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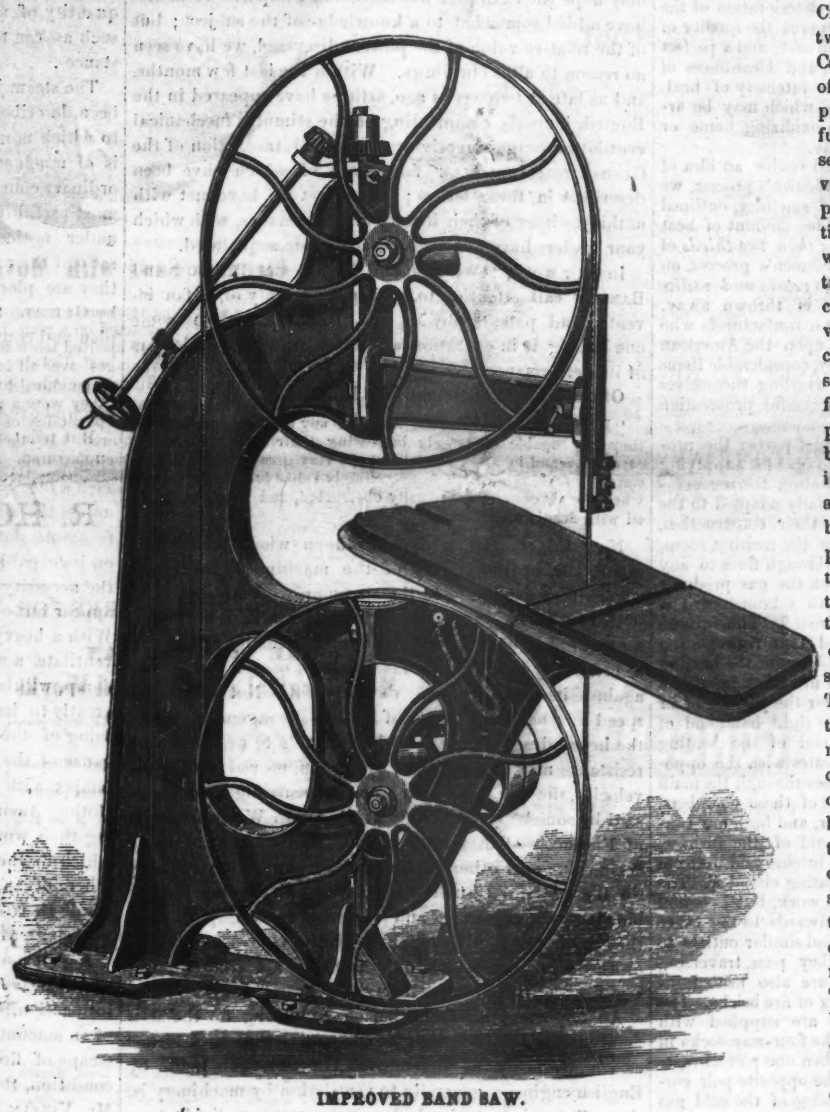
IMPROVED BAND SAWING MACHINE.

The accompanying cut represents an Improved Band Sawing Machine, to which is invited special attention. With this machine three-fourths of the time and labor may be saved in sawing irregular or curved work, and at a small extra charge is furnished fitted to the table, a patent splitting gauge, and a slide rest, with which the machine may be used to advantage in splitting and squaring straight stock. The machine is portable with a heavy iron frame; the table can be adjusted for sawing any bevel on straight or curved work; this is oftentimes a great convenience and saving of time and labor. The guides and support for the saw are firm and conveniently adjusted to any required height. The wheels are 37 inches in diameter; driving pulleys 12 inches in diameter, and should make 350 to 400 revolutions per minute. The table is 36 inches square, and the clearance between saw and frame is 36 inches. The machine will saw 12 inches in thickness. Its weight is 1,400 lbs. For machines or further information apply to HAMPSON & COPELAND, No. 89 Liberty street, New York city.



IMPROVED BAND SAW.

Purification of Iron Ores.

The question of removing sulphur and phosphorus from iron still stands before the practical world as an important, well-known, yet unsolved problem. It is the bridge with which we expect some day to connect the metallurgical practice of the present day to a future far more advanced, and a scientific system of metallurgy, to be arrived at by the gradual yet constant advancement and development of science and knowledge. We have recorded many attempts to remove phosphorus and sulphur from pig iron, from liquid steel, and from wrought iron, but we have not had a single instance of practical success to place before our readers. The general conclusions which seemed to force themselves upon the minds of metallurgists, by the results of all those unsuccessful experiments, were, as a rule, unfavorable to the treatment of iron in its more advanced stages of manufacture, and pointed to the blast furnace, if not to the calcining kiln, for the purification of the substances charged into them. Seeing, in fact, how difficult it was to remove sulphur and phosphorus from iron, if these substances are once combined with that metal, it becomes a question for investigation whether such a combination could not be prevented by removing from the raw materials all those substances which form the sources of these noxious contaminations when reduced in the smelting furnace.

The simplest means of improving the charges, and the one which suggested itself without much thought or science, was the mixing of phosphoric ores with others free from phosphorus, and thereby diluting the noxious impurity. This process is more effective than would appear at first sight. Given two kinds of ore, the one contaminated with sulphur to an extent which will make the iron produced from it unfit for the intended use, and another ore containing phosphorus to a similar extent, it is obvious that a mixture of the two ores will produce an iron which will be superior to that produced from either of the two kinds of ore when smelted by itself. The practice of mixing different ores for the blast furnace charges is, therefore, not a mere production of an average quality from superior and inferior kinds of raw materials, but it is, when properly carried out, attended by an actual improvement of the make of iron over the products derivable from any one of the ores mixed together when smelted singly and without other admixtures.

The next step to be recorded in that direction is the practice of washing iron ores after calcination. This, too, is at present an old established process, but one which has been rarely used on account of the expense and inconvenience which was thought necessarily connected with this mode of purification. The washing process is applied exclusively for the removal of sulphur, and it is altogether without any effect upon the phosphorus that may be contained in the ore. The rationale of the washing process is the following:—An iron ore contaminated with pyrites, such as, for instance, the spathic ore or brown hematite of Styria, Rhinish Prussia, of the Weardale District, and of other localities, when submitted to calcination, under the free access and influence of the air, takes up a certain quality of oxygen, and by that process the pyrites and other similar combinations of sulphur and iron become converted into sulphates of iron, which are soluble in water. If after calcination the ore is washed with a large quantity of water and for a considerable length of time, all those soluble salts, and with them the component sulphur will be removed from the ore, which remains in a more or less purified state, according to the more or less efficient manner in which the calcination and washing have been effected. We have had occasion to describe two ironworks on the Continent where purification from sulphur is most effectively attained by washing the calcined ore previous to its being smelted, viz., the Kladno Ironworks in Bohemia, where forge iron for puddling is the staple article, and the Ironworks Maria Zell, in Styria, producing foundry iron and Bessemer pig iron.

We now pass from the record of processes in practical existence to a new method of purifying iron ores now under experiment in this country, and patented by Mr. Thos. Rowan, of Glasgow. This is a process of purification from sulphur and from phosphorus by calcination and subsequent washing, only the calcination in this instance is not a mere oxidising process as now practiced, but the ore is mixed with chorides, such as common salt or chloride of manganese, and calcined in contact with these substances. Such a calcination is well known to metallurgists, particularly to those accustomed to the extraction of copper and silver from their ore. It is called a chloridising calcination, as distinguished from the common or oxidising calcination, and its effect is to convert many of the substances contained in the ore into chlorides. The effect of calcining an iron ore containing sulphur and phosphorus in contact with common salt (chloride of sodium) would be the decomposition of the salt by the action of the sulphur and the formation of sulphate of soda and the liberation of the chlorine, which combine with all the bosic matter contained in the ore, such as lime, magnesia, etc., and also with the phosphorus. The idea of removing phosphorus from iron by the action of chlorine was originated by Dr. Crace Calvert, of Manchester, more than twenty years ago, but it appears that Dr. Calvert expected a gaseous combination of phosphorus and chlorine to be found and passed off as a vapor either from the blast furnace or calcining kiln. Mr. Rowan's researches seem to show that none of the volatile combinations of chlorine and phosphorus are formed during such a calcination, but that a combination is formed which is soluble in water, and can be extracted from the ore by washing after the calcination is completed. The effect of washing the ore after this chloridising calcination is the removal of the sulphate of soda and of the chlorides of phosphorus formed in that process. The sulphur and phosphorus pass into the water, and can be recovered from it if desirable, but the insoluble residue is an iron ore purified to a considerable extent, and fit for use in the blast furnance after the moisture is evaporated. It has been proposed, at one of the great ironworks in the Cleveland district, to effect this calcination by charging the ironstone mixed with salt into the calcining kilns now in use, but this is not a suitable mode of working on a large scale. The time for calcination, and particularly that for washing, should be ample, and much greater than can be allowed in the calciniug kiln. The calcination should be carried on close to the mines in very large heaps covered at the top and connected at the bottom with flues which lead into a chimney. The salt mixed with the ore, or, still better, dissolved in water and sent into the calcining heap in the form of small jets or streams of brine, would act upon the mass for any desirable length of time. The whole calcining heap should, after being burnt out, be immersed with water, or be percolated by a large stream or body of water for several weeks. After this the ore may be sent to the smelting works, and the calcining kilns there will play the part of evaporators only. They will dry the ore and heat it to some extent previous to being charged into the blast furnace.

The question of trouble and inconvenience will thereby be transferred from the iron master to the mine owner, and it will resolve itself simply into a question of price per ton of purified ore. Considering that the removal of sulphur and phosphorus from Cleveland pigs would raise their market value at least £1 per ton, and taking 3 tons of calcined ore for the ton of iron made, it is clear that the process of washing can be paid for at the rate of, say, 5s. per ton of ore, and have an advantage to those who use the washed ore instead of the raw ironstone. The quantity of salt required depends upon the quantity of phosphorus contained in the ironstone, but it will scarcely exceed 5 per cent. of the weight of iron ore in any case. The value of the salt added may be estimated therefore at 6d. per ton of ore, leaving a margin of 4s. 6d. for the expenditure of calcination and washing. This is a figure which ought to afford a very handsome profit to those who undertake the purifyiug process on a large scale. The Upleathan mines and others in the Cleveland District are almost within sight of the sea, which would afford both the salt for calcination and the water for extracting the heap when

calcined. The process, although hardly tried on a scale which could be called practical, as yet deserves the utmost attention of every intelligent iron master and owner of ironstone mines. Its theory is supported by a great deal of experimental evidence, and the importance of the problem that Mr. Bowan has so far tried to solve, justifies the commencement of experiments on a full working scale without hesitation and delay. We look upon experiments of that kind as a question of national importance. A purification of the phosphoric iron ores of this country means no other thing but the universal and unreserved substitution of steel manufacture instead of the manufacture of iron and the application of steel in all modern constructions; it is equivalent to a saving of an enormous value now annually destroyed by the wear and tear of the inferior materials produced from impure iron ores, and to a direct increase in the national wealth, amounting to many millions per annum.—*Engineering*.

Adoption of the Siemen's Regenerative Gas Furnace at Pittsburg.

DESCRIPTION OF ITS OPERATIONS.

From a lengthy article in the *Protectionist* on the Pittsburg, Pa., steel works, we make the following extracts relative to the Sieman's Furnace at the steel works of Messrs. ANDERSON & WOOD, to whom belongs the credit of its introduction into this country. Says the writer: "No better evidence of the energy and enterprise which characterizes this establishment could be adduced than their adoption and successful operation of the Regenerative Gas Furnace, invented by Messrs. C. W. & F. Siemens, of London. This invention, which is founded upon philosophical principles, is evidently destined to revolutionize the business of manufacturing steel. The inventors claim: 1. Unlimited command of heat, without intense chimney draught; 2. Great purity and gentleness of flame, which largely diminished the oxidation or deterioration of the material heated in the furnace, and improves the quality of the product; 3. Increased durability of furnace, and a perfect uniformity of heat; 4. Saving of space, and cleanliness of operation; 5. Complete command of the intensity of heat, and of the chemical nature of the flame, which may be arrested, or changed from a reducing to an oxidizing flame or the reverse; 6. Complete absence of smoke.

"In order to convey to the uninformed reader an idea of the immediate benefits derived from the Siemen's process, we may state that in the ordinary process of smelting, outlined above, the waste of heat is enormous. The amount of heat thus wasted has been estimated at *not less than two-thirds* of the whole heat and combustion. The Siemen's process, on the other hand, is expressly designated to *retain and utilize* that portion of heat which in furnaces is thrown away. Messrs. ANDERSON & WOOD were the first manufacturers who had the enterprise to adopt the process upon the American continent. The outlay of time and money, considerable items of themselves, failed to deter them from availing themselves of everything science can afford in the successful prosecution of their business.

"Siemen's furnace consists of two distinct parts: the producer, in which the fuel is converted into gas for supplying the furnace, and the furnace proper, including the regenerators. The gas producers, which are especially adapted to the consumption of coal, are quite simple in their construction, and may be located either in or outside of the melting room, the gas being conducted to the furnace through flues to any required distance. [The distance between the gas producer and the furnace in ANDERSON & WOOD's establishment is about twelve feet, both being under one roof.] The furnace proper is composed of one heating and four regenerating chambers. The latter, which are placed beneath the heating chamber transversely, and are filled with fire brick in such a manner as to leave space between them for the passage of air and gas, work in pairs, the two under the right hand end of the furnace communicating with that end of the heating chamber, while the other pair communicates with the opposite end. The gas from the producer passes through the main gas flue and enters at the bottom of one of these chambers, whilst air enters the neighboring chamber, and both are conducted through passage outlets at one end of the furnace, where mingling, they produce at once an intense and uniform flame, which distributes itself over the heating chamber. The heat is not released after performing its work, but is bound to an endless round of duty. Passing onwards to the other end of the furnace, the combined gases find similar outlets to that which they entered, down which they pass, traversing the two remaining regenerators, which are also heated intensely, and there arrested by the packing of fire bricks. The passage between the four regenerators are supplied with valves and deflecting plates, which are like four-way cocks in their action, and are easily reversed. When one pair of regenerators has become fully heated; and the opposite pair correspondingly cooled, by the upward passage of the cold gas and air, the valves are reversed, the separate currents of gas and air enters at the bottom of the heated regenerators, and taking up the heat stored in them, convey it back to the furnace, thus two of the regenerators are always accumulating heat which would otherwise be wasted, and which, when the valves and deflecting plates are reversed, is carried back to the furnace, by fresh currents of air and gas, which, as they pass upwards through these heated regenerators, attain a temperature equal to a white heat before they meet and ignite in the furnace, thus adding the carried heat to that due to their chemical action. The furnace, it is estimated, carries forward to be evolved by the chemical action of combustion about four thousand degrees of heat, while that carried back by the regenerators is about three thousand. The action of the furnace is so effectual and perfect that the gases which enter the stack through the waste flue to be cast into the air, will not exceed three hundred degrees Fahrenheit.

