to build one hundred more ovens in the spring. The West Virginia Central Railroad Company will extend its road from Thomas to Leadesville, a distance of thirty-five miles.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 24.

Statistics.

Production Bituminous Coal for week ended February 18th, and year from January 1st: Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1888. Week.	1888. Year.	1887. Year.
Phila. & Erie RR.	1,000	5,118	.....
*Cumberland, Md.	46 289	398,281	357,385
Barclay, Pa.	4,513	23,086	40,004
Broad Top, Pa.			
H. & Broad Top. RR	10,092	51,616	59,855
Clearfield Region, Pa.			
Snow Shoe	3,795	22,388	26,176
Karthaus (Keating).	4,312	29,474	28,941
Tyrone & Clearfield	64,343	469,257	408,352
Tipton	864	5,514	.....
Alleghany Region, Pa.			
Gallitzin & Mountain	17,668	122,315	109,563
Pocahontas Flat Top Coal.			
Norfolk & West. RR.	22,766	203 887	155,794
Kanawha Region, W. Va			
Ches. & Ohio RR.	37,695	257,122	202,784
Total	213,247	1,588,018	1,388,834

* Tons of 2240 lbs.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.			
West Penn RR.	8,362	61,900	46,751
Southwest Penn. RR.	1,687	14,777	22,612
Pennsylvania RR	5,466	40,075	33,715
Westmoreland Region, Pa.			
Pennsylvania RR.	28 480	217,764	203,942
Monongahela Region, Pa.			
Pennsylvania RR.	4,390	50,559	52,814
Total	48,385	385,075	359,834
Grand total	261,632	1,973,093	1,748,668

Production of Coke on line of Pennsylvania RR for week ending February 18th, and year from January 1st, in tons of 2,000 pounds: Week, 85,451 tons; year, 568,163 tons; to corresponding date in 1887, 615,581 tons.

Production Anthracite Coal for week ended February 18th, and year from January 1st:

Tons of 2240 lbs.	1888 Week.	1888 Year	1887. Year.
P. & Read. RR. Co..	39,161	738,861	981,935
Cent. R. R. of N. J.	92,767	608,699	*
L. V. RR. Co.	187,234	976,358	831,057
D., L. & W. RR. Co.	134,606	974,905	667,626
D. & H. Canal Co..	95,053	616,606	664,632
Penna. RR.	66,810	469,601	350,744
Penna. Coal Co.	36,238	219,312	149,162
Total	651,869	4,604,342	3,646,050
Increase	61,378	958,292	
Decrease			

* Included in tonnage of Philadelphia & Reading RR.

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.

Production for corresponding period:

1883	3,552,821	1885	2,882,817
1884	3,914,545	1886	4,069,149

Anthracite.

Since the resumption of work in the Schuylkill regions the coal market here has been growing weaker, and to-day there is practically no business being done. The companies have as yet made no change in their prices, which remain as quoted heretofore, but the actual prices at which outside producers are selling coal are very considerably off the circular prices of the companies.

There is to be a meeting of the sales agents on the 28th, and it is possible that a reduction will then be made; if not, it is more than probable that it will be made before the 1st of April.

The mild weather, which with but a few days' interruption has lasted throughout the winter, has greatly lessened the expected consumption of anthracite, so that dealers generally are fairly well supplied, and there is such a wide-spread impression that prices will be lower there is no demand at present rates.

In the East the demand has been so light that freights have suddenly fallen one-third and to-day are quoted $1 and discharge for Boston. This is a reduction of fifty cents within a week. We hear of some collieries in the Wyoming region that have stopped on account of lack of orders, and it is hinted that stove coal can be purchased here at $4.50, and some even say at $4.25, though we have not been able to confirm this latter figure and question its accuracy. Broken seems to be the most in demand, and for free burning full circular prices are obtained. Egg is abundant, and the price is weak, at about twenty-five cents below Broken. Stove may be quoted from $4.50 to $4.60, and Chestnut $4.75. Pea coal is selling at $3.50 to $3.60. Buckwheat, $2.50.

It is said that the Western market is in a still worse condition than the Eastern, Chicago especially being depressed. Prices there may be quoted at $5.50@$6, and a good deal of coal offering. It is said some has been standing on the tracks in cars since the Reading strike commenced.

At a meeting of the retail coal dealers in this city yesterday, the donation of something over two hundred tons of coal was made to the Society for the Improvement of the Condition of the Poor, to be distributed among the poor of this city. The wholesale dealers are also proposing to donate a cargo of about 125 tons to the same charity. These gifts will, no doubt, be extremely welcome, but they would have done more good had they been made a month or so ago.

The Reading is said to have notified furnace men of an advance in price of their coal, but it is very doubtful if it will be enforced; in fact we look for lower prices all around, and the furnace men deserve a portion of the reduction which appears to be in store for manufacturers generally.

Bituminous.

There is nothing new to report in the bituminous market. Supplies are abundant for present use, and the mines are catching up on their contracts. Cars are becoming more abundant, or perhaps we should say locomotives more abundant, for the general complaint throughout the country is due probably more to the lack of motive power than the lack of cars; this is true especially of the Pennsylvania Railroad. Prices remain at $3.50 to $3.70 alongside this city.

Boston. Feb. 23.

[From our Special Correspondent.]

For the want of something better to write about I have hunted up a chapter of statistics of the receipts of coal at this port for the year 1887. The coal trade make no efforts to get statistics, and the only record kept is by the Chamber of Commerce, which, however, makes no effort to classify receipts and only states the total amount. A slight expense only would suffice to make these returns of much value. For the year 1887 2,256,488 tons of coal were received here from domestic ports, and 13,868 tons from foreign ports.

The monthly receipts of domestic coal were as follows:

	Gross tons.		Gross tons.
January	81,489	August	268,130
February	121,896	September	253,364
March	197,487	October	246,406
April	228,989	November	211,037
May	215,970	December	226,484
June	245,243		
July	230,033	Total	2,256,488

How much of this is anthracite or how much bituminous is past telling, neither are comparative figures at hand, owing to the change of record books from the defunct Board of Trade to the Chamber of Commerce. The imported coal, of which there were 28 arrivals, or about the same as for two or three years past, was almost wholly Nova Scotia culm. The receipts of domestic coal for January, 1888, were 142,816 tons, against 81,149 tons in January, 1887.

Concerning the market for anthracite coal at this port the main fact is that recent arrivals keep dealers quite comfortably supplied, and trade with jobbers is slack. There is a fair supply of stove coal to be had at $4.75 f.o.b. at New York. Egg is lsss plenty, say at $4.25 and thereabouts, while broken coal is about as scarce as ever at $4@$4.25, with pea and buckwheat almost equally scarce at nominal quotations. Nut coal is fairly plenty on the basis of stove coal prices.

In bituminous coal cargo lots are still quoted at $2.50@2.60 f.o.b. There appears to be some "hustling" for contract business, but if any thing has been done it was *sub rosa*. Opening prices are awaited with much interest.

There is an easier tone to freights, particularly on large vessels from New York. The barges are making a good thing this winter. Only steamers are arriving from Philadelphia. We quote, exclusive of discharging: New York, $1.25@$1.50; Philadelphia, $1.60; Baltimore, $1.50@$1.55; Newport News and Norfolk, $1.35@$1.40.

There is a fair movement at retail. Prices are still at top notch, and are a little unsteady, as, of course, a decline must shortly follow if the strike is really ended, and if March is ordinarily mild. The combination among retailers has worked six months to a charm, and will be continued, undoubtedly, until some hard streak is encountered and competition gets beyond all bounds. We quote delivered prices: Stove, $7.75; Egg, $7.50; Broken, $7.25; Franklin, $9; Lehigh Egg, $7.75; Broken, $7.50.

Pea coal prices are high as stocks are short. As high as $7.25 is obtained for Stove, $6.40 for Broken, and $6.75 for Egg.

Buffalo. Feb. 23.

From our Special Correspondent.]

The general features of the coal and coke trade without change and devoid of incidents worthy of note.

The Grand Trunk Railway contract has been awarded, but as usual little has been made known. Messrs. Loomis & Co. and Messrs. Brinker Jones & Co., of Buffalo, get 50,000 tons each; Mr. O. W. Shipman, of Detroit, secures 25,000 tons to be delivered at Detroit, and 45,000 tons at Brockville. A Cleveland firm will supply Sarnia with 35,000 tons. The balance is said to be in the hands of Erie Railroad parties for sub-division. In the absence of definite figures, reports say that $2.05 is the price at International Bridge, as against $1.85 a year since.

The testimony before the Congressional Committee has been a source of wonderment to the uninitiated in coal matters and of annoyance to some folks within the magic circle. Further developments are anxiously awaited and comments on what Congress may or should do are uppermost in men's thoughts.

W. L. Scott & Co. will discontinue shipping coal from Buffalo and do it at iEre, Pa., where they have just completed a new trestle. They have been using the W. N. Y. & P. R.R. trestle here, in conjunction with Coxe Bros., but the latter need all the spare capacity. Scott's and Coxe's business, it is understood, were somewhat antagonistic to the Penn. R.R. when combined, hence the change. Coal for Buffalo will be turned over at Emporium; that for Erie at some other point.

Buffalo, by large meetings and earnest work, is doing everything possible to secure the $1,000,000 appropriation, called for by the Cantor Bill, for improving the canals and enlarging the locks. Reader, if you have any influence and love to see the State of New York prosperous, go thou and do your level best to aid the good cause!

A company of Eastern capitalists and Duluth men contemplate building another 300,000 ton capacity coal dock at that port as well as engaging in the manufacture of iron and steel. The West Duluth Land Company have donated 85 acres of land at Grassy Point and work will commence March 1st. Capital stock one million dollars. The company will also make their own coke. Capacity of furnaces, 160 tons.

Vessel men here do not anticipate such a season as last for many good and pertinent reasons, too long for the space at your disposal to enumerate. Suffice it to say that their conclusions seem to be well-founded. At least 70,000 new tonnage will be ready for the opening of navigation so early in the year.

The Erie Railroad has ordered 1,000 gondola coal cars to be delivered immediately.

Pittsburg. Feb. 23.

[From our Special Correspondent.]

Coal shows no animation at this writing. The Ohio is in fair boating order. During the week about five million bushels have left for the Western and Southern markets. Prices at Cincinnati weak and shade lower; the rates here are:

PRICE OF COAL PER 100 BUSHELS = 7,600 LBS.

First pool	$4.75	Fourth pool	$3.25
Second pool	4.25	Railroad coal	5.00
Third pool	3.75		

Connellsville Coke.—The situation remains unchanged. Coke dealers and furnace men are as wide apart in their views as ever; both sides firm, one demanding lower prices, the other refusing them. A large number of ovens in the Connellsville region remain shut down.

At a meeting of the coke producers in the Connellsville region, held here to-day, it was decided to make a reduction in price as the iron trade is so depressed at present. Furnace coke, free on board, was reduced to $1.50 per ton, to dealers $1.60 and to foundries $1.75, this reduction to take effect March 1st. It is a drop of 25 cents per ton. The formation of a new syndicate—the Pittsburg and Connellsville Coke Exchange—progressed so satisfactorily that the papers of agreement are to be signed on the 24th. There will be five firms in it instead of four, as formerly, viz., H. C. Frick Coke Company, J. M. Shoemaker Coke Company, McClure Coke Company, Chicago and Connellsville Coke Company, J. W. Moore Coke Company. Mr. Moore will represent all the members of the old Producers' Association, representing about three thousand ovens.

At a meeting of Pittsburg Railroad Coal Association and the operators from the Hocking Valley held at Columbus, Ohio, last week, an agreement was reached regarding the difference in the selling price of Pittsburg and Hocking coal at the lakes. Pittsburg coal will be sold for 20 cents per ton more than Hocking Valley. Last season the difference was 25 cents per ton, and as a result the operators of Ohio had the advantage of prices, as well as freight rates, which were 15 cents per ton lower than the Pittsburg rate.

FREIGHTS.

The latest actual charters to February 23d, per ton of 2240 pounds:

From Philadelphia:—No shipments on account of the strike of the employés of the Philadelphia & Reading Coal and Iron Company.

From New York to:—Bath, Me., 1.50*; Beverly, 1.25*; Boston, 1.00@1.25; Bridgeport, Conn., .65; Cambridgeport, Mass., 1.50*3c; Chelsea, 1.50*; Com. Pt., Mass., 1.50*; E. Boston, 1.50*; Fall River, .90; New Bedford, 1.00; New Haven, .65; New London, .90; Norwich, .75; Portsmouth, N. H., 1.50*; Providence, .80; Salem, .90*.

From Baltimore to:—Bangor, 1.40; Bath, 1.40; Boston, 1.40; Bridgeport, Conn., 1.25; Bristol, 1.25; Brooklyn, 1.10; Charleston, .90; Fall River, 1.25; Galveston, 3.25; New Bedford, 1.25; New Haven, 1.25; Newburyport, 1.55; New York, 1.10; New London, 1.25; Portland, 1.40; Portsmouth, N. H., 1.55; Providence, 1.25; Quincy Point, 1.40@1.50; Salem, Mass., 1.25; Savannah, 1.25; Somerset, 1.50; Williamsburg, 1.10.

* And discharging. † And discharging and towing. 3c. per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. †† Pilotage. ** Below bridge. * Old B. I.

MARKETS.

NEW YORK, Friday Evening, Feb. 24.

Prices of Silver per ounce troy.

Feb	Sterling exchange	Lond'n Pence.	N. Y Cents	Feb	Sterling exchange	Lond'n Pence.	N. Y. Cts.
18	4.86	44	95⅝	22	.....	44⅛	.....
20	4.86	44	95¾	23	4.86¼	44	95¾
21	4.86¼	44 1-16	95⅞	24	4.86½	*	95⅝

* 43 15-16.