"The furnace constructed by Messrs. ANDERSON & WOODS admits twenty-four pots, holding seventy-five pounds, enabling them to turn out ten thousand eight hundred pounds of steel in twenty-four hours (day and night). The product, we need scarcely add, is equal to any article ever imported into this country."

[From the Marquette (Mich.), *Plaindealer*, Aug. 27, 1868.

JOURNAL OF MINING.—This is undoubtedly the ablest mining paper published in America, and we would recommend it to every resident of this region, who are the least interested in mining affairs. It is a large and neatly-printed sheet.

Practical Letters.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

ON THE VENTILATION OF COAL MINES.—NO XVIII.

BY J. W. HARDEN, M. E.

In further corroboration of the view he assigns as a reason for strictures on the first series of these papers, your contributor, Mr. ROTHWELL, says of my notice of the fan, as well as of the air pump, that it was "so lightly passed over." Turning, however, to No. 8 of those articles, we find the following:

"Of the fan, as applied to the ventilation of coal mines, I need say but little; it is the means generally adopted in our own country, where natural ventilation is not sufficient; and is therefore pretty generally known. It is much used in Belgium also, and there are some good examples of it there; but, applied to deep mines, in no instance do the results obtained appear to bear comparison with those of the furnace. For shallow pits, on the other hand, it is without question much superior. In England, mechanical appliances generally have not received the attention some of them deserved; objection being made to their greater liability to derangement, as compared with the furnace; but for the comparatively shallow mines, the fan is becoming deservedly popular. There are several varieties of it. GUIBAL'S, FABRY'S LETORET'S and PASQUET'S, all of Belgium, are good; but the first two are looked upon as the best. From GUIBAL'S, results have been obtained, varying up to more than 100,000 cubic feet of air per minute, with a water gauge pressure representing 15 1-2 lbs. on the square foot."

In going over the ground again, as we have done, we may hope the examples adduced, and comparisons made, have added somewhat to a knowledge of the subject; but of the relative value of the powers discussed, we have seen no reason to alter our views. Within the last few months, and as late as two weeks ago, articles have appeared in the English journals, commenting on the stimulus mechanical ventilation is again receiving, from the introduction of the GUIBAL and LEMIELLE fans, both of which have been described in these letters; but as yet we have met with nothing, either of their history or performance, with which your readers have not been already made acquainted.

In their work, "Coal Iron and Oil," Messrs. DADDOW and BANNAN call attention to, and speak highly of, a fan invented and patented by Mr. J. L. BEADLE; perhaps some one having it in operation will favor us with particulars of its performance.

Of the fan and air pump, Mr. ROTHWELL says:

"By simply increasing the speed of any of these ventilators, they are capable of largely increasing their ordinary working capacity," and he adds, 'This, and the very great resistance they can overcome, renders them exceedingly valuable after explosion, when the air courses are usually obstructed, and the mine is filled with deadly after-damp."

Now this condition depends upon whether, and how much, the ordinary *duty* of the machine is below its "working capacity." In the air pump we have seen that, with the dimensions necessary to mine ventilation, there is a great objection to speed; and in the velocity of the fan, as ordinarily constructed, has consisted one of the reasons against its more general development. Not only does speed increase the liability of both to derangement, but in the heavy drags we are told they are able to overcome, the resistance may be such, that, by the fan, moved with great velocity, the passage of air from the centrifugal force—as said by somebody very lately at the South Wales Institute of Engineers—"may be very small indeed." And as to their value over other means after air explosion; not only do these fearful casualties *obstruct* the air courses, but, by blowing out crossings, and throwing down partitions, they more frequently change the entire course and action of the air; upon which, only as these are restored, can any ventilating power be brought to bear.

An important consideration in providing for the artificial ventilation of a mine, is the selection of such means as cannot easily be deranged. The objection made by English engineers generally to ventilation by machinery is, that all moving mechanical contrivances are liable to a disarrangement and fracture of their parts; that with the stoppage of machinery, the mine becomes unventilated; whereas, with the furnace, ventilation is continued some hours, (I have known it to last for days) after the extinguishment of the fire.

To appreciate the force of this objection, it is necessary to understand thoroughly the amount of responsibility and consequent anxiety involved, in the management and working of a fiery colliery. Ventilation under such circumstances can not go wrong for the smallest space of time, without great risk; the men and horses may be lifted out of danger, but this can not be done without loss. It is true, that, to meet contingencies, duplicate machines may be erected, as recommended by a commission of inquiry on the subject, twenty years ago; and I make no doubt, but that in the more fiery mines of England, with the adoption of mechanical ventilation, such a course will become general, if not universal. The step has been taken at the Elscar Colliery. A second fan, smaller than that I described on page 178, has been put up, to be used only in the event of the larger one, at any time, getting out of order.

By the furnace, properly constructed and applied, we have seen that large volumes of air are circulated. Ordinarily speaking, with shafts of sufficient depth, it is the most simple, steady, and efficient of the powers used, and, as far as we have yet seen, the most economical. It has been recommended and employed in England, because in the majority of cases it has proved itself sufficiently effective, and especially the least liable to derangement. It is, moreover, the least costly in erection, even though a dumb drift be required.

Its less liability to derangement Mr. ROTHWELL does not consider "by any means proved;" he ignores a fact needing no demonstration: that the more parts there are in a machine, the greater will be its liability to derangement—a fact, but for which the Elscar Colliery proprietors would have spared themselves the outlay for an auxiliary fan.

Turning this discussion to a practical account, we are brought to the conclusion, that there are circumstances under which either of the powers discussed may be rightly or wrongly applied; and that there are variations in the construction of each, varying again in degrees of merit.

The waterfall naturally, is an accidental condition of things; applied to ventilation artificially, it can be looked upon only as a temporary expedient.

With conditions in ventilation the reverse of desirable, there is in the principle of the air pump a power to overcome resistance, for which either of the other powers would be inadequate; but to circulate even a moderate quantity of air by it, requires a machine of dimensions such as can not be recommended under ordinary circumstances.

The steam jet is useful under circumstances such as have been described; and as a contingent in the many reverses to which mining operations by their nature are liable; it is of much service, and can be easily applied, but in the ordinary course of mining, the fans and the furnace are the most useful of the ventilating powers at present brought under notice—the measure of their values being in the ratio of their adaptability to the circumstances under which they are placed. Of fans, as far as we have yet seen, that by GUIBAL of Belgium has proved itself the best. Of the plan and construction of the furnace, local conditions will best dictate; and, in the adoption of either, their dimensions should be such as to place their "working capacity" much above their ordinary duty.

But whatever may be the power adopted, it is not possible to circulate a large volume of air through a mine, at such a rate of current as to answer all the purposes desired, unless the air ways are of corresponding dimensions. The recommendation of a power, the merits of which rest alone on its capability to overcome heavy drags, and by which the necessity of providing good sized air courses is left to appear but of secondary importance, is of itself pernicious. With a heavy drag, the velocity of the current necessity to ventilate a mine giving off but a small amount of fire-damp, will be such, as, in the swalling of the lights alone, greatly to incommode the men at their work; to say nothing of the danger of dragging the flame through the gauze of the lamp, in the more fiery mines. Miners will tamper with the regulators, pile up coals, and hang up clothes, their jackets sometimes, in the thirl connecting their working face with the intake air; circumstances which in themselves, may appear trivial, but which, with others of an equally trivial nature, assist to make up a whole that becomes important. Such acts of imprudence a milder current would not have suggested.

And it must be borne in mind that a powerful ventilator under heavy resistance, "wire-draws the air;" it brings into action its tensile property, relieves the face of the coal of an amount of pressure, and by so doing, facilitates the escape of fire-damp at a time, when, from its attenuated condition, the air has less power of dilution. As said by Mr. VIVIAN, some years ago, "the object should be to change the air as completely as you can, with as little current as possible." It is also necessary that the air courses should be of such size, that the men can travel them without discomfort; they ought not to find it, as I have often done, a work of labor to get through them; else, their duties will be most likely to be neglected.

In practice, the height of the air courses in a thick coal will be regulated by its partings; in a thin coal, by the parting at the floor and roof; but chance conditions ought not injuriously to affect their area. To say, as our friend does, that in deep and extensive mines, the conditions to be sought can be obtained "only by an expenditure which renders it impracticable," is to say very little for "the present practice of mining engineers."

[THE END.]

—It is designed to supersede in London the office of the lamplighter by a kind of clockwork arrangement attached to the taps of the street lamps, which shall turn them full on at stated times, every night, and shut them nearly off every morning, the gas being kept constantly burning during the day with a very small blue flame, duly protected against extinction by the wind.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

LESSONS ON MECHANICAL DRAWING—No. XX.

BY T. P. PEMBERTON.

SET-SQUARES FOR MAKING LETTERS.

I have explained in a former lesson, the two triangles or set-squares which are most useful to the draughtsman for the purpose of drawing hexagonal figures, section lines, etc. The angles of these triangles being 30°, 45°, 60° and 90°, are not altogether suitable for marking out letters for reference on a drawing, or for the general designation of the plan drawn; the title being usually put on with Egyptian, Roman, or Block letters, Italic, or other ornamental print.

Neat lettering and well-formed figures are highly conducive to the appearance of drawings, and generally receive close criticism. However well a drawing may be lined and colored slovenly or careless penmanship will mar and detract from its otherwise neat appearance.

Ordinary writing and common ink should be entirely discarded in mechanical and architectural plans. India Ink only should be used, and when letters of reference or words of description are required, they should be neatly written in Italic Print, and for a title or heading of a drawing, there are none that look better than Block and Roman letters.

Mr. W. B. HARRISON, Mechanical Editor of the AMERICAN JOURNAL OF MINING, in describing set-squares for making letters, furnishes the following instructive remarks and useful illustrations:

"Probably there is no art so difficult of attainment, and one in which so few persons are proficient, as that of making letters of the style called Roman; yet this letter is the one with which our books and papers are printed, and the one most commonly presented to the eye. However perfectly formed these letters may be when shaped by the art of the die-sinker, as seen in the impression produced by the printing types, yet sign-boards that at every step meet our eyes attest that upon them are many unsuccessful attempts to form well-proportioned letters. Among a few of the faults that are evident we will mention that the letters A, V, and W often encroach upon each other's premises, and if a vertical line were drawn between two of them more or less of each letter would be curtailed. That each letter must be inclosed within a space determined by right angles, as is seen upon a printer's type, seems not to have entered the mind of the artist. Proportioning the width of letters is another rare attainment, and giving the proper angles to such letters as are made in part with oblique lines, as A, M, N, V, W, X, Y, and Z, is a third fault. To criticise and correct the two faults first mentioned is not now our object, but, taking up the third and last one, we will give a few plain directions that may possibly be of some use to the artist and letter-painter.

"It will be observed that the angle in the lines of A differ from those of K, and both A and K differ in their angles from X and W; and a closer examination of well-proportioned letters will determine that the inclined portions of A, M, and V have the same angles, those of X, Y, and Z are similar, and K and W, the two remaining letters, are made in part with unlike oblique lines, and also differing from the others mentioned. It can then be resolved that there are but four angles in all these letters, and that if these angles could be determined, there would then be an easy rule by which to be governed in their formation.

"There are generally about three widths of letters used, the most common being the ordinary Roman, the same letter made narrower or occupying less width, and called 'condensed,' and the same made of greater width, and called 'extended.' Taste and circumstances determine the width of each kind, and as they thus differ the oblique lines of the letters so formed also differ. To approximate the proper angles for each of the three kinds, let the artist provide himself with three pieces of thin board, metal, or even thick paper, made with one side and the bottom at exactly right angles to each other; the other side is cut with four angles, as seen in the cuts. Fig. 1 shows the angles for the condensed letter, Fig. 2 those for the common Roman letter, and Fig. 3 the extended letter. It will be observed that one side of each form or set-square is divided into four equal parts, each appropriated to certain letters and varying in angle from its neighbor. The lower division gives the oblique lines of the W, the second those of A, M, N and V, the third those of X, Y, and Z, and the fourth and top are K. No exact guide can be given for these angles; as before remarked, taste and judgment must decide them. The artist can measure the angles of some good alphabet, and be governed by them in making his angles.

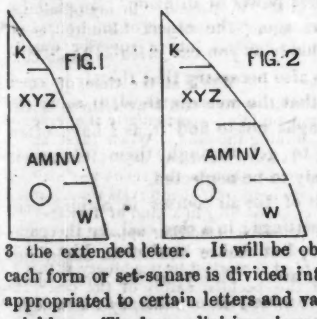


FIG. 1

FIG. 2

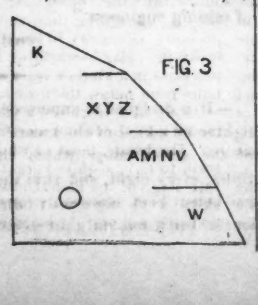


FIG. 3

"To use the instruments place the bottom portion upon a line drawn beneath the letters to be made, or the back can be similarly placed upon a vertical line, and the angles formed from the appropriate divisions. The draughtsman can use his T-square or parallel rule, which is adjusted so as to bring the divisions required between the lines forming the top and bottom of the letters, and make the lines as he would upon the beveled side of a triangular set-square.

"To persons who have difficulty in making letters upon plans or drawings the hints above given may prove of essential service, and although we have but given a 'hint' for the approximation of the angles of letters, yet to the ingenious artist who would pride himself upon a uniform style of letter, this hint will be acceptable, and can be carried out with the most satisfactory results.