Market has been very quiet and without any distinctive feature.

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 2½ per cent. During the week, the bank gained £250,000, and the proportion of its reserve to its liabilities was raised from 46·35 to 46·78 per cent, against a reduction from 51·28 to 50·15 per cent in the same week of last year, when its rate for discount was 4 per cent. Thursday, the bank gained £47,000 bullion on balance. The weekly statement of the Bank of France shows an increase of 5,025,000 francs gold and a gain of 3,475,000 francs silver.

Copper.—Trading throughout the week has been satisfactory, and although quotations are slightly easier, a very healthy tone has been observable, and it is known that some large quantities in speculators' hands, which have been hanging on the market for some time past, have now been cleared out, and passed into the hands of dealers or consumers. With little prospect that they can do any better during the next few months by waiting and low stocks, consumers have been tempted to purchase more freely at the slightly lower prices recently established. As to the general prospects of the market, there is still a great amount of uncertainty as to whether the Calumet & Hecla Company have actually entered into an agreement with the French syndicate or not. As far as can be ascertained from the company's agent here the rumor is denied, but on the other hand the parties interested in the operations of the syndicate continue to reiterate it. Of course should the statement be actually confirmed the significance of such a fact will be fully appreciated by everybody interested in the copper market, but even should this prove to be the case, we think the wise course is to adopt a very cautious policy, as it should not be overlooked that the present price of copper, in common with most other metals, has now reached such a high level that careful operations are more than ever necessary. The same condition of affairs abroad exists as last reported, that is to say, Chili bars continue very firm, with moderate fluctuations, while on the other hand the amount of actual legitimate buying by consumers is comparatively small. It is expected that the statistics of visible supply will show a further increase at the end of this month. On Monday last Chili bars opened in London at £77 17s. 6d.; advanced on Thursday to £78 15s., and closed to-day at £79, spot cash. We quote lake copper, spot, 16·10c.; March, 16·15c.; April, 16·40c.;

May, 16·40c.; June, 16·40c.; July, 16.30c.; casting copper, 15@15⅝c., according to brand.

The exports of copper from New York during the week were as follows:

		Matte.	Lbs.	
To Liverpool—				
By S.S. Spain—Sacks		7,312	885.253	$45,500
" Etruria—Sacks		1,955	195,500	15 000
" Arabic—Sacks		7,325	873,730	44,000
		Copper.		
" Adriatic—Casks		224	224,000	34.166
" City of Richmond—Casks		106	112 320	5.000
" " " —Pigs		817	133,804	18,500
To Havre—				
By S. S. La Normandie—Pigs		767	263.850	40,000
" " —Casks		20	25 000	3 812
" Gascogne—Casks		131	159 250	24,300
" " —Pigs		83	28,286	5,000
To Antwerp—				
By S. S. Belgenland—Casks		23	44,466	7,500

Tin has been firmly held at 37c. spot cash, but it is understood that some large parcels have been sold privately at some concession on this price. A good business has taken place in futures, and throughout the week about 300 tons have changed hands. The closing quotations are: Spot, 36¾ to 37; March, 35·95 to 36¼; April, 32⅛ to 33¼; May, 31·60 down to 31·35. The deliveries have been somewhat better lately, and consumers seem to be almost entirely without stocks.

Lead.—The speculative movement has made further progress in this article. It became known that the large speculator who has for some time past been "booming" this article, apparently without any other supporters, had recently entered into a further contract for 1200 tons of Richmond lead, delivery from March to June next, at a price a little above 5c. on dock, New York, and this led to several parcels being secured by consumers for early delivery, as they wanted to provide against contingencies. On the whole, however, consumers view the present condition of affairs with some suspicion. No confirmation has yet been received from abroad that a syndicate has been formed; on the contrary, it is again stated on good authority that there is no prospect of such a scheme being carried out. As it certainly does not appear to be at all likely that we shall witness any scarcity of lead, it is evident that the present high price is altogether the result of speculation. It is also reported that considerable quantities of lead are stored in warehouses in London. In London the price of Spanish lead has ruled during the week at about £14 10s. per ton, but private cables this afternoon report a rather firmer market, with Spanish lead quoted £14 15s. and English £14 17s. 6d. to £15. We quoted here Spot 5·07½c.; March, 5·10c.; April, 5·15c.; May, 5·15c.; June, 5·15c. The market closes strong. For prices of sheet, pipe and shot see our list of current quotations.

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

The market remains substantially unchanged and consumers continue to buy from hand to mouth only. However, the speculative buyers of the seaboard keep our market pretty well drained of its surplus. Sales for the week sum up to 1000 tons, prices ranging from 4·70@4·80.

Messrs. Everett & Post, of Chicago, telegraph to-day as follows: The market remains about the same, if any thing a shade firmer, speculators taking about all that is offered, especially futures. Consumers have been apathetic, but are now commencing to nibble. The following are the prices, bid and asked, 4·80, 4·85, 4·90.

Spelter has been in very good demand lately at 5¼@5¾. Foreign Spelter has also been more inquired for, and sales have taken place at prices slightly higher than a week ago, owing to the European markets having shown a firmer tendency. We quote foreign 6 to 6¼c., according to brand and delivery.

Antimony continues firm. Cookson's, 14½; Hallett's, 11⅛@11⅜c. In England the quotations are unchanged.

Chemicals.—There is little of interest to report in the chemical market. The complaint of all except the fertilizer men is that the market is very dull.

Among the heavy chemicals, carbonated soda ash, 58 per cent, is in fair demand, at 1.20@1.25; 48 per cent is also a trifle more active, with quotation at 1.25@1.30, as to quantity.

In caustic soda ash, 48 per cent, there is no change. The small stock on hand maintains the spot price at 1.27½@1.30. Lots to arrive bring from 1.20@1.25, according to quantity.

Alkali, 48 per cent, is in moderate demand for small lots at 1.22½@1.25; 36 per cent is very dull, with nominal quotations, at 1·10@1·15c.

High test is not wanted; the quotations are 1.15@1.17½.

Caustic soda continues very quiet, with no change in our last quotations.

Bleaching powder is dull, at 1.82½@1.92½, as to brand and quantity.

The acid market is without change. Acetic acid is in some demand in a jobbing way at 2¾@2½.

Oxalic acid continues quiet. We note no change in prices since our last, and while manufacturers may continue to sell at present figures, it is doubtful if the price will go much lower.

Sulphuric acid 66° continues about the same. The demand is fair in a small way, but large quantities are not wanted. Quotations continue at 90@95 for large lots, and 1@1.10 for smaller quantities. Chamber acid is fairly active at former figures.

The fertilizing chemical market continues very active.

Kainit is not on the spot in any quantity, and $11@$11.50 is demanded for small lots ex store. Future shipments are in good demand at our former quotations.

Double manure salt is, perhaps, the only article among the fertilizing chemicals that is not very active. Prices are nominal at 1.20 for lots ex store, while lots to arrive are quoted at 1.12½@1.15.

Muriate of potash continues in good demand, with no change in prices. Spot lots may be had at 1.77½. Str. shipments for prompt delivery, same price. Sail shipments are quoted at 1.72½.

Sulphate of ammonia continues scarce, with no change in our last quotations.

Nitrate of soda is in fair demand; prices, 2.20@$2.25 ex store. Future sail shipments may be had at 1·85@1 90c. Goods near by are worth 1.95@2c. according to position.

Brimstone is rather quiet and the price is low. Spot lots may be had from $21.50@$22, according to quantity. Futures may be had at $21@$21.50.

Quicksilver is unchanged, with quotations at 63@65c. per pound.

The Brunswick Antimony Company is meeting with success in introducing its excellent white arsenic and some other products.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 24.

The bulletin of the Iron & Steel Association of Feb. 22 publishes the following table compiled from the last monthly summary of the Bureau of Statistics of the Treasury Department, showing the imports of iron and steel and iron ore into the United States from all countries in the years 1886 and 1887. The imports of iron and steel in 1887 amounted to 1,783,251 gross tons, against 1,098,564 tons in 1886. The imports of iron ore in 1887 amounted to 1,194,301 gross tons, against 1,039,433 tons in 1886.

Articles—Gross tons.	12 months ended Dec. 31. 1886.	1887.
Pig iron	361,788	467,522
Old and scrap iron	87,170	313,418
Scrap steel	10.139	26,532
Bar iron	29,149	36,219
Iron rails	6	241
Steel rails	41,581	137,588
Cotton-ties	10,322	21,675
Hoop and scroll iron	114	32
Steel plates, etc	4,214	24,004
Steel blooms, etc	149,337	310,551
Sheet and plate iron	6,118	7,154
Tinplates	257,822	283,836
Wire rods	136,965	149,350
Wire and wire rope	2,401	2,899
Anvils, forgings, etc	861	1,316
Chains	597	914
Total	1,098,564	1,783,251
Iron ore	1,039,433	1,194,301

The total value of our imports of iron and steel, excluding iron ore, and including machinery, cutlery, fire-arms and similar products, the weight of which is not given in the above table, in the twelve months ended December 31, 1887, was $56,420,540, against $41,630,779 in the correspouding period of 1886. The value of the imports of iron ore in the year 1887 was $2,206,958, and in 1886 it was $1,912,437.

The iron market has been very quiet during the past week, with very little new business reported, and that only in small lots.

American pig-iron is firm and unchanged. There have been sales of some few thousands of tons in small lots. Prices are, if any thing, a little firmer.

Scotch pig is a little easier here, without much inquiry. Glasgow quotations are lower on most brands, and freights are more favorable to importation

Bessemer pig is purely nominal, although quotations of foreign are less firm.

There have been sales of steel rails during the week aggregating about 20,000 tons, chiefly in small lots. The Eastern mills are several of them filled up to their allotments. The Western mills are generally more eager for work. Quotations are unchanged.

Business continues brisk in all departments of structural iron, and the mills still have plenty of work ahead.

Steel plates are in good demand, stimulated by the great activity of the locomotive and car works. Although quotations are unchanged on American plates, yet it has been known for some time that buyers who can wait for importations can buy foreign tank and boiler plates fully ¼ of a cent below domestic prices.

There has been some inquiry for old car wheels, which are scarce in this market.

Old rails are nominally unchanged, although strong holders are very firm, and will not sell at current quotations. We note a sale of several hundred tons of Tees at a price equivalent to $21.50 New York.

The Association of Eastern Nail Manufacturers is making good progress towards perfecting its allotment system for the restriction of production.

Louisville. Feb. 20.

[From our Special Correspondent.]

Comparatively speaking the past week has been quiet, only a few sales of any magnitude having been booked. Good grades of Southern coke irons are scarce. Charcoal irons seem to be a little weaker than they were, and some low prices have been made. Inquiries are still numerous, but difficult to meet, both on account of the scarcity of the iron and the variation between the views of the buyers and sellers. The delivery question is a difficult one with some of the leading Southern furnaces, who have in the past few weeks been compelled to blow out to go through a course of relining. Under this state of affairs deliveries will necessarily fall short, and buyers will have to place their orders elsewhere to cover their requirements until the furnaces with which they have orders placed resume operations. Quotations will be found in our weekly register of prices.

Pittsburg. Feb. 23.

[From our Special Correspondent.]

A combination of circumstances has produced a duller iron market than for some time past. The announcement of the failure of Graff, Bennett & Co., a large iron firm, had a very depressing effect on trade for the time being. The more the matter was investigated the less injurious it was found to Pittsburgers, still there is no denying the fact that matters of this kind are well calculated to make business men more cautious and lose confidence to a certain extent. Wednesday being a legal holiday makes the week one day shorter and curtails transactions.

The unsettled condition of the iron market and all pertaining to the manufacture of iron continues. We have strikes and counter strikes among all classes with one exception. The parties that order strikes, always make full time, and are certain to be on hand when pay day comes. The late failure will place fully two thousand more among the list of idlers that have nothing to do, along with thousands of others. This is a sad picture, and what is more, a true one.

The iron market is weaker but not quotably lower. Dealers are as wide apart in their views as ever. Those furnaces out of blast propose to so remain until matters are satisfactorily arranged between coke dealers and freight rates are restored to what they think a reasonable figure. While certain dealers are disposing of a good deal of iron at lower prices others are inclined to wait and trust to the future for better prices. The feeling among buyers is that they can obtain about all the iron they want at lower prices. The chances of a firmer market are not very strong. But a larger volume of business may be regarded as pretty well assured, and in the long run it will doubtless be more satisfactory than during the past two or three months. Meanwhile, values will be more or less unsettled, and it will require time to adjust them in accordance with the conditions which seem likely to prevail from this time forward. The iron ore question still remains unsettled. Negotiations are pending for several large blocks, but so far have not been consummated. The time is not far off when something must be done.

SALES REPORTED SINCE OUR LAST.

Coal and Coke Smelted Lake Ore.	
1500 Tons Bessemer	17.70 cash.
1500 Tons Bessemer	17.70 cash.
500 Tons Bessemer	17.75 cash.
300 Tons Gray Forge	16.20 cash.
500 Tons Gray Mill	16 25 cash.
500 Tons Bessemer, off grade	17 50 cash.
200 Tons Gray Forge, all ore	17.00 cash.
300 Tons White and Mottled Bessemer	16 25 cash.
325 Tons No. 1 Foundry, all ore	18.25 cash.
50 Tons No. 2 Foundry, all ore	17.85 cash.
250 Tons No 1 Mill	17.10 4 mo.
25 Tons No. 2 Foundry	17 50 cash.
Coke, Native Ore.	
75 Tons Silvery	18.50 cash.
50 Tons Gray Forge	16.25 cash.
25 Tons Silvery	19.00 cash.
Charcoal.	
50 Tons Cold Blast	27.00 cash.
25 Tons No. 2 Foundry	24.50 4 mo.
Steel Billets and Slabs.	
1000 Tons Billets	29.00 cash.
500 Tons Slabs	28.50 cash.
2800 Tons Billets	29.50 cash.
Muck Bar.	
500 Tons March	27.75 cash.
500 Tons Spot	28.25 cash.
Steel Wire Rods.	
500 Tons American Fires	43.00 cash.
Old Iron Rails.	
500 Tons American T's	24.00 cash.
500 Tons Imported D. H.	25.50 cash.

Philadelphia. Feb. 24.

[From our Special Correspondent.]

Steel rail makers admit sales for the past six days amount to 35,000 tons, though higher figures are claimed. Inquiries are now in hand for two thousand tons light sections, and quite a number of inquiries for street rails. The business done lately has been below anticipations, but there is still a great deal of confidence that the market will come up to expectations. The quotations of the past three or four weeks remain. The dullness in foreign and fair activity in home products is kept up very well, and prices are steady. The pig-iron market is stronger than a week ago, because of the submission of a number of offers, chiefly for forge. Foundry seems to be neglected, except in a small way. The poor brands are freely offered but meagerly taken, because of the current belief that prices will be shaded in the course of a week or two. Forge iron buyers must soon come in. Offers were made this week at $16.75, and it is quite probable that six or seven thousand tons will go at that figure or near it. Brokers have a good many sales half through. Foreign material of all kinds is dull.

Sales of three hundred tons muck bars were made. Eight hundred tons structural iron are in negotiation. A cutting of one tenth is going on among plate and tank iron makers, who are scrambling after business. Makers expect better prices, but buyers do not think prices can be strengthened. Bar iron orders are coming in for railway, car and boat purposes, besides the general demand. The Pennsylvania Railroad will order in all 3300 cars, and has closed for 2200. There are inquiries, according to two or three well-posted car builders, for between six and seven thousand cars

WEEKLY REGISTER OF

CURRENT QUOTATIONS.

CHEMICALS.

Acid—Acetic.....2¾@2½
Muriatic, 18°, per 100 lbs.....1.20
Muriatic, 20°, per 100 lbs.....1.35@1.50
Nitric, 36°, per 100 lbs.....4.50@5.00
Nitric, 42°, per 100 lbs.....6.00
Oxalic.....7 @7½
Sulphuric, 60°, per 100 lbs.....90
Sulphuric, 66°, per 100 lbs.....1.10
Alkali—36 p. c.....1.10@1.15
48 p. c.....1.2½@1.25
Refined, 58°.....1.15
Alum—Lump, per lb.....1¾
Ground, per lb.....2
Lump. per ton, Liverpool.....£5
Sulphate of Alumina.....£3 15
Aqua Ammonia—18°, ℔ lb.....4
20°, ℔ lb.....5
22°, ℔ lb.....6¾
26°, ℔ lb.....9¾
Ammonia—Sul., per 100 lbs. 3.00@3.50
Carb., per lb.....7¾
Muriate, per lb.....7
Arsenic—White, powdered, ℔ lb..3
White, glass.....
Red. per lb.....6½
White, at Plymouth, per ton..£10 7 6
Asbestos—American, p. ton.....20.00
Italian, p. ton, c. i. f. L'pool...£18 0 0
Asphaltum—P. ton.....13.00
Prime Cuban, ℔ lb.....5@6c.
Hard, ℔ ton.....$28.00
Trinidad, refined, ℔ ton.....$30.00
Barytes—Sulph., Am. prime white16.00
Sulph., foreign, floated, p. ton....19.00
Sulph., off color, p. ton.....12.50
Carb., lump, f.o.b. L'pool, ton..£6 0 0
No. 1, casks, Runcorn " "£4 10 10
No. 2, bags, Runcorn " " 3 15 0
Bleach—Over 35 p.c., ℔ lb.1.92½@1.97
Borax—Per lb.....6¼
Refined at Liverpool, per ton..£28 10
Brimstone—*See Sulphur.*
Bromine—Per lb.....36
Cement—Rosendale, per bbl.....1.00
Portland, American, per bbl.....2.00
Portland, foreign, per bbl.....2.25
Chalk—Per ton.....3.00
Precipitated, per lb.....4
China Clay—English, per ton....18.50
Southern, per ton.....13.50
Chrome Yellow—Per lb.....8
Cobalt—Oxide, per lb.....2.15
Copper—Sulph. English Wks.,ton£24
Precip., Eng. Wks, unit....fluctuating
Copperas—Common, per 100 lbs.$ 70
Best, per 100 lbs.....1.20
Liverpool, per ton, in casks, £1 16 1.20
Cream of Tartar—Am. 90%....33¼@34
Powdered, 99 p. c.....35
Emery—Grain, per lb.....4
Flour, per lb.....2½
Feldspar—Ground, per ton....14.00
Fuller's Earth—Lump, per bbl. 95
Powdered, per lb.....2
Gypsum—Calcined, per bbl.....1.25
Iodine—Resublimed.....3.50
Kainit—Per ton.....11.00
Kaolin—*See China Clay.*
Lead—Red, per lb.....6
White, American, in oil, per lb.....6½
White, English, per lb.....7½
Acetate, or sugar of.....13@13½
Litharge—Powdered, per lb.....6@6¼
English flake, per lb.....9
Magnesite—Syrian, per ton.....15.00
Manganese—lump, c. i. f. Liverpool, per ton.....£3 2 6
Per unit, up or down.....1s. 6d.
Ground.....£5 10
Mercuric-Chloride—(*Corrosive Sublimate*) per lb.....55
Mineral Wool—Per lb.....2
Mica—
In sheets according to size, 1st quality, ℔ lb.....25@$6.00
Phosphate Rock—S. Carolina, per ton f. o. b. Charleston.....5.80
Ground, f. o. b. New York..8.75@ 9.00
Canadian Apatite, lump, f. o. b. at shipping port, per unit.....24
Phosphorus—Per lb.....70
Plumbago—Ceylon, per lb.....4@5
American, per lb.....7@8
London, per cwt.....£0 15 0
Potassium—Cyanide, per lb....39@41
Bromide, per lb.....37
Chlorate, per lb.....15¾@16½
Carb. per lb.....5
Caustic, per lb.....7¼
Iodide.....2.70@2.75
Muriate, per 100 lbs.....1.77½@1.80
Nitrate, refined, per lb.....6
Bichromate, per lb.....10½
Sulphate, per 100 lbs.....1.10
Yellow Prussiate, per lb.....19
Red Prussiate, per lb.....42
Pumice Stone—Select lumps, lb. 3@5
Original cks., per lb.....1¾
Powdered, pure, per lb.....2
Pyrites—Non-cupreous, p. unit, s. 10
Quartz—Ground, per ton.....18.00
Rotten Stone—Powdered, per lb. 8½
Lump, per lb.....5
Eng., powdered, per ton.....£4
Lump, per ton.....£5
Salt—Liverpool, ground per bbl. 70
Turk's Island, per bbl.....25
Salt Cake—Per 100 lbs.....55
Saltpeter—Crude, per lb.....4½
Refined, per lb.....6
Soda Ash—Carb.,48% 100 lb...1.25 @1.35
Caustic, 48%.....1.27½@1.30
High test.....1.12½@1.15
Soda Caustic, 60%.....2.50@2.60
" " 70%.....2.30
" " 74–5%.....2.25
Sal, English, per 100 lbs.....90@1.00
Sal, American, per 100 lbs.....1.15
Nitrate, per 100 lbs.....2.25
Strontium—Nitrate, per lb.....10½
Sulphur—Roll, per lb.....1½
Flour, per lb.....1¾
Crude Brimstone, 2s., per ton.21.50@22
Crude Brimstone, thirds, per ton 19.75
Talc—Ground French, per lb.....1¼
Domestic, per lb.....6
Domestic, per ton.....15.00
C. i. f. Liverpool, per ton.....£4 5 0
Tannin—Pure, per lb.....
Vermillion—American, per lb...50
English, per lb.....65
Vitriol—(Blue), Ordinary, per lb..5
Extra, per lb.....5½
Zinc Oxide—Am., Dry, per lb.....4½
Antwerp, Red Seal, per lb.....6@6½
Paris, Red Seal, per lb.....6½@7
* Spot.

BUILDING MATERIAL.

Bricks—Pale, per 1,000.....5.00
Jerseys, per 1,000.....7.50
Haverstraw, per 1,000.....8.50
Front bricks, per 1,000, from.....10.00
Building Stone—Amherst free-stone, per cu. ft., from.....75
Brownstone, per cu. ft., from.....1.00
Granite, rough, per cu. ft., from..45
Slate—Purple and green roofing, per 100 ft.....6 00
Red roofing, per 100 sq. ft.....15.00
Black, roofing, per 100 sq. ft.....5.00

THE RARER METALS.

Aluminum—(Metallic), per lb...11.00
Arsenic—Metallic, per lb.....32
Barium—(Metallic), per lb.....975.00
Bismuth—(Metallic), per lb.....2.40
Cadmium—(Metallic), per lb.....1.45
Calcium—(Metallic), per oz.....150.00
Cæsium—(Metallic).....
Cerium—(Metallic) per oz.....160.00
Chromium—(Metallic), per lb...200 00
Cobalt—(Metallic), per lb.....6.00
Didymium—(Metallic), per oz...160 00
Erbium—(Metallic), per oz.....140.00
Gallium—(Metallic), per oz.....3250.00
Glucinum—(Metallic).....4.50
Indium—(Metallic), per oz.....158.00
Iridium—(Metallic), per lb.....700.00
Lanthanum—(Metallic), per oz.175.00
Lithium—(Metallic), per oz.....160.00
Magnesium—Per lb.....4.50
Manganese—Metallic, per lb.....1.10
Mercury—*See Quicksilver.*
Molybdenum—(Metallic) per oz 6.00
Nickel—(Metallic), per lb.....65
Niobium—(Metallic), per oz.....128.00
Osmium—(Metallic), per lb.....640.00
Palladium—(Metallic), per lb...512.00
Platinum—(Metallic), per lb...128.00
Potassium—Metallic, per oz.....2.00
Quicksilver—Per lb.....
London, per flask of 75.....
Rhodium—(Metallic), per lb....512.00
Ruthenium—(Metallic), per oz.112.00
Rubidium—(Metallic), per oz...200.00
Selenium—(Metallic), per oz.....3.00
Sodium—(Metallic) per lb.....4.50
Strontium—(Metallic), per oz..128.00
Tantallum—(Metallic) per oz...144.00
Telurium—(Metallic) per oz.....9.00
Thallium—(Metallic) per oz.....3.00
Titanium—(Metallic) per oz.....32.00
Thorium—(Metallic) per oz.....272.00
Tungsten—(Metallic) per oz.....4.00
Vanadium—(Metallic), per oz...320.00
Yttrium—(Metallic), per oz.....144.00
Zirconium—(Metallic), per oz..240.00

METALS.

Aluminum—
Bronze (10 %), ℔ lb.....46c.
Copper—
Lake Ingot, Spot, ℔ lb.....16·00@16·30c.
Electrolytic, ℔ lb.....16c.
Casting Brands, ℔ lb.....15@15·50c.
Chili Bars, London, ℔ ton.....£79
Am. Matte, Liverpool, ℔ unit.....
Sheet Copper (according to size), ℔ lb.....25 @38c.
Lead—
Domestic, Common, Spot...5·07½c.
Foreign.....5¼c.
Sheet, ℔ lb.....6½@6·60c. net
Pipe, ℔ lb.....6c. "
Tin lined Pipe, ℔ lb.....12c. "
Shot, ℔ lb.....6 @ 7c.
Tin—
Tin Plates.....14s. 6d.
Tin Spot.....£166
Banca pigs, ℔ lb.....36 75c.
Zinc—
Domestic spelter, ℔ lb.....5¼@5½
Foreign spelter, ℔ lb.....5¾@6
Silesian, London, ℔ ton.....£19 7s. 6d@£19 10s.
Sheet, American, ℔ lb.....6¾@7
Antimony—Hallet's, per lb...11½@11¾
Cookson's, per lb.....14@14½
Star Antimony.....£48

IRON AND STEEL.