Mining Summary.

GOLD AND SILVER.

California.

Southeastern Counties.—A correspondent of the San Francisco *Bulletin*, journeying through the southeastern counties of California, writes of mining affairs and the prospects generally of the country. His remarks on the recent "smoky" phenomenon, that has so puzzled well-shaken Californians, also upon the earthquakes, may not be out of place here. He says:—"As the smoky atmosphere of some weeks ago has not been fully cleared up in the minds of investigators, I wish to throw either more light, or mist, upon it by saying, that at the time it was experienced at San Francisco, and attributed to fires near by, that it was just as smoky all along the eastern slope of the Nevadas, also in the Inyo Mountains, east of them. During the continuance of the phenomenon—if such it may be considered—I was upon the summit of one of the high mountains of that region, and in a stratum of atmosphere above the smoky one. The division between the two was as clearly defined and as regular as a tightly-drawn cord could have made it. On the other side of the Nevadas they have been having earthquakes, of which no account has been taken. At the head of Kern River hundreds of shocks were experienced for days at intervals, and some so hard as to cause rocks to tumble down hill. This I did not experience myself, but have it from very reliable authority. During the past summer several severe shocks were felt at Cerro Gordo, Independence and Kearsage. One thing is certain; nature is not standing still. Another singular occurrence I must speak of. Owens Lake has no visible outlet, and for many years has remained at about the same height, rather receding if anything. After the earthquake of the 24th of July, it suddenly began to rise, and continued to rise until it had overflowed thousands of acres by its spreading waters, and at one time it was thought it would cut its way through to Little Lake. It as suddenly began to fall, and finally resumed its ordinary level. It was quite impossible for the water pouring into it to produce the rise, as the lake is some 30 miles long and 20 wide. As to the general prosperity of the Owen's River country, it may be considered as advancing. The farming interest has been profitable, and the mining prosecuted with more vigor. At Cerro Gordo have been developed some fine lodes and very rich ore. Several furnaces of a large capacity have been erected, which were not completed at the time of my visit, but I have since learned that some were a success and others a failure, on account of poor material of which they were made. One single successful furnace will of itself produce a very large amount of metal. This district is very rich unquestionably, in silver especially, but smelting is the only mode by which the ore can be extracted, in consequence of its being associated with copper and galena. In the other districts there has been more activity, and I may say success. Another season it will receive considerable impetus, as some will solve the problem of getting out the precious metals. This whole country is rich in gold and silver, but so peculiarly locked up that it has baffled a good deal of skill, experience and capital to get it out. The problem of cheap extraction also will undoubtedly be solved by some of the many now striving to do it. In traveling north I found the Nevadas on the eastern slope heavily patched with snow, which goes over into the next season—an unusual occurrence—which it has not been known to do for years, and the Indians say, for the coming winter, that there will be 'heaps sun.' Last winter they said 'heaps water,' but whether the 'heap know,' others much judge. I give the idea for the benefit of those who believe in Indian prophecies. Among other localities, I visited Hot Springs, in Mono County, and looked into the Danir process. The Doctor politely took me through and exhibited its process and results. I must say that I do not consider the Doctor fully does on a large scale what he can do on a small one, yet I am satisfied he is on the right track, and has made quite an advanced step. He certainly does, on a small scale, separate the precious from the baser metals by the smelting and oxidizing operations. That it can be done we must admit, for nature does it, and that is not past finding out. He should be encouraged and supported by the miners of this locality as a laborer in metallurgical science. This Hot Spring district is also rich in ore of a rebellious character. The ore has mostly been shipped to San Francisco and from thence to England, which fact of itself proves its richness, as transportation alone amounts to considerable of a figure per ton. The mining region about this place is comparatively low and very accessible for working, with a good climate. Journeying on, I found myself on the borders of Mono Lake. This is a fine sheet of water, and some fifteen or twenty miles in length and from eight to twelve miles wide. The water is alkali, and has no living thing in it. Thousands and tens of thousands of ducks cover its waters, but are very shy. In the center of this lake are springs boiling up of hot water, and many peculiar petrifactions are found thereabouts."

Nevada County.—The Grass Valley Consolidated Mining Company, an English incorporated company, has purchased of W. O. Sidney certain mining claims on Union Hill, Grass Valley, for £110,000. The sale includes the Bulger claims, and Doran, Murphy & Co's. claims on the McGrand ledge. The document requires $536 in stamps....The Empire mine, of Grass Valley, is opened to the depth of 800 feet, and the new hoisting works which are being erected are the finest in the State. The ledge is richer than any before worked in the mine. From three carloads of rock they took $2,000 in gold.....The Banner Mining Company are going to add ten more stamps to the mill, making 40 in all. A new and heavier engine is also to be up....The Idaho mine, from 350 tons of rock, realized from their clean up of Sept. 28 the comfortable sum of $14,410....The prospects in the Eureka district are extremely flattering. A crushing from Sweet's mine is now made at Palmer's mill, which is expected to yield from $15 to $20 per ton. The Birchville company have struck a rich shoot in their mine, and are taking out better rock than they have ever had before. It is expected to yield from $60 to $70 a ton. A crushing of 75 or 80 tons from the Banbury ledge, made at Black & Young's mill, was cleaned up a few days ago and yielded $4,000. A new claim, supposed to be on the Banbury ledge, is now being open, and is yielding as rich ore as was ever seen in the District.....The Bed Rock Tunnel Company, of Bridgeport Township, have completed their tunnel to a point under the channel for which they are running. The tunnel is 2,503 feet in length, 300 feet below the bed rock and 429 below the surface. When the shaft is raised it will give sufficient drainage to a number of excellent mining claims on Johnson's Hill.

Alpine County.—Says the Monitor *Miner*, Oct. 24:—"The Globe Tunnel is now 70 feet, and having struck much easier rock about ten days since, good headway is now being made. The rock is filled with sulphurets, and considerable water is encountered, showing the near proximity to the ore deposit for which the tunnel is running....The Imperial Company are having built, extending from the mouth of their tunnel across the river, a fine bridge or tramway, upon which the car will be run, dumping the rubbish upon the flat opposite the tunnel... The Pioneer mill is being put in readiness for reducing Star ore. The work of hauling ore down will soon be commenced....The building over the new hoisting works of the Morning Star Company goes on as fast as men can advantageously work.

Inyo County.—The Cerro Gordo mines are proving very rich. Specimens have been received from the Belmont mine which assay from $300 to $500 per ton. A number of tons from this mine have been shipped to San Francisco to Professor Price. The vein is of good size and promises to turn out a large quantity of ore. A shaft has been sunk on the vein to the depth of 150 feet, and the quality of the ore improves as the shaft goes down. The ores of the Cerro Gordo district are mostly of the smelting class, and as fluxes and fuel are abundant, they can be worked cheaply. Several furnaces are now at work in the district.

Placer County.—Capt. Fitch, Christman and Boggs have about 30 tons of quartz taken from the Grant and Colfax ledge, now at the Ophir steam-mill, awaiting to be crushed. The rock indicates great richness. Fay & Co., of the Green Emigrant claim, we are informed, have purchased the Golden Rule mill, and will commence moving it to the Green Emigrant claim to-day. It will be in full operation within thirty days. Thirty tons of rock from the Wahigreen claim, near Ophir, crushed a few days since, yielded over $80 per ton.

Calaveras County.—After a week's run of the Petticoat mill at Railroad Flat, Calaveras County, 85 ounces of gold were taken from the outside plates alone. The battery was not cleaned up, but the yield must be enormous if there is the usual disparity between the amounts generally taken from the outside and inside plates. When the fact that the mill had only been in operation a week, and that the battery is composed of but 10 stamps, is taken into consideration, some idea of the richness of the rock may be formed.

Kern County.—Carr, Potter & Booth cleaned up their arastra recently, and found $150 to the ton, and the rock now coming from the mine is richer than ever. Davis & Harrison cleaned up theirs, and got six pounds of hard amalgam from five tons of rock. Rasmason & Co. are also grinding away on rock which has been paying them at the rate of $150 per ton. New leads are being found every week, and the prospects are that Greenhorn will be one of the most thriving camps in this country.

San Bernardine County.—A rich ledge was struck recently about half-way between Graniteville and South Fork. It is large, well-defined, and miners think the rock will yield from $35 to $40 per ton.

Sierra County.—The Brush Creek Mill, Sierra county, recently cleared up $3,000 for three weeks' running.—The mining prospects in the vicinity of Tippecanoe, are excellent. In the claims of J. Rowland and B. Henry they have sufficient water to last nine months of the year.

Nevada.

QUARTERLY RETURNS OF BULLION PRODUCING MINES IN LANDER COUNTY.

The Austin *Reveille*, Nov. 9, has the Lander County Mine statement for the last passed quarter. Some errors having inadvertently crept into the editor's figures at that time, he takes occasion in a subsequent issue to point them out. We have amended his article according to his directions, and therefore present it to our readers within quotation marks. It reads as follows: "We give below a tabular statement of the proceeds of mines in Lander County for the quarter ending September 30, as compiled from the books of the County Assessor. The table contains the names of only 41 mines or companies, although the books of the Assessor give 159 entries of sources whence bullion was obtained. As many as 118 entries are specified by the names of the owners of the mines or of the individuals who sent the ore to mill. This was a prominent feature in the returns of the previous quarter, but it was worse in the last quarter. As long as the books of the County Assessor do not show all the mines or companies in the county which produced bullion during each quarter, they will possess little value, either at home or abroad. In spite of this defect in the present return, we believe it gives a correct exhibit of the total product of bullion in this county during the last quarter:

Mine or Company.	T's.	lbs.	Average pr T.	Mine or Company	T's.	lbs.	Average pr T.
Aurora (W P)	14	1,926	$208 72	Last Chance	12	1,832	$183 20
Aurora (W P) S Ex.	2	1,782	259 66	Montrose	8	1,481	100 14
Aurora	2	194	275 62	Mississippi	1	1,926	249 58
Blair (W P)	5	400	91 88	Magnolia	46	1,502	346 86
Buel North Star	343	866	355 56	Manhattan S M Co.	320	1,502	163 63
Chihuahua (Newark)	109	1,000	69 64	New York & Austin			
Chase S M Co.	5	1,494	488 01	S M Co.	97	446	277 16
Double Eagle	3	1,731	247 74	Napper Tandy (W P)	1	663	206 06
Diana S M Co.	7	1,650	161 94	Phœnix	1	629	26 48
Empire	3	1,312	119 22	Patriot Mine	1	1,458	76 18
Eberhardt (W P)	141	765	1,331 18	Plymouth S M Co.	7	1,894	368 19
Eclipse	1	352	564 48	Romulus (W P)	10	1,977	311 30
Featherstone (W P)	21	1,543	78 82	Silver Cloud	5	1,573	229 45
Fortuna	4	970	224 06	Summit	2	1,732	205 27
Genesee (W P)	79	869	166 52	South American	58	198	335 69
Green Mountain	3	450	938 81	Silver Chamber	12	464	480 40
Hidden Treas. (WP)	211	687	114 60	St. Louis (Cortez)	28	150	755 64
Hidden Treas. S Ex.	2	500	567 06	Savannah	1	1,824	264 46
Iceberg (W P)	5	1,155	282 88	Timoke	11	848	250 32
Indiana	12	1,947	112 46	Vedder Co.	1	346	124 74
Keystone (W P)	56	938	1,137 61	Wabash (W P)	2	192	411 38

"The reduction of ore during the quarter amounts to 2,030 tons, against 2,173 1-2 for the previous quarter. The total yield of this number of tons is $603,979 50, which gives an average yield per ton of $297 45. The total product of the previous quarter was $410,110 48. It will be understood that the computations are made in currency. The production of the mines in the Reese River district has fallen off since the previous quarter, while that of White Pine has increased. The Buel North Star of Lander Hill is largely ahead of its production during the previous quarter. The number of tons produced in the last quarter is 343, averaging $355 55 per ton, against 125 1-2 tons, averaging $425 12 per ton, in the previous quarter. The product of the North Star of the Manhattan Company is very light compared to that of the previous quarters. For the last quarter the number of tons worked is 321, averaging $163 63 per ton, against 575 tons, averaging $144 09 per ton, in the previous quarter. We have been

informed that the return in the table does not show the number of tons of ore produced by the mines of the Manhattan Company; as the amount of custom ore from White Pine and other points did much to supply the mill during the quarter, and allowed its own ore to accumulate. The product of the Florida mine of the New York and Austin Company is greatly less than for a number of quarters. During the previous quarter it produced 151 tons, averaging $370 per ton, against 97 tons, averaging $277 16, for the last quarter. The Magnolia appears in the table with 46 3-4 tons, averaging $356 86 per ton, against 16 tons, averaging $464 91, in the previous quarter; and the South American mine, which had only 3 tons, averaging $202 64, in the previous quarter, produced 58 tons, averaging $335 69 per ton, during the last. The Chihuahua mine, of the Centenary Company, in the district of Newark, produced 202 tons, averaging $98 32 per ton, in the previous quarter, against 109 1-2, averaging $69 64 per ton, in the last quarter. But White Pine is the interesting feature of the present table, not so much on account of the amount of ore it produced as for its extraordinary grade. The amount returned for the Eberhart is 141 tons, which averaged $1,331 18 per ton; and for the Keystone, 56 tons, averaging $1,127 64 per ton. For the Aurora there are 15 tons, averaging $208 72 per ton; the Romulus, 11 tons, averaging $314 35 per ton; and the Wabash, 2 tons, averaging $411 38 per ton. There were undoubtedly many small lots of rich ore from the White Pine district worked at different mills during the quarter; but the Assayer's books credit them to A, B, C, and D, without specifying the names of the mine or the district in which they are located. Quarter after quarter we have pointed out the slovenly manner in which the returns were made; but instead of the manner being improved it grows worse. If the quarterly returns of mines which produced bullion, as they are now made, possess any practical value we are not aware of it. We publish them because a number of our readers desire that we should do so."

Northumberland.—The Austin *Reveille*, Nov. 10, has the following:—"Yesterday the first bar of silver produced by the mill of the Quintero Company in the district of Northumberland, was attached in three suits by workmen for labor. The bar was valued at some $1,100. The mill had just been finished, but it was attached a few days ago by P. M Eder for about $4,000. We have been informed that the liabilities of the company, for labor and materials, exceed $20,000. Many of the circumstances of the affair wear a singular aspect."

Bullion Products.—The Austin *Reveile*, Nov. 9, reports:—"We saw a fine lot of bullion to-day at the National Bank, which had just been brought into the city from the district of White Pine. The lot consisted of 28 bars, which were valued at $41,884 50. It was produced at the Oasis mill, formerly belonging to Gen. Page, but now the property of the Eberhardt company. ....Seven bars of bullion, valued at $9,840 85 were brought into the city to-day from the Centenary mill at Newark, consigned to W. S. Gage & Co.

Utah.

The *Frontier Index* is now printed at Bear River City, one hundred miles west of Green River City. From it we condense the following items:—"Bear River City is the greatest coal and timber station on the Union Pacific Railroad. Oil wells are successfully bored in the suburbs of the city. Five of the most superior white sulphur springs in America are right in the city, the point from which mountain engines must start east over the rim of the Great Basin, and west over Echo Mountain. Dr. Hayden, the leading geologist of Wyoming, says that the quality of the inexhaustible mines of coal here, is superior to any other yet developed in the Rocky Mountain region. These boundless beds crop out in four veins so directly contiguous to the railroad track that it can be loaded from the hillsides into the cars. Two of these veins, fourteen feet wide, are separated by a stratum of the purest fire-clay, twenty-seven feet wide, all cropping out along and facing the railroad track at this place. These beds of mineral are already traced, in plainly defined mother formations, a distance of four miles both sides of this town. Prospectors just in from the head of Bear River, in the Uintah Mountains, bring specimens of quartz that show the free gold as distinctly as any from Sweetwater or anywhere else. Vegetables are cheap from the Salt Lake settlements. There are 3,000 men to be supplied in the coal mines, timber-cutting, and heavy grading in this vicinity. This place is already outfitting the whole country westward to Humboldt Wells. Five thousand persons already obtain their mails at this post-office. Houses and streets are built up by magic. Every branch of business is represented, wholesale and retail. Ronghs stand no show. A jail is being built. Great is Bear River. Lumber only seven cents per foot. Coal $7 per ton. We are 1,000 miles west of Omaha, 300 west of Laramie, 900 east of San Francisco, and 85 east of Salt Dake. The track is laid 20 miles west of Bilkville, and within 60 miles of Bear River. The ties are being bedded to the head of Muddy Creek, near the summit of Quaking Asp Mountain. The cars will probably run to Bear River City by Christmas, and if the weather admits of track being laid during the winter months, we may all load up and take passage into Salt Lake Valley about next April. In a drunken row recently, Mike Ryan, Sam Tunsell, Tom Taylor and John Harrigan were all severely shot in their legs. Jas. White, who descended the great canyon of the Colorado River, last fall, is keeping a restaurant here."

Montana.

We condense from the Deer Lodge City *Independent* the following, relative to the progress of mining in that portion of the territory. It says: "The Myer's lode is being developed vigorously, and the owners are making more than wages crushing the rock in arastras; one day it yielded $126. . . .Lincoln Gulch continues to improve. New diggings have been discovered. As high as $3 to the pan was taken out of one claim. . . .There are four mills running in Deer Lodge County, which are producing in the aggregate over $100,000 per month. . . .The Hershfield mill, after running five days on the Thomas lode, cleaned up nearly $4,500. A new shaft is being sunk on this lode. . . .Butte City is looking up; a large ditch is being run, in which will open a large extent of mining ground. Take it all in all, this country never was in a better condition. . . . At Argenta, the furnace of Tootie, Leach & Co., which has been in process of erection during the summer, is at last in full blast, and with the most flattering prospects. It is smelting ore from the Tuscarora and Stapleton lodes, both being good ones, but of which the Stapleton is in every respect one of a superior character. The rock is being got out rapidly, and enough is in sight to run on all winter. The furnace is constructed on a plan similar to the one of Prof. Rhomps, and has a capacity of from six to eight tons of ore per day, which produces about a ton of metal. This metal, upon cupellation, yields, on an average, from 17 to 20 pounds of silver. All indications are bright and promising. . . .A correspondent of the *Post*, writing of the gulch mines in the vicinity of Diamond City, says: "Just above the City, the celebrated claims in which Messrs. Metcalf, Head, McGregor, Brumley, Williams, Thomas and the 'Ingram boys' are interested, are yielding larger returns than any other placer mines in the United States. The dividend, clear of all expenses, in Messrs. Metcalf, Head & Co.'s claim was, week before last, over $9,000 in gold. During our visit to these mines, prospects of from seventy-five cents to one dollar to the pan were obtained ten feet above the bed-rock, in the claim of the Ingraham boys, and $15,000 in gold was refused for fifty feet of ground. . . . Business in Diamond City, while it makes no great show, is, nevertheless, good, and not subject to sudden changes. Prices for staple articles are about the same as in Helena, and commercial transactions are conducted upon the slow but sure policy."

Mexico.

THE TAXES ON THE PRODUCTION OF THE PRECIOUS METALS.

The Canadian Monetary *Times* says: "We have received printed copy of the report submitted to the Mexican Congress in May last, recommending a reduction of the taxes on precious metals, and a perusal of the document fills us with astonishment that a Government can exist with taxes so oppressive, that the mining industry continues to support a large proportion of the population, and the mines should be found to produce $20,000,000 annually (the manifested exportation is $15,000,000) with a considerable profit, after submitting to such terrible exactions. The taxes amount o 24.66 per cent. or nearly one fourth of the total production. The committee suppose that a miner takes from his mill a bar containing $1,000 marcs of silver worth $9,416 36. He must pay on this $270, or 3 per cent. of the tax called the quinto; $135, or 1 1-2 of the mineria $22 50, 1-4 for assay; $22 50, or 1-4 for State tax; 11-2c. for additional tax; $46185 more than 5 per cent., for coining; 2 1-2 per cent. for circulation, and 7 1-2 per cent. for exportation; so that of the $9,415 36 with which he started, he pays out $1,863 45 of tax, and has $7,551 91 left for himself. The charge for coining is ostensibly less than 5 per cent., but the laws allows a certain variation from the standard coins in fineness and weight; and this variation is managed to the loss of the miner, who gets only so much as the mint officers are compelled to deliver to him. Two and a half per cent. has been taken off since this report was made, but 22 per cent. still remain, and the committee recommend the entire abolition of all taxes on the precious metals. The adoption of their recommendation would prove the wisest official act in the history of Mexico. The ores must be very rich, or the cost of extraction very small, to permit any productions under such burthens. The imposition of such a tax in California and Nevada would reduce the annul productions of these two States from $50,000,000 to $10,000,000, or less. The mines of note which produce more than 20 per cent. net in this State can be counted upon the fingers, and yet our mines are regarded as the richest in the world. The report estimates the annual production of the mines at $20,000,000, and says this amount is extracted from 600,000 tons of selected ore, picked from 5,000,000 tons of vein-stone, making an average of $33 to the ton of selected ore, and $4 to the ton of vein-stone broken down in the mine. At the Valenciana mine 3,100 laborers were at one time employed, and at the Proano 3,400, in extraction and the work directly or indirectly connected therewith, leaving the amalgamators and packers out of the count. At Fresnillo, while the Proano mine was most productive, the richest ore yielded five times as much to the ton as the poorest; but the poorest was so much more abundant that its total production was seven times as great as that of the richest. The average yield of Proano was thirty-one ounces per ton in 1836, and only nine and a half ounces in 1862; and of Real del Monte forty-nine ounces in 1843 and twenty-nine ounces in 1852. At Proano the extraction cost $45 and the reduction $31 65 per ton in 1836, and in 1858 the expense had been reduced to $10 85 for extraction, and $11 17 for reduction."

Victoria.

GOLD STATISTICS.

According to the mineral statistics of Victoria for the quarter ending June 30, it appears that during the quarter ending March 31 the produce of gold was—from alluvial, 307,125 ounces 16 dwts.; and from quartz, 134,936 ounces, 8 dwts.—442,062 ounces 4 dwts.; and during the quarter ending June 30—from alluvial, 279,349 ounces, 18 dwts.; and from quartz, 145,163 ounces, 1 dwt.—424,512 ounces, 19 dwts., making a total for the half year of 586,475 ounces, 14 dwts. from alluvial, and 280,099 ounces, 9 dwts. from quartz—866,575 ounces, 3 dwts. in all. The quantity of gold, the produce of the colony, exported during the quarter ending March 31, was 532,066 ounces, 10 dwts., and during the quarter ending June 30 it was 385,792 ounces, 1 dwt.—917,158 ounces, 11 dwts. for the half year.

IRON.

Canada.

THE MOISIC IRON SMELTING WORKS.

We have through a Montreal paper a very interesting account of the Moisic Iron Works, which are now engaged in manufacturing iron from the magnetic iron sand found on the banks of Moisic River. It reads as follows: "The run down from Quebec to the Moisic presented few features of interest, except that the banks on both sides of the river, dressed in their magnificent autumn foliage, looked superlatively grand, in spite of the murky atmosphere, unrelieved by a glimmer of sunshine, which maintained its ascendency until Tuesday morning when we crossed the bar at the entrance of the Moisic and steamed to the wharf. This wharf is connected with the smelting works, a mile and a half distant, by a tram road built over the company's land, which extends a mile on each side of the river, and for four and a half miles along the gulf of this tram-way runs on a narrow spit of land little more than three acres broad in any part, and lying between the sea and the harbor. At the head of the creek where this narrow terminates, the sea-wark bank gradually rises to an altitude of some thirty feet above a shelving beach, along which, at a distance of three or four yards from the bank, is raised the magnetic iron sand. This sand, which adheres to the loadstone with all the tenacity of polished steel, is found in layers underneath the ordinary yellow sand—washed in by the tides sometimes at a depth of only a few inches at others of several feet—sometimes almost free from admixture—at others in the proportion of one-third more or less of yellow sand to two of the ore. At the time of our visit some thousands of tons of the ore had been raised and placed in heaps along the bank, ready for transport to the smelting works. This ore was so rich in quality as to require little or no washing, while as regards quantity the supply seemed inexhaustible. It is calculated that upwards of 20,000,000 tons, unsurpassed in richness and purity, and capable of yielding from 50 to 60 per cent. of 'pure, refined, reheated, rehammered wrought iron,' totally free from those troublesome ingredients, sulphur and phosphorous, which so seriously detract from the value of every known ore by adding to the expense of production, lie within the Moisic Company's property, consisting of 3,232 acres, mostly covered with timber which can be cut and delivered at the works at a cost of about a dollar a cord.

"Along the beach and on the side of the bank for miles, the ore can be discovered cropping to the surface, and sometimes a mere scratch with a walking-stick will reveal its presence under the thinnest coating of ordinary sea sand. How this ore was originally deposited, whether in the course of centuries it has been washed in by the sea, or whether, as seems more probable, it has been brought down by the spring and autumn floods from the bed of the Moisic River, is a point which geologists leave open to conjecture. It is known, however, that the water of the Moisic is largely impregnated with iron, which gives color to the theory that to the river we owe the marvellous deposit now being worked into wrought iron of a quality and value hitherto unapproached by the best 'blooms' of Sweden and Norway, and forming a unique instance of the manufacture of iron from granular magnetic ore.

"We have before us at this moment a prospectus of the Moisic Mining Company, from which we glean that the most important of all questions in this, as in nearly all industrial enterprises—the labor question—has received here a satisfactory solution. The majority of the hands employed are French Canadian. Some have served their apprenticeship as 'bloomers' in the States, where a high rate of wages is given, but such is their attachment to home and kindred, and so much less the cost of living, that they are content to work at the Moisic for little more than half the rates they would obtain in northern New York. To use the words of the prospectus, 'the cost of labor at Moisic is almost less than any where else in the civilized world.'

"In other respects, the company enjoys very important natural advantages, hardly possessed in a like degree by any other.

"1st. In addition to the enormous quantities of timber on their own property, they have secured a government grant of the timber on an immense tract of land adjoining, which timber can be easily transported by a small river steamer now similarly employed, and at a scarcely enhanced cost.

"2nd. Charcoal kilns, contiguous to the works, have been and are being erected with brick and lime of the best description, made on the spot.

"3rd. The cost of charcoal is only 3 1-2 cents per bushel; each ton of wrought iron of 2,240 lbs. consuming from 200 to 250 bushels.

"4th. A constant supply of running water for washing the ore—in power equal to 100 horses—is available.

"5th. An extensive bog in the centre of the property, containing peat of excellent quality, and capable of being worked at small cost, is available for smelting purposes. The depth of peat has been tested and found to be 21 feet.

"In addition, it is stated, that should the supply of fuel be exhausted—a very remote contingency, so remote, indeed, that it need hardly be taken into account—Nova Scotia coal can be laid down at the wharf, free from dues, for about $2 50 per ton. So that under every aspect of the case it seems fair to assume that the company can produce iron of a quality vastly superior to any in the market, at rates far below those of the imported article, and even undersell Swedish iron in the English and foreign markets. Were it otherwise, and if facilities for manufactures did not exist, we believe the ore could be placed on board vessels at an expense of 25 cents a ton, and be manufactured at a profit in the States and in Britain.

"Some specimens of Moisic iron and steel were sent to the Paris Exhibition, where they obtained honorable mention. M. Poinsat, the celebrated French chemist, in an analysis of the ore sent to the Exhibition, with the specimens made therefrom, obtained the following results:

Oxide of Magnetic Iron	51.12
Protoxide of Iron	34.60
Titanic Acid	11.27
Silica	3.01
	100.00

Metallic Iron 63.83

"The same results—or nearly so—were obtained by Sir Wm. Logan and Messrs. Hayes and Jackson, of Boston, but the quality of the iron produced is perhaps best proven by recent tests made by Mr. Lawson, Superintendent of the West Point Foundry, who reports that a square inch of Moisic iron RESISTS MORE than 20,000 pounds greater pressure than the iron of the *most popular* brands in the United States. The following is his certificate as given in the prospectus before referred to:

"Tests of the most popular brands of Wrought Iron made at the West Point Foundry:

Hatfield	51,776	pounds	to square inch.
Pennock	53,582	"	"
Lukins	54,876	"	"
Sligo	57,407	"	"
Idaho	58,156	"	"
Eureka	59,504	"	"
St. Lawrence (Moisic)	80,221	"	"

"NOTE.—The St. Lawrence sample was simply rolled from the bloom, without having been piled, and had it been refined to the extent of the other specimens tried, it would have doubtless stood (100,000) one hundred thousand pounds to the square inch."