American Pig-Iron.
No. 1 X.....$20.50@$21.50 at tidewater
No. 2 X.....$18 50@$19.50 " "
Forge.....$17@$17.50 " "
Scotch Pig—Coltness...$21.00@$21.25
Clyde.....19.50@ 20.00
Dalmellington.....19 50@ ....
Summerlee.....21 00@ ....
Gartsherrie.....20 75@ ....
Shotts.....21.00@ 21.00
By Cable to day to the Metal Exchange:
Scotch Warrants.....39s. 3d.
Coltness, at Glasgow.....49s.
Langloan, at Glasgow.....47s.
Summerlee, at Glasgow.....49s.
Gartsherrie, at Glasgow.....45s. 9d.
Glengarnock, at Ardrossan.....45s.
Dalmellington, at Ardrossan.....41s.
Eglinton, at Ardrossan.....40s. 3d.
Bessemer Pig—
Foreign, nominally.....$20.00@$20.25
Domestic.....$18.50@19 at furnace
Spiegeleisen—
German, 20 per cent.....$26.00@$26.25
English, 20 " " .....26.50@ 27.00
" 30 " " .....31.00@ 31.50
Ferro Manganese.....53.00@ 54.00
Steel Blooms, nominally.....30.00@ 30 50
Steel Billets, " .....30.00@ 30.50
Steel Nail Slabs, " .....30 50@ 31.00
Steel Wire Rods, " .....41.00@ 41.50
Steel Rails—
Heavy sections, at mill....$31.50@ 32.50
Light " " .....52.50@ 37.50
Structural Iron and Steel—
Bridge Plate, at mill.....2·10@2·15c.
Angles, at mill.....2·20@2·25c.
Tees, at mill.....2 50@2·70c.
Steel Angles, at mill.....2·50@2·70c.
Beams and Channels, on wharf, 3·3c. base.
Steel Plates—
Tank and Ship, on wharf.....2 6@2·7c.
Boiler Shell, on wharf.....3 @ ....
" Flange, " .....3¼@.....
" Fire-Box, on wharf....4 @4 15c.
Iron Plates—
Common tank, on wharf...2¼@2 3-10c.
Refined tank, on wharf.....2 4-10@2½c.
Boiler shell, " .....2¼@2 6-10c.
Boiler flange, " .....3½@3 7-10c.
Extra flange, " .....4 @4¼c.
Bar Iron—
Best refined.....2@2·1c. base.
Refined.....1·9@2c. "
Common.....1·8@1 9c. "
Merchant Steel—
American tool.....8½@10c.
Special grades.....13 @20c.
Crucible machinery.....5 @6c.
" spring.....4½c.
Bessemer machinery.....2·2@2·5c.
" spring.....2·2@2·5c.
Cast-Iron Pipe—
According to size.....$27.00@$34.00
Wrought-Iron Pipe—
Butt-Welded, Plain and Tarred, 47½ per cent disc.; Galv., 37½ per cent disc.
Lap-Welded, Plain and Tarred, 60 per cent disc; Galv., 45 per cent disc.
Boiler Tubes—52½ per cent disc.; Casing, 50 per cent disc.
Rail Fastenings—
Spikes.....2·20c. delv'd
Angle Fish-bars.....1·9 @2·5c.
Bolts and Sq. Nuts.....2·9 @ 3c.
" " Hex. " .....3·1 @3·2c.
Wrought Scrap—
Foreign, *ex store*.....$20.50@$21.50
No. 1 Yard *to vessel*.....21.00@ 22.00
Cast Scrap.....15.50@ 16.50
Old Car Wheels.....@ 19 50
Old Rails—Tees.....21.50@ 22.00
—Doubles.....22.50@ 23 00
Nails—In car-load lots.....@ 2.05
—From store.....2.05@ 2.10

Louisville Prices.

Pig-Iron—
So. Coke, No. 1 Foundry..$19.00@$20.00
" " No. 2 " .. 18.50@ 19.00
" " No. 2½ " .. 17.50@ 18.00
Hg. Rock Coke, No. 1 F'dry 19.00@ 20.00
" " Charcoal, No. 1 Foundry.....22.50@ 24.00
So. Charcoal, No. 1 F'dry..19.95@ 20.25
So. Charcoal, No. 2 Foundry 19.00@ 19.50
Silver Gray, different gr'des 16.00@ 17.00
So. Coke, No. 1 Mill, Neutral 17.00@ 17.50
" " No. 2 " " 15.50@ 16.50
" " No. 1 Mill, Cold Short.....16.00@ 17.00
So. Charcoal, No. 1 Mill.....
White&Mottled, diff't gr'ds. 15.00@ 16.00
So. Car-Wheel, St'd Br'nds 24.00@ 25.00
" " Other " 19.00@ 20.00
Lake Superior.....24.00@ 25.00
Hanging Rock, Cold-Blast.. 24.00@ 25.00
" " Warm-Blast 20.00@ 21.00

Pittsburg Prices.

Coke or Bituminous Pig—
Foundry No. 1.....$18.00@18 50
Foundry No. 2.....17.00@17.50
Gray Forge No. 3.....16.25@16.50
" " No. 4.....16.00@16.25
White.....16.00@16.25
Mottled.....16.00@16.25
Silvery.....18.50@19.00
Bessemer.....17.75@18 00
Charcoal Pig—
Foundry No. 1.....24.00@25.75
Foundry No. 2.....23.00@24.75
Cold-Blast.....26.00@28.00
Warm-Blast.....25.00@27.00
20 p. c. Spiegel.....28.00@28.50
Muck-Bar.....27.75@28.50
Steel Blooms.....29.00@29 25
Steel Slabs.....29.00@29.25
Steel Crop Ends.....19.00@
@18 75
Steel Bloom Ends.....
Steel Billets.....29.25@29.50
Old Iron Rails.....24 25@25.50
Old Steel Rails.....21.00@22.00
No. 1 W. Scrap.....20 00@21.00
No. 2 W. Scrap.....18.00@18.50
Steel Rails.....*31.50@32.00
" light sections.....*33.00@34.00
Bar Iron, nominal.....1.80@ 1.90
Nails.....$1.90 net car lots
Steel Nails.....$1.90 net car lots
Two per cent off for cash.
* At works.

Prices for all descriptions of iron are very unsettled. Dealers wide apart. Sales about the only criterion to go by.

Philadelphia Prices.

Foundry No. 1.....$21.00@21.50
Foundry No. 2.....18.50@19.00
Gray Forge.....17.00@16.00
Bessemer Pig.....20.00@.....
Steel Rail Blooms.....29.50@nom.
Foreign Bessemer.....20.00@20.50
Spiegeleisen.....26.50@27.50
Scrap, Selected.....22.00@.....
No. 1.....21.00@20.00
Cargo Scrap.....21.00@20.50
Muck-Bars.....30.50@.....
Merchant Iron.....1.90@2.10c.
Plate Iron.....2.10@ 2.30
Tank Iron.....2.40@.....
Sheet Iron.....2.00@ 1.90
Angles.....2.30@.....
Beams and Channels.....3 30@.....
Nails.....1.90@ 2.00
Steel Rails.....31.50@33.50
Old Rails.....22.50@23.00

STOCK MARKET QUOTATIONS

Baltimore Stock Quotations.

COMPANY.	Bid.	Asked.
Atlantic Coal	$1.45	$1.75
Balt. & N. C.	.10	.....
Big Vein Coal	...	...
Conrad Hill	.10	.20
Diamond Tunnel	....	...
George's Crk. C.	....	100
Lake Chrome	...	.12
N. State, Balto.	.15@.20	.45
Ore Knob	...	.11
Silver Valley	1.55	1.65

Highest and lowest prices bid and asked during the week ending February 23d.

Birmingham, Ala., Stock Quot.

COMPANY.	Bid.	Asked.
Ala. Conn. C.	...	98 @100
Bir. Min. & Mfg.	...	201 @202
Decat. L. Imp. & Fur.	21 @ 23¾	23¾@ 24
DecaturMin. L.	24 @ 25	30
Sloss I. & S.	19 @ 20	...
* Sloss I. & S.	76½	80
Sheffield C. & I.	....	70 @ 71
WoodstockS&I	....	...

* Bonds.

Highest and lowest prices bid and asked during the week ending February 21st.

Pittsburg Stock Quotations.

COMPANY	H.	L.	Closing.
Allegheny Gas	...	...	...
Bridgewater Gas	91.00	90.00	91.00
Chartiers Val. Gas.	91.75	90.13	91.75
Columbia Oil Co	...	...	...
Consignee Mg. Co.	...	...	...
Forest Oil Co	90.00	90.00	90.00
La Noria Mining	3.88	3.25	3.50
Lustre Mining	...	...	...
M'f'turers' Gas	40.00	36.00	36.50
Nat. Gas Co. of W. Va.	...	...	...
N. Y. & C. GasCoal	40.00	37.00	40 00
Ohio Valley Gas	42 00	41.00	41.50
Pennsylvania Gas.	23.00	21.50	21.50
Philadelphia Gas.	53.13	51.50	52.38
Pittsburg Gas Co.	...	...	...
Silverton Mining	1.50	1.75	1.50
Tuna Oil Co	...	...	...
Washington Gas	45.00	45.00	45.00
W't'h'se Air-Brake	120.00	117.00	117.00
W't'ghouse Brake	...	...	...
Westmoreland & Cambria Gas	...	...	...
Wheeling Nat. Gas.	26.50	25.60	25.75
Yankee Girl Mg.	...	...	...

Highest and lowest prices bid and asked during the week ending February 22d.

London Quotations.

COMPANY.	Highest.	Lowest.
Alturas Gold, Idaho	25s.	23s.
Arizona Copper, Ariz.	26s. 6d.	26s.
Birdseye Creek, Cal.	10s.	8s.
California Gold, Colo.	8s.	7s.
Carlisle, N. Mex	25s.	23s. 9d.
Centennial, Cal.	21s. 3d.	20s.
Colorado United, Colo.	20s	15s.
Denver Gold, Colo.	2s. 6d.	2s.
Dickens Custer, Id.	5s.	4s.
Eberhardt, Nev	4s 6d.	3s. 6d.
Empire, Mont	£2⅝	£2⅜
Flagstaff, Utah	6s. 6d.	5s. 6d.
Garfield, Nev	27s.	26s.
Gold Hill, N. C.	3s. 6d.	3s.
Ilex, Cal.	£1¼	£1
Josephine, Cal.	£1⅛	£1⅜
Kohinoor, Colo.	2s. 6d.	1s. 6d.
Lady Franklin N. Mex	12s.	10s
Montana Lt., Mont	£2⅝	£2⅜
New California, Colo.	8s. 6d.	7s. 6d.
New Consolidated	4s.	3s.
New Emma, S., Utah	5s.	4s.
New Hoover Hill, N. C.	3s.	2s.
New La Plata, Colo.	3s. 6d.	3s 6d.
Pittsburg Cons., Nev.	£2¼	£2⅜
Plumas Eureka, Cal.	£⅞	£⅝
Richmond Con., Nev.	£4¼	£4
Ruby&Dunderberg, Nev	4s.	3s.
Russell Gold, N. C.	4s. 6d.	3s. 6d.
Sierra Buttes, Cal.	£¾	£⅛
Stanly, N. C.	£1⅛	£⅝
Union Gold, Colo.	4s. 6d.	4s.
U. S. Placer, Colo.	£⅞	£⅝
Viola Lt., Idaho	39s.	37s.
*Paris Quotations.**		
Boleo	650	650
Golden River	470	470
" parts.	97.50	97.50
" obligations	120	120
Lexington.	86	86
" parts.	5.50	5.50