"Professor Fairbairn, of Manchester, the well known consulting engineer, says that the break strain per inch of the Moisic iron is 26.30 against 25.77 of the Low Moor iron, the best manufactured in England—in other words, 1.25th stronger. Its capacity for elongation is 7 1-4 inches in 10 feet, which proves that under a proper system of manufactnre it may be drawn out in the shape of wire to any extent. It is also a good description of iron for boilers and iron ship-building, and judging from the experiments, it is on the whole a very superior quality of iron.

"Dr. Sterry Hunt more recently gave as his opinion, derived from a personal inspection of the site, that 'the bed of the magnetic iron ore at the Moisic is of immense extent—readily accessible, and as far as can be judged, of excellent quality.' 'You have,' he says, writing to Mr. M. Molson, 'in my opinion solved the problem of the economical treatment of the iron sand by converting it by a simple process into a superior quality of blooms.'

"The smelting works at the Moisic at the time of our visit were not in full blast, owing, as we understood, to some alterations going on within the building—particularly the erection of washing apparatus for cleaning the sand. When these are completed eight fires will be at work night and day. Half that number were now employed—nevertheless the scene was a very animated one. The sand ore is thrown at intervals upon large and constantly-replenished charcoal fires in a kind of furnace, called the Catalan hearth—a primitive smelting apparatus, originally devised in Catalonia, and worked by hand labor, like a blacksmith's forge. *Now* the blast is worked by machinery with a force modified on account of the peculiar nature of the ore. It was found when the works were first started that, by the force of the blast a considerable portion of the ore was blown upon the roof. To remedy this the guage had to be altered. It now answered admirably—the 'bloomers,' more accustomed to the character of the ore, discarding their ancient prejudices in favor of the high pressure, necessary in smelting ores of greater density. Periodically the 'slag' separating itself from the pure iron, which forms in a mass in a kind of reservoir provided for it, escapes through holes from below the hearth, and when it is judged that the mass or 'loup' has acquired a yielding heat it is withdrawn and hammered into bar iron under trip hammers of six tons weight.

"The hands, most of whom have been instructed on the spot, seem to have acquired great dexterity in manipulating the iron at this stage of the manufactnre. It requires not only considerable skill but strong arms to direct the movements of the bar while it is being welded into orthodox shape. Under the prodigious

hammering, the earthy impurity of the metal, technically called 'cinder,' which had been liquified, so to speak, by the heat of the furnace, speedily disappears, and the bar is removed ready for the market. Near the blast furnaces is a shed in which there is an apparatus of simple contrivance for washing the ore, which is thrown into a kind of movable trough through which a stream of water is constantly running. In this way, and by dint of frequent stirring with a wooden implement, resembling a large hoe, the yellow sand is separated from the magnetic, which is removed to a compartment in the smelting shed ready for use. It is hardly a year and a half since the company commenced to clear the ground for building operations. To-day, with eight fires, they are capable of turning out 300 tons of wrought iron per month, approximately valued at from $70 to $75 per ton."

OIL.

Pennsylvania.

MONTHLY REVIEW OF THE OIL BUSINESS.

We are indebted to the October Petroleum Report of the *Titusville Herald* for the following information:

THE PRODUCTION.

"The production during the last two days of October of forty-three gallons to the barrel, as taken from gange tanks at the wells, was 11,113 barrels, a decrease from the last two days of the previous month of 1,414 barrels. This large decrease occurred principally in the Oil Creek and Cherry Run Districts, and was brought about by the production of several of the largest wells falling entirely or falling off very much. The number of producing wells struck in these districts during the month was small. The largest decrease in any one district was in that of Upper Cherry Run, which, during the 30th and 31st of October, was producing 1,665 barrels per day, while during each of the two last days of September it produced 2,379 barrels, a falling off of over 700 barrels. The Cherrytree Run District shows a decrease of nearly two hundred barrels. The farms in the Lower Cherry Run and in the Allegheny River Districts, and the Benninghoff, Blood and Tarr Farms, also show decreases. During the first twenty-five days of the period under review, the production receded, but not so rapidly as during the succeeding six days. In the last week the greater part of the decrease on Upper Cherry and Cherrytree Runs took place, and there was also in this time a decrease in the Allegheny River District, and on Lower Cherry Run. During the first twenty-five days the production at the wells could not have varied much from 11,700 or 11,800 barrels per day. It is doubtful whether the production will decrease so rapidly during November as during the month under review, as there will be a larger number of new wells completed during November than there was in October. The only district where the production has been increased considerably is in that of Pleasantville. In this district the increase has amounted to but 230 barrels, while there were twenty-five or thirty wells which were tested and produced in paying quantities. There was a slight increase on Charley Run, near Oil City. On this Run a new well was struck which produced seventy-five barrels per day. Another one which produced fifty-six barrels per day ceased producing as soon as the former one commenced yielding. The largest producing well in the region now yields two hundred and fifty barrels per day. There are four or five others, the production of which ranges from one hundred to two hundred barrels per day. At Tidionte, the production has remained quite steady. During the month there were considerable quantities of bulk petroleum shipped from this point to Oil City, as there was also during the previous month. The amounts shipped are transferred to the different gange cars, or run into tanks at Oil City, and are then taken account of either as stock on hand or as off shipments.

"The following table shows the total production for October, the average per day, the production previously reported, and the average per day from January 1st to November 1st:

Total shipments of Crude for October of bbls., of 45 gallons each, bbls	325,666
Add to reduce to bbls. of 43 galls. each, bbls	15,147
Total shipment of bbls. of 43 galls. each, bbls	340,813
Stock on hand October 1st, bbls	263,808
Stock on hand November 1st, bbls	266,180
Add increase on November 1st, bbls	2,372
Total production during October, bbls	343,185
Average per day for 31 days, bbls	10,133
Production previously reported, bbls	2,747,371
Total production from January 1st to November 1st, bbls	3,090,556
Average per day for 305 days, bbls	10,133

"The average daily production at the wells on farms and in districts is given during the last two days of the month for the purpose of showing whether the production is receding or enlarging.

PROGRESS OF DEVELOPMENT AND THE TERRITORY.

"The number of new wells being drilled on November 1st was 435, an increase of fifty-seven from the first of the previous month. This increase was a large one, and was unlooked for at this season of the year. The number of wells drilling on the first inst. was forty-four greater than at any previous date during 1868, and one hundred and ninety more than at the same date in 1867. Of the 435 wells drilling on the first, 213 were located on the Pleasantville District. In this district the known producing territory has again been greatly extended by the finding of several large producing wells. It now embraces from three to four square miles, and is much the largest tract ever discovered. So far, large producing wells have been found over nearly the whole of the territory for a distance of about two miles north-east of the National wells, and the present indications are that the producing territory can be much farther extended. The sand rocks underlying this territory, which produces the petroleum, is thin in comparison with other producing sand rocks, and consequently when the wells are sunk closely together the production of each of them declines very rapidly. On Cherrytree Run the development has been very unsatisfactory, six or seven new wells having been tested that did not produce more than from three to twenty barrels per day. On Charley Run, near Oil City, there is some demand for leases, and it is probable that several wells will be commenced in the district during November. On Upper Cherry Run, the known producing territory has been found to be but a few acres in extent, and the number of drilling wells has fallen off. To the east of this district a vein of black petroleum, like that found in the whole of the Pleasantville District, has been discovered, and it is almost certain that it is but a continuation of the vein found in that district. From the experience of the past eight years there is no reason to believe but that the territory in Pennsylvania can, for at least a century, supply any demand which may arise. Although on a general survey of the whole territory, there now appears to be little that, by development, is known to be of the producing order, that has not been drawn upon more or less largely, yet there is no doubt but that there are still large tracts which remain undeveloped, and the territory that has been abandoned can, by exhausting the water from it, again be made to produce. The work of exhausting the water from abandoned territory has been commenced, and the result has already proved that by further prosecution of it, the territory can be made to produce, although not so largely as at first.

THE IRON TANKAGE.

The capacity of iron tankage is 1,070,539 barrels of forty-three gallons each. As compared with the capacity on the 7th of November 1867, the total capacity on the 1st inst. shows an increase of 353,637 barrels. The capacity of tankage shows an increase during the same time of 428,659 barrels. The capacity of tankage now being constructed is, in round numbers, 100,000 barrels, and is located principally at Miller and Petroleum Center.

THE SHIPMENTS.

"The total shipments of Crude and Refined from the region by railroads and transportation lines for the month, was 308,171 barrels of forty-five gallons each, a falling off of over 29,000 barrels. The shipment by the Alleghany River was 5,897 barrels, against 13,780 during September. The total shipment, as compared with that of the previous month, shows a decrease of 35,842 barrels. The amount of refined produced and shipped shows an increase of over 4,000 barrels. To ascertain the total shipment of Crude we have added the difference between that article and Refined on the amount shipped, to the total of shipments by the railroads and the River. The shipment to New York shows a decrease of nearly 43,000 barrels, when compared with the September shipments, and that to Cleveland a decrease of four thousand. The shipment to Pittsburgh was increased by over 5,000 barrels, and to Boston by 4,000 barrels.

EXPORTS.

"The total exports from the United States to Nov. 1st were 85,384,621 gallons, against 54,311,936 gallons during the same time last year."

Wisconsin.

BUILDING STONE AND SLATE.

The Superior *Gazette* says: "A Milwaukee Company are opening an extensive quarry of brown free-stone on Basswood Island, a few hours sail from and very accessible to this place. Under the supervision of Mr. Geo. W. Sweet, they have made preparations for getting out stone on a large. They have erected a spacious pier, over one hundred feet long, ending in sixteen feet of water; also two derricks, boarding houses, and a blacksmith shop; and an expenditure of twenty thousand dollars will probably be made before next spring, when they will commence shipping stone. The company have just closed a contract to furnish stone for a new court house in Milwaukee, which is to be a splendid edifice, costing a half million dollars. A competent board of architects decided in favor of the Lake Superior stone, over all competitors, and pronounced it to be the best building stone to be found in the country. With the immense deposits of this excellent building stone, and the extensive slate quarries now being opened in this vicinity, the lake cities and those of the Mississippi Valley, need not hereafter be at the great expense of transporting material for their 'brown stone fronts,' and slate roofs from the Eastern States, for Lake Superior can supply the markets west of the Alleghanies much cheaper. The development of the stone and slate interests at this end of the lake is destined soon to become a very important trade—hardly second to the immense iron and copper products of the entire Lake Superior region, and we predict the day is not far distant when Superior will have her brown stone blocks, with slate roofs, obtained from the quarries above referred to."

Scientific Meetings.

THE NEW YORK SOCIETY OF PRACTICAL ENGINEERING.

ARION PIANO-FORTE—PROPELLING APPARATUS—ELEVATORS.

The stated semi-monthly meeting of the Society of Practical Engineering was held on the evening of Tuesday, Nov. 24th, at Room 24, Cooper Institute.

An Arion Piano-Forte was exhibited and explained by Mr. MANNER, the inventor and patentee. One of the peculiarities of this instrument consists in the use of a bar in the direction and on a line with the heavy steel stringing under the "overstrung bass." This bar, passing beneath the stringing and running diagonally from the front right hand corner to the back left hand corner of the case, gives strength where most needed, and, in fact, it might not inaptly be termed the spine or back-bone of the piano. The wrest-plank is formed of four sections of hard wood laid horizontally, and firmly glued and fastened, the grain of each section crossing the grain of the one next to it, in a different line or direction; so that the tuning pins have the pressure of the end wood against them in every direction, making it impossible for the pin to loosen itself, as it does where it has a pressure against the sides of the grain.

MR. FREDERICK R. PIKE presented drawings of a new apparatus for propelling steamboats, and explained its powers.

The regular subject before the meeting was "Elevators and Hoisting Machinery," and a paper on this topic was read by Mr. T. P. PEMBERTON, the Vice-President of the Society, who, after giving an interesting and somewhat historical account of successive improvements in hoisting machinery, made some remarks on cranes, their construction and application at the present day, and observed that a distribution of hoisting cranes throughout a large manufacturing shop requires good judgment. They should be found in all machine shops, foundries, and blacksmith's shops. They save an immense amount of unnecessary labor and exertion, and consequently are economical. It is no economy to dispense with such implements and to employ "all hands" to move heavy castings or forgings. Fifteen pounds is as much as can be reckoned as the power of a single laborer working daily, for ten hours, at a winch or crane handle, moving at the rate of 220 feet per minute.

In the construction of cranes, great attention should be paid to the gearing, which should be well proportioned, and have a large surplus of strength. The speaker then explained, by means of drawings, a strong crane of his own design, which is now in operation in several large foundries and other places. Wrought-iron plates bolted to wood work was stated to be a good method of ensuring strength at the joints of the framing. At Mr. GEORGE CORLISS' works, in Providence, R. I., there is a good and systematic arrangement of cranes, which, with the addition of a truck railroad, allows a casting, however large, to be removed from its mould in the foundry to any part of the machine shop, for the purpose of being turned, planed or boxed. To obtain a maximum of strength, with a minimum of material, cranes are frequently made with hollow posts, composed of wrought-iron plates riveted together, and braced with angle iron. Mr. FAIRBAIRN, of England, constructs cranes in this manner, some of which may be seen at the Liverpool and Birkenhead Docks. His plan ensures great rigidity and strength. Traversing cranes were then noticed, and a description was given of one in use in several of the locomotive works in Leeds, England, where an entire locomotive can be raised from its pit and carried over twelve or fourteen others to the other end of the erecting shop. Elevators may be said to be classified as vertical elevators, which are moved by hand or steam power; single and double elevators working on an incline, with an endless rope or chain, and those which are moved by condensed air; elevators for grain and corn mills, for factories, hotels, etc., and others for general purposes.

The objects to be attained by the use of elevators are the quick, steady and reliable transportation of persons, materials or goods, without danger, breakage or accident. The principal elevators, as now constructed and used, may be divided into two classes—those worked by a chain wire or hempen rope, and those which are operated by means of a screw or worm gear. Several drawings of elevators were then exhibited, and the nature of their mechanism explained. It was remarked that one of the best and safest, and one which seemed to admit of general application in mines, manufactories and hotels, was that known as Miller's Patent Elevator, which is constructed by WHITTIER & M'BURNEY, of Boston, Mass, quite a number of which have been erected by them in several large manufactories in the Eastern States.

SCIENTIFIC LECTURES BEFORE THE AMERICAN INSTITUTE.

THE MICROSCOPE AND ITS REVELATIONS.

The first of these lectures before the American Institute was given at Steinway Hall on the evening of November 25, by President BARNARD of Columbia College, N. Y., the subject being, "The Microscope and its Revelations." The construction and uses of the Miscroscope were considered as presenting one of the most felicitous illustrations of the ingenious application of theoretic principles to the production of a practical result, and which was at the same time one of the most signal triumphs of the refined artistic skill of modern times in responding to the demands of science. In the examination of structure, in the study of form, in the observation of the movements and changes continually going on in organic things we presently arrive at a point at which further progress is arrested by the imperfection of our powers. While thus seeking to know something of the minute organization of bodies large enough to be seen and examined in mass without difficulty, we make the discovery that there exist many objects which in their fully developed proportions never attain a magnitude sufficient to betray even their existence to ordinary vision, and of which, without artificial helps, we could never know anything at all. It is becoming every day more and more clear that the causes of all zymotic diseases are to be sought in excessively minute and widely scattered organisms, which to ordinary observation are totally imperceptible. This was just as true of the diseases of plants as of those of animals. The potato rot, the cotton rust, the smut of wheat and the wasting of the vine were just as certainly the product of microscopic fungi as the epidemic among silk worms or the cholera among men. To the study of objects of this kind the microscope was absolutely indispensable. The lecturer referred to the marvels of minute organic life which the microscope disclosed. The *brachionæa*, were among the larger forms of loricated animalcules—that is, animals having silicious loricæ, or shells. Of this animal more than one million individuals could be easily packed in the space of a cubic inch; and the genera *Salpina, Euchlanis Monostyla* and others, all having elegantly sculptured silicious shells, there were some of which at least ten millions to twenty millions could find room in a cubic inch of space. Having given a lucid explanation of the various forms of minute animal and vegetable life, and the power of the microscope in discerning it, the lecturer cited instances wherein the microscope furnished the means of discovering the chemical nature of substances when in quantity too small to be treated by ordinary methods of analysis; as it also succeeded in detecting the adulteration of drugs, groceries and other articles of daily commerce. The microscopic study of the elementary tissues of the higher order of animals had also grown along with a marvellous simplicity and conformity of general plan, such endless variety of detail and such constant association of each variety with a particular natural group that in the vertebrated series it was almost invariably impossible by the examination of the minutest fragment of bone, for instance, to pronounce with confidence as to the natural family to which it had belonged. After fully dilating upon the value and importance of the microscope as a means of scientific investigation, the lecturer proceeded to explain with illustrative diagrams the construction of the instrument and the principles upon which its usefulness depended.

The "Durometer."

For testing the hardness of metals by drilling, is the invention of M. Behrens, an engineer of Tarbes, in France. It has been thoroughly tried, and it is said many French contracts for rails now contain a condition that they are to be tested by this apparatus. It consists of an upright cast-iron standard bolted down upon a bed-plate, and provided with a table for supporting the rail or other article to be tested. The spindle of the drilling tool is capable of being raised and lowered in its bearings by turning a handle for that purpose, and the drill is held down to its mark by a weight fitted for the upper end of the drilling spindle. Its rotary motion is derived through a pair of mitre-wheels, from a driving shaft carrying the usual fast-and-loose pulleys. This shaft has a worm upon it which moves a train of mechanism in connection with a signal gong, for the purpose of indicating the number of revolutions made by the drill. The apparatus is exceedingly compact. Its use by French manufacturers has led to a gradual increase in the hardness of the rails they produce.

MARKET REVIEW.

FRIDAY EVENING, NOV. 27, 1868.

Gold and Silver Stocks.—Through the week, up to yesterday (Thanksgiving Day), Stocks at the mining Stock Board showed considerable life. On Wednesday, sales of Benton were made at 25 cts.; of Montana at the advanced rate of 55 cts.; of Rocky Mountain at 10 cts.; of Gregory, s3, $5 10; and of La Crosse at 15 cts. To-day the sales were confined to Smith & Parmalee and Gregory stocks, the former selling as high as $4.40 and the latter at $5. Of Nevada Stocks there is little to report, and Mannattan is quoted worth $86. Quotations to-day were as follows:

	Bid.	Asked.
Alameda Silver	..	40
American Flag	.. ..	25
Bates & Baxter Gold	.. ..	50
Benton Gold	25	30
Bobtail Gold	.. ..	1 25
Black Hawk Gold	....	....
Consolidated Gregory	4 90	5 05
Edgehill Mining	....	2 50
Gold Hill	.. ..	1 00
Gunnell Gold	.. ..	50
Grass Valley	....	45
Hamilton G. & S. B.	.. ..	85
Holman	.. 2	5
Hope Gold	....	10
Twin River Silver	1 00	5 00
Gunnell Union	.. ..	30
Combination Silver	4 00	7 00
Sensenderfer	....	10 00
Quicksilver	23 50	23 50
Kipp & Buell Gold	..	10
La Crosse Gold	12	20
Liberty Gold	.. 1	2
Manhattan Silver	86 00	.. ..
Midas Silver	....	75
Montana Gold	45	60
New York	75	1 10
Nye Gold	.. ..	3
Owyhee Mining	17 00	....
People's G. & S. of Cal	..	25
Quartz Hill	84	86
Rocky Mountain Gold	08	.. 12
Smith & Parmlee Gold	4 30	4 40
Texas Gold	.. ..	6
Corydon	..	20
Symonds Fork Gold	30	75
N. Y. & Eldorado	....	10
Mariposa	6 00	6 50
Mariposa preferred	22 12½	22 75

Copper Stocks.—Davidson is quoted at 65c. and Flint Steel River $1.75.

Petroleum Stocks.—The market in oil stocks was thus reported to-day at the Board.

	Bid.	Asked.
Bennehoff Run	.. 40	....
Brevoort	90	....
Buchanan Farm	42	..
Central	35	60
Clinton Oil	1 10	....
National	3 25	....
N. Y. and Alleghany	.. ..	2 00
Pithole Creek	70	1 00
Home Petroleum	....	....
Pacific Oil	.. ..	....
Rynd Farm	18	22
United Pet. Farms	.. ..	.. ..
Union	8 50	....
United States	1 50	1 90
Sherman & Barnsdale	85	85
Second National	.. 2	.. ..
Bliven	.. ..	.. ..
Rathbone	.. ..	.. ..
Northern Light	.. 30	....

Miscellaneous Stocks.—Wallkill Lead is quoted at 10@12c.; Rutland Marble, $15 50; Del. & Hud. Canal, 133@133½; Cumberland Coal Preferred, 39½@40; West. Union Tel., 36½@36¾; Pacific Mail Steamship Co., 117½; Wells-Fargo Express, 27; Merchants Union Express, 19½@20; New York C., 126½@126¾; Erie Pref., 59; Hudson River, 128¼; Reading, 99; Mich. S. & N. I., 90; Clev. & Pitts., 88¼; C. C., Cin. & Ind., 77@77½; Chi. & N.W. Pref., 87½@88; Clev. & Tol., 97½@100; Chi. & R. I., 107½@108; Lake Shore R. R., 100; Mil. & St. P., 69½; Mil. & St. P. Pref., 87½@88; Tol. W. & W., 59@59½; Del. L. & W., 129½; New Jersey B., 133; New Jersey C. R., 118@118½; P. Ft. W. & C., 112½@112¾; Ch. & Alton Pf., 147; O. & Miss. R., 31½.

State, R. E. and Other Bonds.—Am. Dock & Imp. Co. 7s, 97; Harlem 1st, 100; Mich. Cen. 8's, new bds., 115; Chi. & N. W. 1st M., 90½; Tol. & Wab. E. E., 75; C. & R. I. & P. P. R. R. 7s, 94½; Col. C. & Ind. Cent. 1st, 74½; Chi. & N. W. con. conv'e, 95; Mor. & Es. 1st, 95½; Mor. & Es. 2d, 91; Mil. & St. P. 1st M., 94; P., Ft. W. & Ch. 2d M 98½@99.

Government Stocks.—The market is firmer, and prices have advanced considerably since our last report. They were thus quoted to-day:

U. S. 6s, 1881, coupon	115½@115½	U S 5-20s, '65, new coup.	110¾ 110¾
U. S. 5-20s, 1862, conpon.	112½ 112¾	U. S. 5-20s, 1867, coupon.	110¾ 111
U. S. 5-20s, 1864, coupon.	107¾ 107¾	U. S. 5-20s, 1868, coupon.	111 111¼
U. S. 5-20s, 1865, coupon.	108¼ 107¾	U. S. 10-40s, ex. coupon	106¼ 106¾

Foreign Exchange.—Foreign Exchange is dull, but quite strong. We quote:

Lon. (pr. bks), 60 dys	109¼@ 109¾	Swiss	5.20 5.17½
Lon. (pr. bks'), sght	109¾ 110	Hamburg	36 ..
London, prime com	....	Amsterdam (bankers')	41 41½
Paris (bankers'), long	5.17½ 5.16¼	Frankfort (bankers')	40¾ 41
Paris (bankers'), short	5.15 5.13¾	Bremen (bankers')	78¼ 78¾
Antwerp	5 20 5.17½	Berlin (bankers')	71¼ 71¾

Gold.—Gold opened strong at 135¾ about ¼ above the closing figures of yesterday, but subseqnently fell off to 135¼.

This morning money is in rather more demand, and 6 per cent. is generally obtained on loans by private bankers. The banks very generally keep up their rates at 7 per cent., and some of the trust companies still charge that rate.

Discounts are easier. The banks have lately taken a considerable amount of paper, and the late accumulation in dealers' hands appears to be much reduced. Prime paper is quoted at 7@9 per cent.

The following bids for gold were opened at the Sub-Treasury this morning:

A Rodewald	$500,000	135 51
Henry Clews & Co	200,000	135 55
Henry Clews & Co	150,000	135 56
Henry Clews & Co	150,000	135 57
Turner Bros	50,000	135 05
Turner Bros	50,000	135 10
Chas. Unger & Co	500,000	135¼
Durante and Earle	100,000	135 40
Total	$1,700,000	

The whole award was made to Henry Clews & Co.

The Specie Market is thus quoted:

(Quotations of value in gold.)

American Gold, Old Coinage	— —	@ 4	pre.
American Half-Dollars, Old Coin	1¼	2	pre.
American Quarter-Dollars, Old Coin	— —	—	par.
Portuguese Gold	par.	1	
Spanish Dollars	— 3	3¼	pre.
Spanish Quarter Dollars, per oz	— —	1 20	
Spanish Qnarter-Dollars, perfect, each	— 22	— 23	
Mexican Dollars	— 4¼	5	pre.
Mexican Quarter-Dollars, perfect	— —	24	
Sonth American Dollars	— —	—	par.
Five FrancPieces	— 96	— 97	
Doubloons, Spanish	16 25	16 75	
Doubloons, Patriot	15 50	15 75	
Napoleons	3 83	3 87	
Heavy Guineas	4 95	4 98	
Sovereigns, Light and Heavy	4 86	4 90	

A heavy sovereign weighs 5 dwts. 2¼ grs.

We take from the San Francisco *Bulletin's* Nine Months Review of the Trade and Commerce of San Francisco, the following statements relative to coin and bullion. Says our cotemporary:

"Our exports of Treasure for the past quarter have been light, amounting to about $8,300,000, making since January 1st a total of $29,000,000. The bulk of this amount was sent to New York and Asia, the former market taking $24,000,000, and the latter $4,830,000, leaving but $1,600,000 to be distributed among some half a dozen other markets, including $481,000 to Panama. The annexed table shows the description of Treasure shipped hence to Asia, as well as to all ports:

	To Asia.	To all Ports.
Gold Bars	$736,436	$15,586,870
Silver Bars	1,746,942	9,963,140
Gold Coin	320,394	2,020,263
Silver Coin	....	5,000
Gold Dust	21,107	27,242
Mexican Dollars	1,505,590	1,505,590
Totals	$4,330,469	$29,058,105

"In addition to the foregoing remittances on mercantile account, the Sub-Treasurer has secretly shipped since January 1st, $7,500,000 gold coin on Government account, the same comprising the duties paid on foreign imports.

"The receipts of domestic treasnre at this port for the past quarter, through Wells, Fargo & Co.'s Express, together with foreign imports, amounted to $13,070,534, making since January 1st a total of $36,589,861, as follows:

From California and Nevada	$32,455,924
From coastwise ports, north and south, including British Columbia	3,338,426
Imports, foreign	795,611
Total	$36,589,861
Same time in 1867	41,917,367
Decrease, 1868	$4,247,506

"The usual tabular statement, with complete details, will be found elsewhere. The coin movement, to and from the interior, through the same agency compares as follows, since January 1st:

Coin movement.	1867.	1868.
Received from interior	$3,404,497	$3,260,769
Remitted to interior	7,807,466	10,311,748
Added to interior circulation	$4,402,969	$7,050,979

"The amount of coin received from the interior during the first 9 months of 1866, was $8,704,127, against $6,454 07 remitted. During the same time in 1865, $8,277,281 was received, and $8,795,858 remitted. In the foregoing figures we have taken no account of the business of the Pacific Union Express Company. This company, as is well known, was only recently organized. Its first report is for the quarter ending September 30th. During this period the receipts of domestic treasure through this agency were as follows:

	Uncoined.	Coined.	Total.
Northern Mines	$1,026,692	$319,534	$1,346,226
Southern mines	61,815	154,889	216,704
Totals	$1,088,507	$473,423	$1,562,930

"Against coin receipts of $474,423, the' company remitted to the interior, dnring the same interval, coin to the value of $178,675. We will now recapitulate our receipts of coin and bullion for the past nine months, as follows:

Per Wells, Fargo & Co	$35,794,250
Per Pacific Union Company	1,562,930
Imports, foreign	795,611
Total	$38,152,791

"The coin received from' the' interior' since the beginning of the year, through both Express Companies, amounts to $3,735,192, while the amount remitted, during the same interval, was $1,490,423. After making due allowance for the shipments by the hands of private carriers, our receipts of treasure this year still show a falling off from $3,000,000 to $4,000,000, since the public carriers are now more generally patronized than when the rates were higher."