Highest and lowest prices February 11th.
* Francs.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last			Dividends. Total paid	Date and amount of last		
1	Adams, S. L.	Colo.	$1,500,000	150,000	$10	*				$555,000	Jan.	1887	.15
2	Alice, S. C.	Mont	10,000,000	400,000	25	*				750,000	Sept	1886	.06¼
3	Alturas, G	Idah.	1,500,000	300,000	5					95,000	Sept	1886	.50
4	Amie Con., S. L.	Colo.	5,000,000	500,000	10	*				330,000	Oct.	1883	.05
5	Amy & Silversmith, S.	Mon.		341,419						247,530	Aug	1887	.12½
6	Atlantic, C.	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	420,000	Feb.	1888	1.50
7	Argenta, S	Nev.	10,000,000	100,000	100	[illegible]	July	1885	.10	40,000	Feb.	1880	.20
8	Aurora, I.	Mich.	2,000,000	100,000	20					155,000	Oct	1887	1.87½
9	Bassick, G. S.	Colo.	10,000,000	100,000	100	*				400,000	Mar.	1884	1.00
10	Belle Isle, S.	Nev.	10,000,000	100,000	100	145,000	Feb	1887	.20	300,000	Dec.	1879	.25
11	Belcher, G. S.	Nev.	10,400,000	104,000	100	2,614,000	Sept	1887	.50	15,397,200	Apl.	1876	1.00
12	Bellevue Idaho, S. L.	Idah.	1,250,000	125,000	10	57,500	Nov.	1887	.25	187,500	Jan	1887	.10
13	Big B'nd Hydraulic, G	Dak.	1,000,000	200,000	5	*				253,000	Aug	1887	.03
14	Black Bear, G.	Cal.	3,000,000	30,000	100	22,500	Dec.	1884	.25	895,000	May	1883	.20
15	Bodie Con., G. S.	Cal.	10,000,000	100,000	100	450,000	Feb.	1888	.50	1,295,000	Apl.	1885	.50
16	Bonanza Developm't	C & M	3,000,000	300,000	10					135,000	Oct.	1882	.15
17	Bonanza K'g, Cons. S.	Cal.	1,000,000	100,000	10	*				185,000	Feb.	1885	.10
18	Boston & Mont, G.	Mont	2,500,000	250,000	10	*				520,000	Jun	1886	.15
19	Breece, S.	Colo.	5,000,000	200,000	25	*				2,000	Feb.	1880	.01
20	Brooklyn Lead, L. S.	Utah	500,000	50,000	10					127,000	July	1887	.05
21	Bulwer, G.	Cal	10,000,000	100,000	10	60,000	July	1887	.20	175,006	Jan.	1884	.10
22	Caledonia, G.	Dak	10,000,000	100,000	100	505,000	May	1885	.15	40,000	Feb.	1886	.10
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000				29,350,000	July	1887	5.00
24	Carbonate Hill, S. L.	Colo.	3,000,000	200,000	10	*				80,000	Apl.	1884	.05
25	Caribou Con., S.	Colo.	1,500,000	150,000	10	*				50,000	Mch	1880	.10
26	Castle Creek, G.	Idah.	100,000	100,000	1					51,000	Oct.	1883	.03
27	Catalpa, S. L	Colo.	3,000,000	300,000	10	*				270,000	May.	1884	.10
28	Central, C	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,860,000	Feb	1888	2.00
29	Christy, S.	Utah	10,000,000	100,000	100					10,000	Jun.	1885	.10
30	Chrysolite, S. L.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec	1884	.25
31	Colorado Central, S. L	Colo.	2,750,000	275,000	10	*				282,500	Feb.	1888	.05
32	Cons. Cal. & Va., G. S.	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.20	1,468,000	Feb	1888	.50
33	Con. Gold Mining, G.	Ga.	500,000	100,000	5	*				108,000	Nov.	1888	.02
34	Contention, S	Ariz.	12,500,000	250,000	50					†2,587,000	Dec.	1884	.25
35	Crescent, S. L. G.	Utah	15,000,000	600,000	25					210,000	Aug.	1886	.05
36	Crown Point, G. S.	Nev.	10,000,000	100,000	100	2,725,000	Jan	1888	.50	11,588,000	Jan.	1875	2.00
37	Daly, S. L.	Utah	3,000,000	150,000	20					450,000	Jan	1888	.50
38	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*				§1,000,000	Nov	1887	.10
39	Derbec B. Grav., G. S.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	180,000	May	1887	.10
40	Dunkin, S. L.	Colo.	5,000,000	200,000	25	*				300,000	Mar	1888	.30
41	Eclipse	Colo.	100,000	100,000	1					20,005	Nov	1887	.10
42	Elkhorn, G. S.	Mont	1,000,000	100,000	10	50,000	July	1883	.50	170,000	July	1887	.05
43	Empire Lt., G.	Mont	500,000	100,000	5					7[illegible],500	Oct	1887	.37½
44	Eureka Con., G. S. L.	Nev.	5,000,000	50,000	100	600,000	July	1886	1.00	4,881,000	Mar	1888	.25
45	Evening Star, S. L.	Colo.	500,000	50,000	10	*				1,400,000	Nov	1883	.50
46	Excelsior, G.	Cal.	10,000,000	100,000	100	560,000	Sept	1885	1.00	875,000	Oct.	1880	.25
47	Father de Smet, G.	Dak.	10,000,000	100,000	100	200,000	Nov	1878	1.00	1,125,000	Dec.	1888	.20
48	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun.	1871		640,000	Jan.	1885	1.00
49	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*				190,000	July	1886	.10
50	Fresno Enterprise, G	Cal.	5,000,000	100,000	50		Mch	1883	.10	110,000	July	1882	.10
51	Garfield Lt., G. S	Nev	500,000	100,000	5					44,730	Mar.	1887	.12½
52	Gould & Curry, G. S.	Nev.	10,800,000	108,000	100	4,197,000	Nov.	1887	.50	3,826,800	Oct.	1870	10.00
53	Grand Central, S.	Ariz.	1,000,000	100,000	10					625,000	Dec.	1882	.25
54	Grand Prize, S.	Nev.	10,000,000	100,000	100	570,000	Apl.	1886	.50	495,000	Mar.	1881	.25
55	Granite, S.	Colo.	125,000	125,000	1					6,250	May	1883	.01
56	Granite Mountain, S.	Mont	10,000,000	400,000	25					4,000,000	Feb.	1888	.50
57	Green Mountain, G.	Cal.	1,250,000	125,000	10	*				212,000	Nov.	1881	.07½
58	Hale & Norcross, G. S	Nev.	11,200,000	112,000	100	5,086,000	July	1887	.50	1,598,000	Apl	1871	5.00
59	Hall-Anderson, G.	N. S.	150,000	150,000	1					7,000	Jan.	1882	.05
60	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50					1,077,500	Dec	1887	.50
61	Hel'a Mg & Red, G. S. L	Mont	3,315,000	663,000	5	*				197,970	July	1886	.08
62	Holmes, S	Nev.	10,000,000	100,000	100	300,000	Sept	1885	.10	75,000	Apl.	1886	.25
63	Holyoke, G.	Idah	200,000	200,000	1					27,000	Feb.	1883	.10
64	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	4,043,750	Feb	1887	.20
65	Honorine, S. L.	Utah	500,000	250,000	2	25,000	Jun.	1883		125,000	Sept	1887	.05
66	Hope, S.	Mont	1,000,000	100,000	10	*				183,252	Oct.	1887	.25
67	Horn-Silver, S. L.	Utah	10,000,000	400,000	25	*				4,000,000	Nov.	1884	.50
68	Idaho, G.	Cal.	310,000	3,100	100					4,593,750	Jan.	1888	7.50
69	Ideal, S. L	Colo.	1,500,000	50,000	10	*				15,000	Oct.	1886	.05
70	Illinois, S	N. M.	100,000	100,000	1					25,000	Jan	1887	.25
71	Independence, S.	Nev.	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept	1879	.25
72	Indian Queen, S	Nev.	250,000	125,000	2					368,750	July	1883	.03
73	Inyo, G	Cal.	500,000	100,000	5	*				45,000	Apl.	1882	.05
74	Iron Hill, S	Dak.	2,500,000	250,000	10	82,500	Oct.	1885		156,250	Nov	1887	.07½
75	Iron-Silver, S. L	Colo.	10,000,000	500,000	20	*				2,200,000	Feb.	1888	.20
76	Jackson, G. S	Nev	5,000,000	50,000	100	10,000	Nov	1880	.20	45,000	Oct.	1886	.10
77	Jocuistita, S	Mex.	2,500,000	250,000	10					1,200,000	Feb.	1885	.50
78	Jumbo, G.	Colo.	2,000,000	200,000	10					35,000	Oct.	1887	.02½
79	Kentuck	Nev.	3,000,000	30,000	100	342,000	Nov	1881	.30	1,350,000	Dec.	1886	.10
80	La Plata, S. L.	Colo.	2,000,000	200,000	10	*				610,000	Sept	1882	.30
81	Leadville Cons., S. L. L	Colo.	4,000,000	400,000	10	*				423,000	Apl.	1887	.05
82	Lexington, G. S.	Mont	4,000,000	40,000	100	*				565,000	Jan.	1885	2.00
83	Little Chief, S. L	Colo	10,000,000	200,000	50	*				780,000	Mch	1885	.10
84	Little Pittsburg, S. L	Colo.	20,000,000	200,000	100	*				1,050,000	Mch.	1880	.50
85	Manhattan, S.	Nev	5,000,000	50,000	100	250,000	Dec	1887	1.00	437,500	Feb	1886	.25
86	Marguerite, G.	Cal.	500,000	25,000	20					18,750	Oct.	1882	.25
87	Marion Bullion, G	N. C	500,000							15,000	Jan.	1886	
88	Martin White, S.	Nev.	10,000,000	100,000	100	1,150,000	Mar.	1886	.25	140,000	Dec.	1886	.25
89	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*				122,500	Feb.	1888	5.00
90	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl	1888	1.00	1,820,000	Mar.	1876	
91	Mono, G	Cal.	5,000,000	50,000	100	616,000	Sept	1887	.50	12,500	Mar.	1886	.25
92	Montana, Lt., G. S.	Mont	3,300,000	660,000	5	*				1,845,93[illegible]	Jan.	1888	.25
93	Morning Star, S. L.	Colo.	1,000,000	100,000	10					750,000	Nov.	1887	.25
94	Moulton, S. G.	Mont	2,000,000	400,000	5	*				380,000	Dec.	1887	.07½
95	Mount Pleasant, G.	Cal.	150,000	150,000	1	*				150,000	Feb.	1887	.30
96	Mt. Diablo, S	Nev	5,000,000	50,000	100	137,500	Jun.	1880	2.00	80,000	July	1885	.20
97	Napa, Q	Cal.	700,000	100,000	7					290,000	Jan.	1883	.10
98	Navajo, G. S	Nev.	10,000,000	100,000	100	455,000	Jan.	1888	.30	325,000	Feb.	1885	.25
99	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*				30,000	Dec.	1885	.06¼
100	Northern Belle, S	Nev.	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	Apl.	1883	.50
101	North Belle Isle, S.	Nev.	10,000,000	100,000	100	250,000	Mar	1887	.50	130,000	Mar.	1888	.50
102	Ontario, S. L.	Utah	15,000,000	150,000	100					8,975,000	Feb.	1888	.50
103	Ophir, G. S	Nev.	10,000,000	100,000	100	4,059,440	Aug	1887	.50	1,595,800	July	1882	1.00
104	Original, S. C.	Mont	1,500,000	60,000	25	*				117,000	Dec.	1887	.05
105	Osceola, C	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	1,072,500	Dec	1887	1.00
106	Oxford, G	N. S.	125,000	125,000	1	*				34,500	Oct.	1885	.02
107	Paradise Valley, G. S	Nev.	10,000,000	100,000	100	47,000	Mar.	1882	.15	150,000	Apl.	1887	.10
108	Parrott, C.	Mont	1,800,000	180,000	10					155,000	Jan.	1888	.10
109	Peacock, S. G. C.	N. M.	2,000,000	200,000	10	*				60,000	Nov.	1886	
110	Pleasant Valley, G. S.	Cal.	10,000,000	100,000	100	10,000	Mar.	1884	.10	30,000	Dec.	1882	.05
111	Platus, G. S. C. L	Colo.	2,000,000	200,000	10	*				20,000	Feb.	1886	.10
112	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*				2,280,000	Feb.	1888	.40
113	Prussian, S. L.	Colo.	1,500,000	150,000	10					132,000	Jan	1883	.10
114	Quicksilver, pref., Q	Cal.	4,300,000	43,000	100					1,267,192	Feb.	1888	2.00
115	" com., Q.	Cal.	5,700,000	57,000	100					151,000	July	1882	.40
116	Quincy, C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862		4,770,000	Feb.	1888	4.00
117	Richmond, S. L.	Nev.	1,350,000	54,000	25	*				4,312,587	Jun.	1887	1.25
118	Ridge, C.	Mich.	500,000	20,000	25	220,000	Mar	1886	.50	100,000	Feb.	1880	.50
119	Rising Sun, S.	Dak.	750,000	150,000	5	*				52,000	May	1881	.07½
120	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
121	Robert E. Lee, S. L.	Colo	10,000,000	500,000	20					100,000	Dec.	1882	.50
122	Rooks, G.	Vt.	500,000	50,000	10	*				61,000	Apr	1885	.30
123	Savage, S.	Nev.	11,200,000	112,000	100	6,324,000	Sept	1887	.50	4,460,000	July	1869	3.00
124	Security L. Mg., Mfg.	Colo.	1,000,000	100,000	10	*				50,000	July	1884	
125	Shoshone, G.	Idah.	150,000	150,000	1					7,500	Apl.	1883	.01
126	Sierra Buttes, G.	Cal.	2,225,000	122,500	10					1,477,245	Oct.	1887	.31¼
127	Sierra Grande, S.	N. M.	2,500,000	500,000	5					860,006	Sept	1884	.25
128	Sierra Nevada, G. S.	Nev.	10,000,000	100,000	100	6,050,000	Dec.	1887	.25	102,000	Jan.	1871	1.00
129	Silver Cord, G. S. L.	Colo.	5,000,000	500,000	10					225,000	Nov.	1883	.25
130	Silver King, S.	Ariz.	10,000,000	100,000	100					1,950,000	July	1887	.25
131	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*				80,000	Nov.	1886	.02
132	Small Hopes Cons., S.	Colo.	5,000,000	450,000	20	*				3,112,500	Dec.	1887	.20
133	Smuggler, S. L.	Colo.	600,000	60,000	10					66,700	Aug.	1883	.25
134	Socorro, C	N. M.	250,000	[illegible],500	100					4,000	Mch	1882	.00¾
135	South Yuba, G	Cal.	2,000,000	[illegible]	50	*				150,000	Oct.	1881	.75
136	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan.	1881	.25
137	Standard, G. S.	Cal.	10,000,000	100,000	100	25,000	Oct.	1884	.25	3,565,000	Feb.	1888	.10
138	Stormont, S	Utah	500,000	[illegible]00,000	1	*				155,000	Nov.	1881	.05
139	St. Joseph, L	Mo.	1,500,000	150,000	10	*				844,000	Dec.	1887	.20
140	Surinam, G.	D. G.	3,000,000	[illegible]	5					105,000	Nov.	1887	.05
141	Swansea, S	Colo.	600,000	[illegible]	10	*				3,000	Dec.	1887	.02½
142	Syndicate, G	Cal.	10,000,000	100,000	100	38,729	July	1882	.15	48,308	Sept	1885	.10
143	Tip Top, S	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov.	1881	.20
144	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*				1,250,000	Apl.	1882	.10
145	United Verde, C.	Ariz.	3,000,000	300,000	10	*				97,500	Feb.	1884	.20
146	Valencia, S	N. H.	150,000	1,500	100					37,500	Apl	1886	2.50
147	Viola Lt., S. L.	Idah.	750,000	150,000	5					222,500	Dec.	1887	.12½
148	Vizina, S.	Ariz.	5,000,000	200,000	25					140,000	Apl.	1882	.10
149	Yankee Girl	Colo.	2,500,000	250,000	10					1,275,000	July	1887	.10
150	Yellow Jacket, G. S.	Nev.	12,000,000	120,000	100	5,44[illegible]	Dec	1885	.7[illegible]	2,184,000	Aug.	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value.	Assessments. Total levied.	Date & am'n of last.		
1	Agassiz Cons., S. L.	Colo.	$2,500,000	50,000	$50	*			
2	Allouez, C.	Mich	2,000,000	80,000	25	$577,000	Feb	1884	
3	Alpha Con., G. S.	Nev.	3,000,000	30,000	100	536,250	Jan.	1888	.87½
4	Alta, S.	Nev.	10,080,000	100,800	100	2,140,800	Nov	1887	.50
5	Amador, G	Cal.	400,000	200,000	2	*			
6	American Flag, S.	Colo.	1,250,000	125,000	10	300,000	Jun	1877	.50
7	Anglo-Montana, Lt.	Mon.	600,000	120,000	5				
8	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5				
9	Aspen Mg. & S., S. L.	Colo.	2,000,000	200,000	10				
10	Barcelona, G.	Nev.	5,000,000	200,000	25	*			
11	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	Jan.	1883	.10
12	Belmont, S.	Nev.	5,000,000	50,000	100	735,000	Apl.	1886	.10
13	Best & Belcher, G. S.	Nev.	10,080,000	100,800	100	2,004,190	Jan.	1888	.50
14	Big Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*			
15	Bi-Metallic, S	Mon.	5,000,000	200,000	25	*			
16	Black Jack, G.	Cal.	250,000	100,000	2½				
17	Black Oak, G	Cal.	3,000,000	300,000	10	*			
18	Boston Con., G	Cal	10,000,000	100,000	100	170,000	Nov	1883	.25
19	Bremen, S.	N. M	5,000,000	500,000	10	*			
20	Brunswick, G.	Cal.	2,000,000	400,000	5	*			
21	Bullion, G. S.	Nev	10,000,000	100,000	100	3,957,000	Aug.	1887	.50
22	Bye and Bye	Ariz.	1,000,000	100,000	10	*			
23	Calaveras, G.	Cal.	500,000	500,000	1	*			
24	Carisa, G.	Wy	500,000	100,000	5	*			
25	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*			
26	Cashier, G. S	Colo.	500,000	250,000	2	*			
27	Cen. Contin'l, G. S. L.	C & A	2,000,000	200,000	10	*			
28	Charles Dickens, G. S.	Idah	1,250,000	250,000	5	*			
29	Cherokee, G.	Cal.	1,500,000	150,000	10				
30	Chollar, S.	Nev.	11,200,000	112,000	100	1,208,000	Dec.	1887	.50
31	Cinnamon Mt., G. S	Colo	750,000	150,000	5				
32	Comstock, G. S	Nev.	10,000,000	100,000	100	30,000	Mar.	1887	.15
33	Con. Imperial, G. S	Nev.	5,000,000	50,000	100	1,175,000	Sept	1887	.25
34	Con. Pacific, G.	Cal.	6,000,000	60,000	100	177,000	Sept	1887	.15
35	Cons Silver, S	Mo.	2,500,000	250,000	10				
36	**Cop. Queen Cons. C.	Ariz	1,400,000	140,000	10				
37	Courtlandt	Colo	500,000	50,000	10				
38	Crescent, S. L.	Colo.	3,000,000	300,000	10	*			
39	Crocker, S.	Ariz.	10,000,000	100,000	100	80,000	May	1887	.10
40	Crowell, G.	N. C	500,000	500,000	1				
41	Dahlonega, G.	Ga.	250,000	250,000	1	*			
42	Dandy, S.	Colo.	5,000,000	500,000	10				
43	Dardanelles, G.	Cal.	1,000,000	100,000	10				
44	Decatur, S	Colo.	1,500,000	300,000	5	*			
45	Denver City, S. L	Colo.	5,000,000	500,000	10	*			
46	Denver Gold, G	Colo.	300,000	60,000	5				
47	Deseret, G. S.	Utah	500,000	50,000	10	*			
48	Durango, G.	Colo	500,000	500,000	1	*			
49	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	1.00
50	El Cristo, G. S	U.S.C	1,000,000	500,000	2				
51	El Dorado, G	Cal.	1,000,000	250,000	4	*			
52	El Talento, G	U.S.C	1,000,000	500,000	2				
53	Empire, S.	Utah	10,000,000	100,000	100				
54	Eureka Tunnel, S. L	Nev.	10,000,000	100,000	100	*			
55	Exchequer	Nev	10,000,000	100,000	100	770,000	Feb.	1888	.20
56	Found Treasure, S.	Nev.	10,000,000	100,000	100	12,000	Jan.	1888	.06
57	Gogebic I. Syn., I	Wis.	5,800,000	200,000	25				
58	Gold Cup, S	Colo.	500,000	500,000	1	*			
59	Golden Era, S.	Mon.	2,000,000	200,000	10	*			
60	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.2[illegible]
61	Gold Rock, G	Cal.	1,000,000	500,000	2	*			
62	Goodshaw, G.	Cal.	10,000,000	100,000	100	*			
63	Grand Belt, C	Tex.	12,000,000	120,000	100				
64	Grand Duke	Colo.	800,000	80,000	10				
65	Great Romance, G.	U.S.C	1,000,000	500,000	2	*			
66	Gregory-Bootall, G.	Colo.	550,000	550,000	1	*			
67	Gregory Con., G	Mon	3,000,000	300,000	10				
68	Harlem M. & M. Co., G.	Cal.	1,000,000	200,000	5				
69	Head Cent. & Tr. S. G	Ariz.	10,000,000	100,000	100				
70	Hector, G.	Cal.	1,500,000	300,000	5				
71	Highland, C	Mich	500,000	25,000	25				
72	Hortense, S.	Colo.	2,000,000	200,000	10				
73	Huron, C	Mich	1,000,000	40,000	25	280,000	May	1887	3.00
74	Iron Gold & Silver, S	N. M.	2,000,000	200,000	10	*			
75	Ironton, I.	Wis.	1,000,000	[illegible]	25				
76	Iroquois, C	Mich	1,250,000	50,000	25				
77	J. D. Reymert	Ariz	10,000,000	100,000	100	*			
78	Julia Cons., G. S.	Nev.	11,000,000	110,000	100	1,650,000	Apl.	1887	.10
79	Kearsarge, C.	Mich	1,250,000	50,000	25	190,000	Oct.	1887	1.00
80	Laclede	N. M.	2,000,000	200,000	10	*			
81	Lacrosse, G.	Colo.	1,000,000	100,000	10	*			
82	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	*			
83	Lochiel, S.	N. M.	2,000,000	200,000	10	*			
84	Lucerne, S.	Colo	5,000,000	500,000	10	*			
85	Mammoth Bar., G.	Cal.	10,000,000	100,000	100	50,000	Dec.	1881	
86	May Belle, G.	Cal.	10,000,000	100,000	100	84,000	Mar.	1884	.15
87	Mayflower Gravel.	Cal.	1,000,000	100,000	10	300,000	Jan.	1888	.40
88	Medora, G	Dak.	250,000	250,000	1				
89	Mexican, G. S	Nev.	10,000,000	100,000	100	2,700,760	Jan.	1888	.25
90	Middle Bar, G.	Cal.	400,000	200,000	2	*			
91	Mike & Starr, S. L.	Colo	1,000,000	200,000	5	*			
92	Monitor, G.	Colo.	100,000	100,000	1	*			
93	Moose Silver, S	Colo.	3,000,000	300,000	10	*			
94	Native, C.	Mich	1,000,000	40,000	25				
95	Neath, G	Colo.	1,000,000	100,000	10				
96	Nevada Queen, S.	Nev.	10,000,000	100,000	100	130,000	Dec.	1887	.50
97	New Germany, G	N. S.	100,000	100,000	1	*			
98	New Pittsburg, S. L	Colo.	2,000,000	200,000	10	*			
99	North Standard, G.	Cal.	10,000,000	100,000	100	20,000	Nov		
100	Noonday	Cal.	600,000	60,000	10	208,000	Dec.	1881	.10
101	Oneida Chief, G.	Cal.	500,000	125,000	4	*			
102	Oriental & Miller, S.	Nev.	10,000,000	400,000	10				
103	Osceola, G.	Nev.	5,000,000	50,00	25	*			
104	Overman, G. S.	Nev.	11,520,000	115,200	100	3,737,180	Aug.	1887	.25
105	Park, S.	Utah	2,000,000	200,000	100				
106	Peer, S.	Ariz.	10,000,000	100,000	10	135,000	Nov.	1886	.10
107	Peerless, S.	Ariz.	10,000,000	100,000	100	320,000	Sept	1887	.25
108	Phœnix	Ariz.	500,000	500,000	100				
109	Phœnix, G. S.	Ark.	5,000,000	200,000	1	*			
110	Phœnix Lead, S. L	Colo.	100,000	100,000	25	*			
111	Pilgrim, G.	Cal.	600,000	300,000	1	*			
112	Potosi, S	Nev.	11,200,000	112,000	2	1,293,600	Nov.	1887	.50
113	Proustite, S.	Idah	250,000	250,000	100	*			
114	Puritan S. G.	Colo.	1,500,000	150,000	1	*			
115	Quincy	Colo.	3,000,000	300,000	10				
116	Rappahannock, G. S.	Va.	250,000	250,000	10	*			
117	Red Elephant, S.	Colo.	500,000	500,000	1	*			
118	Ropes, G. S.	Mich	2,000,000	80,000	1	103,200	July	1887	.50
119	Russell, G.	N. C.	1,500,000	300,000	25				
120	Sampson, G. S. L.	Utah	10,000,000	100,000	5	188,157	Mar.	1887	[illegible]
121	San Sebastian, G.	San S	1,600,000	[illegible]	5	*			
122	Santiago, G.	U.S.C	400,000	1,200,000	2	*			
123	Security, S.	Colo.	10,000,000	1,000,000	10				
124	Sheridan	N. M.	2,000,000	200,000	10				
125	Silver Queen, C.	Ariz.	5,000,000	200,000	25	*			
126	South Bulwer, G	Cal.	10,000,000	100,000	100	100,000	May	1881	.25
127	South Hite	Cal.	10,000,000	100,000	100	195,000	Jan.	1883	.05
128	South Pacific	Cal.	500,000	100,000	5				
129	Stanislaus, G	Cal.	2,000,000	200,000	10				
130	State Line, S.	Nev.	250,000	250,000	1				
131	St. Kevin, G. S.	Colo.	100,000	100,000	1	*			
132	St. Louis & Mex., S.	Mex.	5,000,000	500,000	10	*			
133	St. Louis & St. Elmo	Colo.	2,000,000	200,000	10				
134	St. L. & St. Felipe, G. S.	Mex.	1,500,000	150,000	10				
135	St. L. & Sonora, G. S.	Mex.	1,500,000	150,000	10				
136	St. Louis-Yavapai	Ariz.	3,000,000	300,000	10	*			
137	Sunday Lake, I.	Mich	1,250,000	50,000	25				
138	Sullivan, G. S. L.	Me.	500,000	100,000	5	125,000	Dec.	1882	.25
139	Sutro Tunnel	Nev.	20,000,000	2,000,000	10	*			
140	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	Apl.	1885	3.00
141	Taylor-Plumas, G.	Cal.	1,000,000	200,000	5	10,000	Feb.	1888	.03
142	Tioga Cons., G.	Cal.	10,000,000	100,000	10	*			
143	Tornado Cons., G. S.	Nev.	100,000	100,000	1	*			
144	Tortilita, G. S	Ariz.	1,000,000	100,000	2	*			
145	Tuscarora, S.	Nev.	10,000,000	500,000	100	110,000	Oct.	1881	.1[illegible]
146	Union Con., G. S.	Nev.	10,000,000	100,000	100	2,185,000	Nov	1887	.50
147	Utah, S.	Nev.	10,000,000	100,000	100	70,000	Dec.	1887	.25
148	Washington, C.	Mich	1,000,600	40,000	25				
149	West Granite Mt., S.	Mon.	5,000,000	500,000	10	*			
150	Zelaya, G. S	C. A.	600,000	300,000	2	*			