Petroleum.—Crude, in bnlk, there is perhaps hardly so much firmness; 1,400 bbls. were sold at 18¼c. Refined standard white is a little unsettled, and more in the buyers' favor, with a decreased inquiry. We quote at 35@36c. For Philadelphia delivery there is a fair business at some concessions, closing at 32c. for November, and 31@31¼c. for December; the sales are 14,000 bbls., including 8,500 bbls. for November at 32½,32¾ and 32c.; 5,500 bbls. for December at 32, 31½ and 31.

Receipts for the week ending Nov. 24	pkgs.	7,044
Exports for the week ending Nov. 24	galls.	885,111
Exports from Jan. 1	galls.	48,195,658
Exports same time last year	galls.	29,467,256

The following is the quantity exported from other ports, Jan. 1 to Nov. 21.

	1868.	1967.
From Boston, galls.	2,276,585	2,027,955
Philadelphia	35,687,312	26,495,047
Baltimore	2,419,686	1,312,707
Portland	589,174	900
Total	40,972,737	29,836,609
Total exports from the United States	90,549,252	59,547,554
Same time in 1866		60,340,979
Same time in 1865		23,607,544

Copper.—With very little offering, the price has advanced. Sales for the week foot up 1,500,000, at 22½@23c. for Portage Lake and Detroit, and 23c. for Baltimore; the latter for January to March delivery. The quotations to-day is 23c. for all kinds.

The London Market declined to £67 10 Chili Bars, but rallied to £68 10.

Lead quiet and nnchanged, a jobbing business at $6 40@$6.49, gold, for ordinary foreign.

Tin is quiet. The dealers sell Straits at 26c., gold; of Banca, 400 slabs have been sold at 28c., gold, and it is now held at 29c. English, 26c.

The London Market is quoted at 100s. for Straits; Banca in Amsterdam, 59 florins.

Zinc.—Zinc Paint, French, 11½c. currency, or 7c. gold; Zinc Paint, American, 7½c., currency.

Spelter is easy at 6¼@7c., gold, for Silesian.

Cordage.—Manila is reduced to 22@23c. for large and small sizes.

Cement.—The market for Rosendale is steady at $2, cash.

Lime.—Rockland continues firm at $1.50 for Common and $2 for Lump.

THE IRON TRADE.

NEW YORK, NOV. 27, 1868.

We have no change in the market to report. Prices are firm, stocks light, and transactions small. Sales of American in small lots at $43@41.

Scotch Iron.—The total sales for the week were 600 to 800 at prices, $43.00 for Glengarnock, $44.00 for Gartsbearie.

Scrap iron.—We note 500 tons Light Scrap on private terms; 100 to 200 tons Extra Ship at $42.00@$43.00.

Old Rails are quiet. We note 250 tons T's. Extra Ship $33½, gold; 350 old Barlow Rails on private terms.

Bar continues very dull from store, but prices are nominally without change. Common Sheet may be quoted 5½c for No. 12 to 20; 6¼@6 for 21 to 24; and 7 for 25 to 27, cash. Russian Sheet is in fair demand at 11½@13c, gold, as to numbers—The Elsinore, just arrived, brings 6,290 packs, but it is feared that most of it is damaged.

BOSTON, November 25, 1868.

The demand for Pig Iron is very poor, and full prices continue to be obtained. The sales of Scotch, Gartsharie and other brands have been at $41@$44 per ton; and American Pig at $40@$45 per ton as to quality. In Bar Iron there is no change, with small sales as wanted at previous prices. Russia Sheet Iron is quiet at 12@13c. per lb., gold.

Imports of Pig Iron from January 1 to November 21, 1868:

	1868.	1867.
From Great Britain, tons	20,264	20,655
Coastwise Ports	11,100	8,632

PHILADELPHIA, November 24, 1868.

In Pig Metal there is no change to notice. Sales of No. 1 Antiracite at $42@$43, and No. 2 at $38@$40. Scotch Pig is quite at $43 per ton, and Forge at $35@$35 50 per ton. Manufactured Iron commands $87 50 for Bars. Blooms are quiet

Lehigh Valley Iron Trade.

Pig Iron transported by the Lehigh Valley Railroad Co. for the week ending Nov. 21, 1868:

From	Tons.	Total.
Carbon Iron do	105	7,685
Lehigh Valley Iron Co	300	8,065
Thomas Iron do	535	28,635
Lehigh Crane Iron do	1240	26,870
Allentown Iron do	590	21,585
Robert Iron do	60	5,650
Glendon Iron do	80	19,070
Other Shippers	420	13,820
Total	3,750	120,560

Lake Superior Iron Trade.

Receipts of Ore and Pig Iron at Marqnette, up to and including Saturday, Nov. 14, 1868, by the Marqnette and Ontonagon Railroad.

IRON ORE.

	To November 7.			To November 14.		
	Prev'sly rep'ted.	For past week.	Total.	Prev'ly rep'ted,	For past week.	Total.
Lake Superior Iron Co	91,748	1,648	93,397	93,396	2,271	95,667
Cleveland Iron M. Co	35,720	615	36,335	36,335	103	36,438
Marquette Iron Co	8,483	128	8,611	8,611	..	8,611
Washington Iron Co	28,951	929	29,880	29,880	1,211	31,091
New England Iron Co	8,053	...	8,053	8,053	..	8,053
Edwards Mine	16,894	802	17,696	17,696	594	18,290
Pitts. & Lake A. Iron Co	21,717	....	21,717	21,717	..	21,717
Champion Mine	2,639	838	3,477	3,477	715	4,192
Ore to Local Furnaces	25,822	706	26,528	26,528	1,491	28,019
Total Iron Ore, tons	240,027	5,666	245,693	245,693	6,385	252,078

PIG IRON.

Morgan Iron Co	7,887	258	8,145	8,145	286	8,431
Greenwood Iron Co	1,188	155	1,343	1,343	..	1,343
Bancroft Iron Co	3,573	142	3,715	3,715	100	3,815
Collins Iron Co	4,142	158	4,300	4,300	193	4,491
Michigan Iron Co	4,300	97	4,397	4,397	55	4,452
Total Pig Iron, tons	21,090	810	21,900	21,900	632	22,532
T'l ore and pig iron, t'ns.	261,117	6,476	267,593	267,593	7,017	274,610

Imports of Foreign Iron and Steel at New York.

For the week ending Nov. 20.

	Quantity.	Value.
Railroad Iron, bars	1,820	$12,458
Hoop, tons	42	1,693
Sheet, tons	178	21,643
Pig, tons	1,260	17,261
Other Iron, tons	1,270	32,101
Chains and Anchors, packages	....	....
Tubes, packages	1,018	3,640
Nails, packages	....	....
Steel, packages	2,075	37,190
Machinery	66	6,112
Pipes	....	5,212
Anvils	215	1,976
Wire	12	759
Total value		$140,951

Market Prices.

NEW YORK, Nov. 20, 1868

DUTY.—Bars, 1 to 1¼c. per lb.; railroad, 60c. per 100 lbs.; boiler and plate: 1¾c. per lb.; sheet, band, hoop and scroll, 1½ to 1¾c. per lb.; pig, $9 per ton, polished sheet, 3c. per lb. Payable in gold.

Am. pig, fy. No 1, best,	$41 00	@43 00	
" " 2x frdy,	36 00	39 00	
" Grey Forge	34 00	36 50	
White and Mottled	....	31 00	
Pure white for Cal. mar.	32 50	— —	
Scotch Pig, No. 1, best bd	43 00	45 00	
" " " outside,	43 00	— —	
Wt. No. 1 Scrap f'm yd.	....	46 00	
Ex ship	44 00	....	
Bar, Ref., En. & Am.	90 00	92 50	
Bar, Sw's, as. sizes, gold	87 50	80 00	
Old Rails	47 00	....	
R.R. Iron, For., fm Stock gold	51 50	52 50	
R. R. Iron For., to imp.	50 00	— —	
" " Amer. at wks. currency	77 00	— —	
R. R. Iron, Am., deliv'd	80 00	— —	
Sil rails of any patteru at works, currency	....	— —	
Solid Steel rls. For., gd.	110	— —	
Street Rails at works	85 00	— —	
Light rls. for mines &c. at works	$85 00	@— —	
Do. delivered here	....	— —	

STORE PRICES.

Bar, Swedes, ord'y sizes	— —	155 00	
Bar, Eng. and Am., rf'd.	— —	100 00	
Bar, Eng. & Am., com.	—	90 00	
Scroll	130 00	175 00	
Ovals and half round	125 00	155 00	
Band	130 00	— —	
Horse Shoe	130 00	— —	
Rods, ⅜@3-16 inch	105 00	165 00	
Hoop	135 00	190 00	
Nail Rod, per lb	9½	10½	
Sheet, Rus., as'd. Nos. (gold)	11½	13	
Sheet, s'gle. D & T. com	5½	7½	
Rails, Eng., gold, ton	51 00	52 00	
Rails, American	79 00	81 00	

STEEL.

English, cast 2d & 1st qual	.18	@23	
Eng. Spring 2d & 1st qual	.10	12½	
Eng. Blister 2d & 1st qual	.11½	20	
English Machinery	.13½	16	
Eng German 2d & 3d qual	.14	16	
Am. Blister, "Black Diam'd,"	10¼	16	
American, Cast, Tool	" 19	—	
American, Spring	" 16	13	
American Machinery	" —	13	
American German	" 10	13	

PITTSBURGH, November 21, 1868.

The iron market dnring the week, says the *Commercial*, presented no particular change. The demand keeps pace with the receipts, hence there is no accumulation of stocks here or at the furnaces. The Ohio river being in good navigable order, the receipts by that channel will soon increase. Dealers, however, are disposed to purchase sparingly, merely to supply their current wants. The operations for the past two weeks were as follows:

	This Week.	Last Week.
Anthracite	300 tons.	300 tons.
Bituminous	2170 tons.	1545 tons.
Charcoal R. H.	525 tons.	100 tons.
Alleghany Coke	150	300 tons.
Total	3,145 tons.	2,245 tons.

Showing an increase in sales of 900 tons as compared with the week ending November 14. We are reported the following sales:

ANTHRACITE.

50 tons No. 1 Anthracite	42 00—4 mos
50 tons No. 2 Anthracite	41 00—4 mos
100 tons No. 3 Anthracite	39 00—4 mos.
50 tons No. 2 Anthracite	41 00—4 mos

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORES.

100 tons Open Gray	39 50—4 mos
220 tons Medium Gray, to arrive	38 00—cash
200 tons Medium Gray, to arrive	40 00—5 mos
100 tons Medium Gray, to arrive	40 00—6 mos
100 tons Medium Gray, to arrive	40 00—4 mos
120 tons Medium Gray, at furnace	37 74—4 mos
120 tons Medium Gray, at furnace	38 00—4 mos
500 tons Common White and Mottled, at furnace	35 00—4 mos
400 tons Medium Gray Forge, at furnace	37 50—4 mos
250 tons Open Gray, to arrive	40 00—4 mos
60 tons Medium Gray, at furnace	35 00—4 mos

CHARCOAL.

500 tons Hanging Rock Foundry	45 50—4 mos
25 tons Hanging Rock Foundry	44 00—4 mos

COKE.

200 tons Forge	40 00—4 mos
50 tons Coke	37 00—4 mos

CINCINNATI, November 19, 1868.

PIG.—Receipts continue light, and with fair demand prices are maintained at the advance.

	Per ton.	Days		Per ton.	Days
Hanging Rock H. B. Mill	$37 38	—90	Tennessee Cold Blast	43 45	—90
Hanging Rock H. B. Fou	41 42	—90	Missouri	47 50	—90
Hanging Rock Cold Blast	53 ..	—90	Jackson (stone coal) Fou.	38 39	—90
Hanging Rock Car Wheel	55 60	—90	Blooms	100 105	—90

MANUFACTURED.—Trade is quiet, but no change in prices, though concessions are made from card rates.

	B.	C. C.		B.	C. C.
Flat Bar	4 4¼	5¼ 5¾	Half Oval and ½ Round	4¼ 5¼	6 6¾
Horseshoe Iron	5¼ 6	6¾ 7¼	Angle Iron	5¼ 6¼	6¾ 7¼
Heavy Band	4¼ 5	6 6¾	T & Hollow Rail Iron	.6 ..	7½ ..
Round and Square	.4 8	5¼ 9½	Saw-mill Track	.6 ..	7½ ..
Saddle tree	5¼ 6	6¾ 7½	Sheet Iron, 10 to 17	.5¾ ..	8½ ..
Hoop and Light Band	.5¼ 9¾	6¾ 11	Sheet Iron, 27	6½ ..	9½ ..
Oval Iron	4½ 5¼	5¾ 6¾	Boiler-Plate, 3-16, 5-16	.. ..	7 ..

THE COAL TRADE.

NEW YORK, Nov. 27, 1868.

There is but little change to notice in the markets of this week, and the prices given in our review must be considered as nominal at present, and another week must elapse before quotations can be made; and even then we do not expect to witness any very great change from those as now given. The market may be noticed as quiet, the arrivals are liberal, and stock is increasing—high prices limit the consumption. There is a greater demand for stove than for other sizes.

At the Scranton sale, of the 25th Inst., 70,000 tons were sold. There was a large attendance, but the bidding lacked animation, and, as a result, the prices were considerably reduced below those obtained at the last sale. The following are the rates compared with those of last month:

Tons	Nov. 25.		Oct. 28.	
10,000 inmp	$5 75	@5 60	$5 67½	@5 90
10,000 steamboat	5 90	6 30	5 75	5 95
40,000 grate	5 92½	6 12½	6 32½	6 47
9,000 egg	6 00	6 35	7 51½	7 62½
17,000 Stove	7 82½	8 50	7 05	9 20
10,000 chestnut	5 65	5 96½	6 10	6 40

The following will show the exports of coal from the port of New York for the week ending Nov. 24, and for the season to that date, also the amount exported last year for the same period:

Exports for the week	tons	2,231
Do. from January 1	do	61,201
Do. same time last year	do	61,631

At Philadelphia the market is quiet, and vessels are reported plenty.