G. Gold. S. Silver. L. Lead C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid $1,400,000. Non-assessable for three years. § The Deadwood previously paid $275,000 in eleven dividends, and the Terra $75,000 Previous to the consolidation in Aug., 1884, the California had paid $31,320,000 in dividends, and the Con. Virginia $42,390,000. Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid $1,350,000 in dividends.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb. 18. H.	Feb. 18. L.	Feb. 20. H.	Feb. 20. L.	Feb. 21. H.	Feb. 21. L.	Feb. 22 H.	Feb. 22 L.	Feb. 23. H.	Feb. 23. L.	Feb. 24. H.	Feb. 24.	SALES.
Adams, Colo.											.55		100
Alice, Mont													
Argenta, Nev.													
Atlantic, Mich.													
Belcher, Nev.													
Blue Isle, Nev.													
Bodie Cons., Cal.			2.30		2.30	.60			2.40	2.35	2.30		2,500
Breece, Colo.									.51	.50			400
Bulwer, Cal													
Caledonia, Dak					1.90				1.90		1.85		610
Calumet & Hecla											246¾		20
Catalpa													
Chollar, Nev.													
Carysolite, Colo.													
Colorado Cent'l, Colo.													
Cons. Cal. & Va., Nev.					16.00	14.38			15 00		15.50	15.13	585
Crown Point, Nev			7.13		6.88								500
Deadwood, Dak			2 05	2.00	2.05	2.00					2.00		929
Dunkin, Colo.									1.50		1.55		150
Eureka Cons., Nev	12.38	12.25	11.75		12.00						12.00	11 25	706
Father de Smet, Dak.	.53	.51	.61	.58	.60	.57			.58	.57			3,100
Freeland, Colo.													
Gould & Curry, Nev.													
Grand Prize, Nev.													
Green Mountain, Cal.													
Hale & Norcross, Nev.													
Helena, Mont.													
Holyoke, Idaho			.06		.06						.08		4,500
Homestake, Dak.			11.75								11.50		110
Horn-Silver, Ut.	1 25	1.20	1.15		1.25	1.20			1 25	1.10	1.25	1.20	3,800
Independence, Nev.													
Iron Hill, Dak.													
Iron Silver, Colo.			4.05		4.05	4.00							2,100
Leadville C., Colo.													
Little Chief, Colo.													
Little Pittsburg, Colo.													
Martin White, Nev.													
Mono, Cal.			1.85		1.90				1.85		1.85		1,300
Mount Diablo, Nev.									4 25				200
Navajo, Nev.			1 55		1.70								200
North Belle Isle, Nev.					7.75				7.75				400
Ontario, Ut	28.50								28.50		28.00		235
Ophir, Nev.									10.00				50
Pewabic Mich.													
Plymouth, Cal.	17 63	17.00			17.00				16 75				220
Quicksilver Pref., Cal	36.00		36.25	36.00					35 50		35.75	35.25	1,600
Com., Cal.	11.00								11.00				300
Quincy, Mich.											73.63		25
Ridge, Mich.													
Robinson Cons., Colo.			.90										100
Savage, Nev.	6 75										6.13		300
Sierra Nevada, Nev.					4 70						4 50		400
Silver King, Ariz.					4.80				5.00		5 25		160
Small Hopes, Colo.									3.10		3.00		200
Standard, Cal.			2.95								2.95	2 90	400
Stormont, Ut.													
Yellow Jacket, Nev.			9.50				8 88				8 75		400

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb. 18. H.	Feb. 18. L.	Feb. 20. H.	Feb. 20. L.	Feb. 21. H.	Feb. 21. L.	Feb. 22. H.	Feb. 22. L.	Feb. 23. H.	Feb. 23. L.	Feb. 24. H.	Feb. 24.	SALES.
†Allouez, Mich.					2 75								100
Alta, Nev.	2.25		2.20		2.15						2.10		700
Amador, Cal.	1.70		1.70	1.65	1.65						1.65		1,300
Barcelona, Nev.											.45		100
Best & B'lcher, Nev.			6.63										150
Brunswick, Cal.	1.65		1.65		1.65						1.65	1.55	1,800
Bullion, Nev.			2.10		2.10	2.00					2.10		6 5
Carupano, Venez.													200
Cashier, Colo	.09		.11	.09	.09	.08					.10	.09	4,700
Castle Creek, Id.											.11	.10	2,500
Central Ariz., Ariz.													
Con. Imperial, Nev			3.10								2.75		700
Con. Pacific													
Denver City Colo.													
*Eclipse, Colo.													
Eastern Oregon													
El Cristo, U. S. Col.	1.60	1.40	1.55	1.40	1 70	1.60						1 60	1.45	2,750
Exchequer, Nev.			1.55		1.70						1 60		1.60	660
Found Treas'e, Nev.													
Hector, Cal.			.40		.50								400
Huron, Mich.													
Julia, Nev.			.60		.60						.65		.55	1,000
Kingst'n & Pemb'ke	2.25													200
Kossuth, Nev.			.18	.15							.17			600
Lacrosse, Colo														
Lee Basin, Colo.											.55			1,000
Mexican, Nev.					5.25									100
Middle Bar, Cal.	.35		.37		.38						.37	.36	.38	.36	3,100
Monitor, Colo.	.11		.11		.12						.12				2,200
†National, Mich.					3.88										100
Nevada Queen, Nev															
North Stand'd, Cal.															
Pri'nt'l&Mil'r, Nev.													.60		400
Phœnix of Arizona											.35		.40		500
Potosi, Nev.															
Proustite, Idaho	2.30	2.10	2.15	2.00	2.05	2.00					2.10	2.00	2.10	2.00	12,700
Rappanana'k, Va.	.20		.21	.20							.20		.20		3,300
Red Elephant, Colo.															
San Sebastian, S'nS	2 95		2.95		2 95										295
Santiago, U. S. Col.	3.30		3.30	3.25	3 30										200
Scorpion, Nev.											1.00		.95		700
*Security, Colo	1.00	.98	1.10	1 00							.90		.90		400
Silver Cliff, Colo.															800
Silver Cord															
Silver Hill															
Silver Mg. of L. V															
Silver Queen, Ariz.											.04				2,000
Sutro Tunnel, Nev.	.15	.14	.15	.11							.15	.14	.14		3,800
Taylor Plumas, Cal.															
Tornado, Nev.	.80		.80		.90	.80					.90		.90		2,000
Union Cons., Nev.			4.80										4.50		325
Utah, Nev											2.00		1.90		200
Washington, Mich.															
†Winthrop															

Dealt in at the New York Stock Ex. Unlisted Securities † Dealt in at the Metal Ex. Dividend shares sold, 26,991. Non-dividend shares sold, 57,290 Total New York, 84,281.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Feb. 17.	Feb. 18.	Feb. 20.	Feb. 21.	Feb. 22.	Feb. 23.	SALES.
Atlantic, Mich.	20.00	19 88	20.00	20.00		19.75	815
Bodie, Cal.							
Bonanza D.			1.60	1.38	1.63	1.63	1.50	500
Boston & Mont., Mont							
Breece, Colo.			.60	.60	.60			900
Calumet & Hecla, Mich	246	238	248	244	250	249	250	219	247	1,513
Catalpa, Colo.							.25			100
Central, Mich.	24.00									25
Con. Cal & Va., Nev.	17.00									10
Dunkin, Colo.	1.83	1.78	1.63	1 65	1.60					1,675
Enterprise										
Eureka, Nev.										
Franklin, Mich.	16.88	16 38	16.75	16.63	17.00	16.50			16.38	16 00	1,863
Freeland, Colo.										
Hale & Norcross										
Ironton Iron Co., Mich										
Little Chief, Colo.										
Napa, Cal.	1.63						1 75	1.50	1,830
Osceola, Mich.	26.00	25 50	25.88	25.63	25 88	25 63	26 00	25 00			24.00	23.50	895
Pewabic, Mich.					3.25	2 50	3.00	2.50			3.00	2.75	1,525
Quincy, Mich.	71.75	71.25	71.50	71.25	72.75	71 75	72.00				72.00		681
Ridge, Mich.					2.88		2.00				2.75	2.50	460
Robinson, Colo													
Sierra Nev., Nev.													
Silver King, Ariz.											5.00		50
Standard, Cal													

NAME OF COMPANY.	Feb. 17.	Feb. 18.	Feb. 20.	Feb. 21.	Feb. 22.	Feb. 23.	SALES.
Allouez, Mich.	2.75		2.63		2.63	2 50			2.50		1,700
Arnold, Mich.					.60		.60				300
Aztec, Mich.											
Bowman Silv'r, Nev											
Brunswick, Cal.			1.65				1.65		1.65		800
Canada											
Crescent, Colo.	.12										100
Cusi, N. Mex.	.12		.11		.10						500
Gogebic											
Hanover, Mich											
Humboldt, Mich.	.80										100
Hungarian, Mich.	.28										100
Huron, Mich.	5 38		5.50	5.38	5.50	5 38	5 50	5.38		5.25		925
Kearsarge, Mich.	8.25		8.25	8 00	8.25	8.00	8 13	7.88		7.75	7 50	1,794
Kossuth, Nev.							.16					100
Mesnard												
National, Mich.	3.88	3.81	3.75		3.75		3.88					650
Native, Mich.	3.75											100
Oriental & M., Nev.												
Pont'ac, Mich												
Rappahannock, Va							.20			.20		900
Royal, Mich												
Security, Colo			.95									100
South Side, Mich.												
St. Louis, Mich.	1.00		1.00				1.00					1,800
St. Mary's							.40			.40		500
Sutro Tunnel, Nev.	.17									16		700
Tamarack, Mich	171	170	170		172	171	172	171			171		276
Washington Mich.							.45						200
Winthrop, Mich.													

Boston: Dividend shares sold, 12,642. Non-dividend shares sold, 11,645. Total Boston, 24,287.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	Feb. 18. H.	Feb. 18. L.	Feb. 20. H.	Feb. 20. L.	Feb. 21. H.	Feb. 21. L.	Feb. 22. H.	Feb. 22. L.	Feb. 23. H.	Feb. 23. L.	Feb. 24. H.	Feb. 24. L.	Sales.
Cameron Coal	100													
Ches. & O. RR.	100	3¾		3¼	3					3		3	2¾	805
*Chic. & Ind. Coal RR.	100					41⅜	41½			40½				300
Do. pref.	100													
Col. & Hocking Coal	100	26¾		26¾		26¾	26½					26⅝	26⅜	800
Col., C. & I	100	39	38¼	38⅝	38	38⅜	38			38⅞	38½	38⅞	38½	2,295
Consol. Coal	100													
Cumb. C. & I.	100													
Del. & H. C.	100	110⅝	110	110	109⅝	110	109⅝			109⅜	109⅝	109½		2,210
D., L. & W. RR.	50	131¼	131	131	130⅝	130⅞	130¼			130⅞	130⅜	131¼	130½	46,560
Hocking Valley	100					21½	21							200
Hunt. & Broad Top														
Lehigh C. & N.	50	48¼		48¼	47⅞									535
Lehigh Valley RR.	50	56½		56		56½				56½	56			191
L. & W. C. & I. Co.														
Marshall Con. Coal	100													
Maryland Coal	100					13	12							400
Montauk Coal	100													
Morris & Essex	50	139¼	138½											81
New Central Coal	100													
N. J. C. RR.	100	80⅝	80	80½	80	80⅝	79½			81¼	80⅝	81⅜	80¾	18,680
N. Y. & S. Coal	50													
N. Y., Susq. & Western	100	9½								8⅞				70
Do. pref	100	32¾										32¾	32½	410
N. Y. & Perry C. & I.	100													
Norfolk & Western R.R.	100													
Do. pref.	100	45½	45	45⅝	44⅞	45	44⅞			45¾	45	45⅞	45¼	6,256
Penn. Coal	50													
Penn. RR.	50	54⅝	54½	54⅝	54¼	54⅜	54⅛			54⅜	54¼			2,532
Ph. & R. RR.**	50	67⅝	66¾	66⅞	66¼	66½	65⅞			66⅞	66½	67	66⅜	198,888
Spring Mountain	50													
Tennessee C. & I. Co.	100	32		31⅛	31	31⅛				31¼	31	31⅜		1,465
Westmoreland Coal	100													
Whitebreast Fuel Co.						96¾	96½			97				30

**Of the sales of this stock 61,403 were in Philadelphia, and 137,485 in New York. Total sales, 283,018.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS. Feb. 17.	Feb. 18.	Feb. 20.	Feb. 21.	Feb. 22	Feb. 23.
Alpha						
Alta	2.10	2.10	2.05	2.00	2.00	1.95
Belcher						
Belle Isle	.65	.65	.70			
Best & Bel.	6.25	6.37½	6.00	5.62½	5.62½	5.50
Bodie	2.25	2.30	2.35	2 45	2 45	2.25
Bulwer		.85	.80	.80	.80	
Chollar	5.62½	5.62½	5.62½	5.12½	5.12½	5.00
Commonwealth.	4.30		4.12½	4.00	4.00	
Con. C. & V	15.37½	15.37½	15.75	14.75	14.75	14.75
Con. Pac.						
Crown Pt.	6.62½	6.75	8.87½	6.37½	6.37½	6.12½
Eureka C.	12.25	12.00	12.00	11.50	11.50	11.50
Gould & C.	4.55	4.85	4.65	4.45	4.45	4.30
Hale & N.	9.62½	9.75	9.75	9.50	9.50	9.00
M. White						
Mexican	5.00	5.50	5.37½	5.25	5.25	5.12½
Mono			1.90	1.90	1 90	1.90
Mt. Diablo				4.50	4 50	4.50
Navajo	1.65	1.65	1.90	1.80	1.80	1.65
Nev. Queen	3.85	3.80	3.85	3 85	3 85	3.85
N. Belle I.	7.37½	7.50	7.50	7.50	7.50	7.50
Ophir	9 75	9.87½	10.00	9 62½	9 62½	9.87½
Potosi	5.37½	5.50	5.25	4 90	4.90	4.85
Savage	6.50	6.62½	6.37½	6.87½	5.87½	6.00
Scorpion						
Sierra Nev.	4 85	5.00	6.37½	5.87½	4.50	4.40
Sutro Tun.						
Tip Top						
Union Con.	4.25	4.50	4.25	4.05	4 05	4.10
Utah	1.80	1.95	1 85	1.80	1.80	1.75
Yellow Jkt.	9.12½	9.00	9 12½	8.75	8 75	8 50

on the market, and while probably true, the statement can not be verified. Three hundred tons of old rails sold at $21.85. Stocks are low. Pipe and skelp iron are dull. The prospects of agreement among nail makers are helping the market. Spike orders were taken at $2.15. No. 1 scrap is going at $21

FINANCIAL.

NEW YORK, Friday Evening, Feb. 24.

Mining Stocks.

There is nothing of interest to report in the mining market, and the situation remains as last week. The total transactions for the week amounted to only 84,281 shares.

Horn-Silver was one of the most active stocks on the list, and is firm at from $1.15@$1.25. Ontario remains unchanged at from $28@$28.50. The company has just declared its usual monthly dividend of $75,000, making a total to date of $8,975,000.

Carupano attracts but little interest. No sales are reported this week. A few were made last Saturday at from $2.05 to $2.10.

San Sebastian rules at $2.95.

Santiago shows some activity at from $3.25 to $3.30.

Rappahannock remains unchanged at from 20 to 21c.

Silver King shows an advance—going from $4.80 to $5.25.

The largest sales were again made in Proustite; the price opened last Saturday at $2.20 and closed to-day at $2. Castle Creek records sales at 10 and 11c., and Holyoke at 6 and 8c.

The Comstocks show a decline all along the list. Consolidated California and Virginia Mining Company went from $16 to $14.38 but to-day advanced again to $15.50. Yellow Jacket declined from $9.50 to $8.88. Sierra Nevada from $4.70 to $4.50. Savage from $6.75 to $6.13. Ophir shows one sale at $10. Crown Point went from $7.13@$6.88. Union Consolidated from $4.80@$4.50. Utah from $2@$1.90. Consolidated Imperial from $3.10@$2.75. Alta from $2.25 @$2.05. Best & Belcher was firm at $6.63, and Bullion at from $2@$2.15.

Eureka Consolidated shows transactions of over 700 shares, also at declining prices, which went from $15.38 @$11.25. Phœnix of Arizona shows a few transactions at from 35 to 40c.

North Belle Isle was firm at $7.75. Navajo advanced from $1.55 to $1.70. Belle Isle shows a few sales at from 69 to 70c. Tornado at from 80 to 90c.

Father de Smet continues to demand attention, and shows a further advance, going from 51c. to 61c. Homestake is neglected, and is selling at from $11.50 to $11.75. Deadwood-Terra is quiet at from $2 to $2.05. Caledonia declined from $1.90 to $1.85.

Transactions in the copper stocks, which includes those at the Consolidated Stock and Petroleum and Metal exchanges, of this city, are small. A sale of 25 shares of Quincy was made to-day at $73.63; 20 shares of Calumet & Hecla changed hands to-day at $246.75. National is quoted at $3.88, and Allouez at $2.75.

The Colorado stocks were neglected. Iron Silver remains firm at from $4 to $4.05. Robinson was neglected, at 90c. Dunkin shows a few transactions at from $1.50 to $1.55. Breece at from 50 to 51c. But little life is nowadays infused into Security by its manipulators, and the price shows but little change from week to week. A few shares changed hands at from 98c. @ $1.10. Cashier shows more activity and larger sales than for some weeks past. The price remains at from 8@11c. Lee Basin is quoted at 55c.; Small Hopes at from $3@$3.10.

Quicksilver Preferred opened at $36.25, but sold to-day at $35.25. Common shows transactions at $11.

Plymouth Consolidated shared in the decline of all the stocks, and went from $17.63 to $16.75.

Bodie Consolidated was quite active at from $2.30 to $2.40. Standard was firm, at from $2.90 to $2.95. Mono, at from $1.85 to $1.90. Hector shows sales in the beginning of the week from 40 to 50c., but was quoted to-day at 25c.

The event of the week was the decline of Brunswick, which was due to the sudden death of Mr. Charles Adler, who was one of the principal owners of the stock. The price has ranged from $1.55 to $1.65 for months past. No sales of this stocks were made to-day—it was offered, it is said, at $1.30. The last sale yesterday was made at $1.55. The company is said to have a good property, which shows favorable prospects.

Sutro Tunnel was firm at from 14 to 15c.

Auction Sale of Stocks.

The following securities were sold at auction in this city on the 21st inst.: 100 shares Little Pittsburg Consolidated Mining Co., $100 each, $30; 50 shares Iron Cliffs Co., $50 each, $58.50; 10,000 shares Horn-Silver Mining Co., of Utah, $25 each, $1.15 per share; 50 shares Iron Cliffs Co., $50 each, $57 per share.

Meetings.

The annual and special meetings of the following companies will be held on the dates given:

Alturas-Senate Mining Company, No. 50 Exchange place, New York City, March 6th, at three o'clock P.M.

Florence Mining Company, No. 112 North Fourth street, St. Louis, Mo., March 3d. Special meeting for the purpose of voting upon a proposition to increase the capital stock of said company from $500,000 to $2,500,000.

Osceola Consolidated Mining Company, No. 69 Devonshire street, Room 20, Boston, Mass., March 8th, at twelve o'clock noon.

Preston Coal and Improvement Company, No. 227 South Fourth street, Philadelphia, Pa., March 7th, at twelve o'clock noon.

Sloss Iron and Steel Co., Birmingham, Ala., March 14th, at twelve o'clock noon.

Assessments.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of sale.	Am'nt per share.
Alpha Cons., Nev...	23	Jan. 9	Feb. 15	Mar. 6	.87½
Alpha M. & M., Nev.	1	Jan. 9	Feb. 15	Mar. 6	.25
Anchor, Utah......	4	Feb. 7	Mar. 10	Mar. 31	.20
Baker Divide, Cal....	15	Jan. 7	Feb. 13	Feb. 29	.25
Best & Belcher, Nev.	39	Jan. 4	Feb. 9	Mar. 2	.50
Bodie Cons., Cal.....	8	Feb. 13	Mar. 20	Apr. 26	.50
Bullion, Dak.........	4	Feb. 4	Mar. 10	Apr. 2	.00¼
Climax, Dak	2	Jan. 4	Feb. 4	Feb. 27	.00
Commonwealth, Nev	6	Dec. 29	Feb. 6	Feb. 28	.50¼
Cora, Dak...........	1	Jan. 31	Mar. 6	Mar. 23	.01½
Crown Pt., Nev	25	Jan. 4	Feb. 8	Feb. 29	.50
Equitable, Utah......	33	Feb. 14	Mar. 30	May 9	.15
Eva, Nev............	6	Jan. 5	Feb. 10	Mar. 5	.05
Exchequer, Nev.....	25	Feb. 7	Mar. 13	Apr. 4	.20
Flowery, Nev........	5	Jan. 13	Feb. 17	Mar. 9	.20
Found Treasure, Nev	2	Jan. 31	Mar. 7	Mar. 28	.06
Genesee, Nev	1	Jan. 10	Feb. 14	Mar. 6	.03
Golden Fleece, Cal...	12	Jan. 28	Mar. 15	Apr. 10	7.00
Heath, Idaho.......	3	Feb. 8	Mar. 19	Apr. 13	.05
Keyes, Nev	1	Feb. 15	Mar. 20	Apr. 16	.20
Mexican, Nev	35	Jan. 17	Feb. 21	Mar. 13	.25
Mayflower, Cal......	40	Jan. 19	Feb. 23	Mar. 16	.50
Mono, Cal.	25	Dec. 20	Jan. 24	Feb. 28	.50
Morning Star, Nev...	3	Jan. 13	Feb. 15	Mar. 3	.01¾
Navajo, Nev.........	18	Jan. 10	Feb. 14	Mar. 6	.30
North Bonanza, Nev.	8	Jan. 10	Feb. 15	Mar. 14	.15
Paradise Valley, Nev	4	Jan. 28	Mar. 1	Mar. 23	.10
Pioche, Cons., Nev...	4	Dec. 30	Feb. 4	Mar. 22	.20
Pittsburg, Cal........	20	Feb. 15	Mar. 17	Apr. 6	.75
Quartz Mt., Cal......	20	Jan. 17	Feb. 20	Mar. 15	.70
Rattler-Gilroy, Dak..	10	Jan. 21	Feb. 24	Mar. 14	.01½
San Francisco, Nev..	2	Feb. 3	Mar. 10	Apr. 3	.40
Spanish, Cal.........	2	Jan. 4	Mar. 10	June 2	.04
Spring Valley, Cal...	2	Jan. 11	*Mar17	*Apr16	.50
Summit-Red Bird, Utah............	4	Jan. 31	Mar. 10	Mar. 28	.15
†Taylor-Plumas, Cal.	3	Feb. 20	Mar. 31	.....	.03

* The delinquent day and day of sale were postponed to dates given above.

† Stockholders who paid the voluntary assessment No. 2 will be credited with the same on surrendering the company's obligation to repay said assessment out of the first earnings of the mine.

Dividends.

Eureka Consolidated Mining Company, of Nevada, has declared monthly dividend, No. 82, of twenty-five cents per share, or $12,500, payable March 1st, at Messrs. Laidlaw & Co.'s, No. 14 Wall street, New York City.

Manufacturers' Natural Gas Company has declared dividend, No. 1, of three-quarters of one per cent, payable March 1st.

North Belle Isle Mining Company, of Nevada, has declared a dividend, No. 4, of fifty cents per share, or $50,000.

Ontario Silver Mining Company, of Utah, has declared a dividend, No. 141, of fifty cents per share, or $75,000, payable February 29th, at Messrs. Lounsbery & Co.'s, No. 15 Broad street, New York City.

Rochester & Pittsburg Coal and Iron Company, of Walston, Pa., will pay coupons due March 1st, on the first mortgage bonds, on presentation after that date at the Gallatin National Bank, No. 36 Wall street, New York City.

Pipe Line Certificates.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Feb. 18.....	90c.	90c.	88⅞c.	89⅝c.	642,000
20......	88⅞	88⅞	88	88⅜	786,000
21......	88¾	89⅛	87⅛	87⅞	2,531,000
22......	....	....	...	....	... .
23......	88	89⅝	87½	89⅝	1,649,000
24......	89⅝	91¼	88¾	89⅛	4,002,000
Total sales in barrels					9,610,000

Boston Mining Stocks. Feb. 23.

[From our Special Correspondent.]

The market for copper stocks the past week has been quite active, with Calumet & Hecla as the main feature. The advance of last week in this stock continued until it reached $250, which is the highest point touched for several years. The buying has been good and evidently by those who are well posted as to the relations of the company to the syndicate, and who expect to realize handsome profits above present prices, as well as good returns for their investment. The market opened at $238 and steadily advanced with hardly a break until it culminated at $250, as the point beyond which it was not allowed to go, and with only a slight reaction, a few shares only being sold to-day at $247@$248.

Quincy has also been in good demand, and advanced to $72¾, a gain of $2¾ for the week, closing at $72. Tamarack holds steadily at $170@$171, with small sales at $172. The balance of the list has been rather inclined to weakness, more stock coming out than was anticipated. This was the case with Franklin, an effort was made to advance the price, and $17 was

IMPORTATIONS.

Tin Plates.	Week ending Feb. 18. Boxes.	Year 1888. Boxes.
Bruce & Cook	2,328	11,685
Central Stamping Co	......	1,371
Coddington & Co., T. B	3,158	22,258
Cort & Co., N. L	1,159	15,807
Cons. Fruit Jar Co	......	425
Crooks & Co, Robert	1,322	9,343
De Mill & Co., H. R	......	1,651
Dickerson, Van Dusen & Co.	5,111	41,970
Lalance & Grosjean Mfg Co	......	215
Merchant & Co	......	1,205
Mersick & Co., C. S	......	1,306
Morewood & Co., G	......	1,983
Naylor & Co	645	645
Phelps, Dodge & Co	8,023	49,256
Pratt Mfg Co	......	26,974
Shepard & Co., Sidney	......	421
Thomsen & Co., A. A	5,587	23,089
Whittemore & Co., H	......	4,790
Wolff & Reesing	500	900
Wright & Sons, Peter	133	165
Total	27,966	215,456
To corresponding date in 1887	23,882	162,658

Tin.	Tons.	Tons.
Abbott & Co., Jere.	......	612
American Metal Co	5½	5½
Crooke Smelt. & Refin. Co	......	51
Dickerson, Van Dusen & Co.	......	10
Hendricks Bros	......	38
Naylor & Co	5½	435½
Phelps, Dodge & Co	......	45
Thomson & Co., D	......	36
Total	11	1,233
To corresponding date in 1887	642	1,747

Pig-Iron.	Tons.	Tons.
Abbott & Co., Jere	......	500
Baldwin Bros. & Co	......	100
Bartlett & Co., N. S	100	1,200
Crocker Bros	300	1,700
Crooks & Co., R	100	600
Dana & Co	......	300
Henderson Bros	......	400
Lee & Co., James	......	100
Milne & Co., A	......	15
Sanderson & Sons	......	2
Stetson & Co., G. W	550	2,200
Williamson & Co., Jas	......	600
Total	1,050	7,717
To Corresponding date in 1887	2,750	6,450

Bar-Iron.	Tons.	Tons.
Abbott & Co., Jere	......	1,067
Abeel Bros	......	3
Bacon & Co	......	13
Lilienberg, N	......	5
Lundberg, Gustaf	......	112
Milne & Co., A	......	95
Naylor & Co	......	25
Page, Newell & Co	......	20
Philip, C. M	......	20
Wallace & Co., W. H	......	12
Totals	......	1,372
To corresponding date in 1887	11	1,051

Scrap-Iron.	Tons.	Tons.
Brown Bros. & Co	......	20
Burgess & Co	......	172
Geisenheimer & Co	......	565
Muller, Schall & Co	15	15
Neumark & Gross	......	36
Trowbridge & Co., D	......	75
Ward & Co., J. E	......	50
Total	15	933
To corresponding date in 1887	55	2,728

Iron Ore.	Week ending Feb. 18. Tons.	Year 1888. Tons.
Earnshaw, A	528	1,482
De Flornes, R	......	689
Naylor & Co	......	350
Wright, Chas. L. & Co	500	500
Total	1,028	3,475
To corresponding date in 1887	855	3,167

Spiegeleisen.	Tons.	Tons.
Abbott & Co., Jere	......	5
Crocker Bros	21	144
Geisenheimer & Co	......	8
Jansen, J. A	1,641	5,153
Naylor & Co	...	546
Total	1,641	5,856
To corresponding date in 1887	4,095	10,659

Steel and Iron Rods.	Tons.	Tons.
Abbott & Co., Jere	450	1,833
American Screw Co	150	232
Bacon & Co	......	86
Carey & Moen	......	197
Dana & Co	300	305
Downing & Co., R. F	......	12
Galpin, S. A	......	360
Heyn, A	100	773
Leng, J. S	......	17
Lundberg, Gustaf	......	115
Milne & Co., A	......	1,006
Montgomery & Co	......	35
Muller, Schall & Co	25	150
Naylor & Co	232	1,979
Page, Newell & Co	......	152
Pierson & Co	10	......
Roebling's Sons, J. A	18	449
Walschid Co	5	......
Washburn Mfg. Co	......	35
Whittemore & Co	1,000	.....
Wolff & Co., R. H	35	450
Total	2,325	9,201
To corresponding date in 1887	2,385	14,025

Steel Blooms, Billets' Slabs.	Tons.	Tons
Abbott & Co, Jere	50	128
Lalance, Grosjean & Co	2	2
Mersick & Co	5	5
Milne & Co., A	......	456
Muller, Schall & Co	5	5
Naylor & Co	......	12
Pierson & Co	15	15
Roebling's Sons, J. A	......	98
Wallace, W. H & Co	5	5
Total	82	726
To corresponding date in 1887	1,454	8,696

Old Rails.	Tons.	Tons.
Brown Bros. & Co	......	668
Crossman & Bro., W. H	......	1,005
Frankfort, M	......	100
Geisenheimer & Co	......	100
Neumark & Gross	......	1,810
Stetson & Co., Geo. W	......	230
Total		4,013
To corresponding date in 1887	3,604	21,310

Spelter.	Tons.	Tons.
American Metal Co., Lt	......	102
Friedensville Zinc Co	......	23
Total		125
To corresponding date in 1887	98	286