BOSTON, November 25, 1868.

The market is fair for English Cannel, with sales at $18@$20 per ton. Picton and Sydney are steady at $8 50@$9; and Cumberland at $9 per ton. Anthracite continues in good retail lots at $11@$12; and cargo prices are nominally $10@$11 per ton. The market is very unsettled for coal, and from indications at shipping points, present high prices are not likely to last any length of time.

PHILADELPHIA, November 24, 1868.

There is a fair business, but prices are without any material change.

The following table exhibits the amount of Coal that was passed over the various rontes of transportation from the Pennsylvania Coal districts for the week ending Nov. 21, 1868, and for the season to that date. A comparison is also made with the amount transported the corresponding week in 1867 showing the increase or decrease, as the case may be:

	1867.		1868.		INC. OR DEC.	
COMPANIES.	WEEK.	TOTAL.	WEEK.	TOTAL.	WEEK.	YEAR.
Phil. & Read. R. R.	58,939	3,011,132	64,421	2,839,919	5,482 d	171,213
Schuylkill Canal	33,825	956,738	34,856	1,121,771	1,031	165,033
Lehigh Valley R. R	46,194	1,892,635	54,023	2,169,314	7,879	266,679
Lehigh & Sus. R. R	7,812	457,819	16,593	462,340 d	8,781 d	4,521
Lehigh Canal	31,679	968,084	33,953	937,164	2,274 d	30,920
Scranton North	13,646	422,113	14,267	558,837	621	106,724
Scranton South	21,705	1,122,834	24,889	969,790	3,184 d	153,044
Penn. Coal Co. rail	15,732	750,279	18,744	835,655	3,012	96,376
Penn. Coal Co. canal	117	21,169	827	28,417	710	7,248
Del. & Hud'n Canal	23,985	1,290,172	45,360	1,531,865	21,375	241,696
Shamokin	11,059	440,646	10,048	452,725 d	1,011	12,079
Trevortou	1,498	43,951	955	34,229 d	543 d	9,722
Short Mountain	3,599	80,943	3,487	116,619 d	112	35,676
Lykens Valley Co	2,549	75,620	1,520	77,872 d	1,029	2,252
Hunt'g'n & B'd T'p	6,703	217,967	6,198	248,864 d	505	30,897
Wyoming South	15,921	344,846	13,611	319,764 d	2,310 d	25,082
Wyoming North	....	61,369	2,452	63,869	....	2,500
Williamstown Col.	4,217	117,291	6,374	173,173	2,157	55,882
Total	293,130	12,314,608	359,578	12,962,187		
			299,130	12,314,608		
Increase			60,448	647,579		

Schuylkill Coal Trade.

BY RAILROAD AND CANAL, FOR WEEK ENDING, NOV. 19, 1868.

	RAILROAD.	CANAL
St. Clair	31,224	....
Port Carbon	7,842	9,285
Pottsville	26,300	1,746
Schuylkill Haven	27,333	20,848
Auburn	2,606	....
Port Clinton	12,983	1,419
Company's use	5,311	....
Total for week	113,599	33,298
Previously this year	2,839,919	1,121,771
Total	2,953,518	1,155,069
Same time last year	3,070,071	990,563
Decrease	171,213	164,506

Lehigh Canal Coal Trade.

Shipped for the week ending Nov. 21, 1868.

WHERE FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
MAUCH CHUNK.		
Lehigh Coal & N. Co.	....	....
Summit Mines	12,473 03	343,768 17
Room Run Mines	....	14,584 00
Total Mauch Chunk	12,473 03	358,352 17
BEAVER MEADOW REGION.		
W. T. Carter & Co.	983 07	19,383 04
Spring Mountain Coal Co.	291 01	3,846 06
Thomas Hull & Co.	679 05	16,341 17
Honey Brook Coal Co.	2,237 10	51,721 12
German Pa. Coal Co.	793 06	15,591 18
Other Shippers	81 10	2,196 04
Total Beaver Meadow Region	5,065 19	109,081 01
MAHANOY REGION.		
McNeal Coal & Iron Co	44 00	93 12
Knickerbocker Anthracite Coal Co.	....	192 04
North Mahanoy Mines	....	65 15
Delano Mines	....	....
Primrose Mines	....	....
Walter Brothers & Co.	....	....
Mount Etna Coal Co.	....	860 05
Trenton Coal Co.	....	....
Thomas Coal Co.	....	94 06
Williams & Herring	....	....
New Boston Coal Co.	193 06	1,606 19
Copley Coal Co.	....	787 03
Mount Carmel	138 10	292 01
Other Shippers	....	248 03
Total Mahanoy Region	375 16	4,230 17
HAZLETON REGION.		
A. Pardee & Co	1,707 17	66,428 01
G. B. Markle & Co.	1,355 09	32,991 05
Wm. S. Halsey & Co.	67 06	1,477 17
B. Mountain Coal Co	1,238 01	20,799 02
Sharpe, Weiss & Co	1,315 07	33,721 12
Coxe Brothers & Co.	292 08	9,449 09
Ebervale Coal Co.	691 09	26,194 10
Stout Coal Co.	98 00	11,970 02
Harleigh Coal Co.	1155 17	23,350 09
Asburton Coal Co.	....	64 06
Highland Coal Co.	195 10	15,621 07
Jeddo Coal Co.	....	....
Pardee Brother & Co	....	....
Mount Hall	....	....
Woodside	464 04	8,351 10
Latimer	445 16	6,942 09
Sugarloaf	78 10	1,408 18
Other Shippers	116 06	6,203 02
Total Hazleton Region	9,222 00	264,972 19
UPPERE LEHIGH REGION.		
Upper Lehigh Coal Co.	1,236 01	18,657 17
WYOMING REGION.		
Newport Coal Co.	....	....
Valley Coal Co.	....	....
Warrior Run Manufacturing Co.	....	....
Parrish & Thomas	67 04	10,940 16
New Jersey Coal Co.	129 14	7,056 15
Preston Colliery	....	....
L. & Susquehanna Coal Co.	....	....
Germania Coal Co.	378 07	7,424 06
Franklin Coal Co.	....	....
Audnr'd Im't Coal Co.	....	....
W. Barre Coal & Iron Co	4,202 19	121,666 16
Union Coal Co	....	....
B. H. Hillman & Son	....	....
Wyng C'l & Trns Co.	....	3,704 11
Mineral Spring Coal Co.	....	....
Henry Colliery	....	1,910 10
Everhart Coal Co.	....	....
East Boston Coal Co.	95 00	1,800 04
John Horton	....	16,157 18
Enterprise	....	183 02
Shawnee	92 03	....
Harvey Brothers	....	242 04
Consumers Coal Co.	....	5,716 00
Delaware & Hudson Canal Co.	....	87 18
Chauncy	384 14	1,262 18
Morgan Shaft	....	95 12
Berkley, Price & Co	....	266 04
Other Shippers	139 06	3,283 10
Total Wyoming Region	5,580 07	181,899 04
Mauch Chunk Region	12,473 03	358,352 17
Beaver Meadow Region	5,065 19	109,081 01
Mahanoy Region	375 16	4,230 17
Hazleton Region	9,222 00	264,972 19
Upper Lehigh Region	1,236 01	18,627 17
Wyoming Region	5,580 07	181,899 04
Total.	33,953 06	937,164 15
Corresponding week last year	31,679 16	968,084 02
Increase	2,273 10	....
Decrease	....	30,919 07

Report of Coal Transported over Lehigh Valley Railroad

For the week ending November 21, 1868, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREVIOUSLY Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mahanoy	11,566 06	432,274 14	443,841 00
Total Hazleton	22,340 00	972,478 14	991,818 14
Total U. Lehigh	130 07	37,598 07	37,728 14
Total B. Meadow	12,937 14	407,615 14	420,553 08
Total Wyoming	7,048 19	265,333 08	272,372 07
Grand total	54,023 05	2,115,290 17	2,169,314 03
Same time last year	46,114 18	1,846,521 01	1,892,635 19
Increase	7,198 08	268,769 16	276,678 04
Decrease	....	....	....
Forwarded east from M. Chunk by r'l	54,023 06	2,115,290 17	2,169,314 03
Delivered at M. C'k and on line of r'd above that point	2,603 12	55,648 15	58,252 07
At Penn Haven for shipm't by canal.	2,073 15	185,763 16	194,843 11
At M. Chunk for shipment by canal.	5,009 08	106,314 00	111,323 09
Total by rail and canal	70,716 02	2,463,017 08	2,533,733 10
Same time last year	50,651 17	1,967,098 02	2,017,749 19
Increase	20,064 05	495,919 06	515,983 11
Decrease	....	....	....

Cumberland Coal Trade.

By B. & O. RAILROAD.—The shipments over the Baltimore and Ohio Railroad, for the week ending Nov. 21, were as follows:

From Cumberland and Pa. Railroad, via Cumberland	
Consolidation Company	2,099 18
Borden	2,306 16
Midland	432 13
Allegany	102 08
American	....
From Eckhart RR.	
C. & L. Co.	2,757 01
From George's Creek, via Piedmont.	
George's C. & I Company	2,236 07
Central	3,256 04
Atlantic	967 05
Savage Mt.	93 01
Franklin	328 02
Piedmont	1,655 07
Swanton	622 09
Potomac	1,699 07
Hampshire	2,261 19
American	614 14
Barton	511 02
Total	22,784 13

By C. & O. CANAL.—There were despatched from this port, during last week, 14,489.05 tons of Coal.

The Cumberland *Alleganian*, Nov. 25, says: "The President of the Chesapeake & Ohio Canal Company has given notice to shippers, boatmen and others interested, that no way bills will be issued or clearances for boats from this port given from the 10th proximo, as the water will be drawn from the canal for the purpose of making repairs, etc. In view of the speedy close of navigation, business on the canal is being vigorously pushed, and the different companies are using their utmost efforts to make their shipments as heavy as possible."

Lehigh and Susquehanna Railroad.

Report of Coal shipped for week ending Nov. 14, 1868.

WHERE FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Mauch Chunk Region	2,127 15	32,852 09
Hazleton "	9,874 05	315,917 17
Upper Lehigh "	3,193 17	124,154 16
Wyoming "	17,181 17	446,112 17
Grand Total	32,376 14	919,037 18
Corresponding week last year	7,812 15	457,818 15
Increase	24,563 19	461,218 04
Forwarded South from Mauch Chunk by Rail	15,449 17	399,929 12
Delivered on line of L. & S. R. R. above Mauch Chunk	1,144 01	62,411 00
Delivered at Coal Port for shipment by Canal	15,782 16	456,967 07
Total	32,376 14	919,037 19

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

At New York, Nov. 21, 1868.

Schuylkill R. A., choice	$10 25	$....	Schuylkill Chestnut	$7 50	....
" Ordinary	10 00	....	Lehigh W.A.L'p old Co.	8 75	....
" W. A. Lump	7 50	....	" Broken	8 50	....
" Steamboat	8 00	....	" Egg	9 25	....
" Broken	8 50	....	" Stove	10 00	....
" Egg	9 00	....	" Chestnut	7 50	....
" Stove	10 00	....	Shamokin	7 50	....

SPECIAL COALS.—DEALERS' QUOTATIONS.

Diam'd Vein R.A., Sch'kill	10 50	....	Old Co.'s W. A. Lehigh	....	9 50
Locust Dale W.A., "	10 25	....	Mt. Pleasant	....	....
Honey Brook " Lehigh	9 50	9 75	Buck Mountain	7 50	10 00
Harleigh " "	8 25	9 75	Buck Ridge W.A., Sh'kin.	10 50	....
Spring M'n " "	8 25	9 75	H. Heils, E. F'klin, Lorb.	10 00	10 50
Sugar Creek " "	....	9 75	New England Red Ash	7 25	7 95
Sugar Loaf " "	....	....	Wyoming	7 50	....

Dealers in these Coals may be found in our advertising columns.

At Philadelphia, Nov. 25, 1868.

Lehigh L'p and St'mb't	6 50	6 75	Henry Clay, Egg & St.	....	8 00
" Broken and Egg	6 75	7 25	Locust Mount Lump	....	6 00
" Stove	7 75	8 00	" Steamboat	6 00	6 25
" Chestnut	6 00	6 25	" Broken	....	6 75
Schuylkill R. A	7 75	8 00	" Egg	7 25	7 50
" Chestnut	5 50	5 60	" Stove	....	7 75
" W. A. Lump	5 25	6 00	Lorberry Coal	8 00	8 25
" Broken	6 50	6 75	Shamokin	7 25	7 50
" Egg and Stove	6 90	7 50	Franklin, (Lykens Val.)	8 00	8 50
" Chestnut	5 50	6 00	Broad Top	....	5 00
Hill & Harris, Egg & St.	7 50	7 75			

Scranton Coal at Elizabethport, Nov. 21, 1868.

(Corrected weekly by D. L. & W. R. R. Co.

Lump	6 25	....	Egg	8 00	....
Steamer	6 25	....	Stove	9 50	....
Grate	6 75	....	Chestnut	6 50	....

Prices for Pittston Coal at Newburgh, Nov. 21, 1868.

(Corrected weekly by Penna. Coal Co.)

Lump, per ton, 2240 lbs.	....	....	Egg " "	....	....
Steamer, " "	....	....	Stove " "	....	....
Grate " "	....	....	Chestnut " "	....	....
Pea " "	....	....			

70 cents additional to New York.

Lackawanna at Rondout, Nov. 21, 1868.

Lump	6 25	....	Egg	8 00	....
Steamer	6 50	....	Stove	9 00	....
Grate	7 00	....	Chestnut	6 50	....

65 cents additional to New York.

Lehigh Coal at Elizabethport, Nov. 21, 1868.

Lump	8 25	....	Chestnut	7 50	....
Steamboat and Broken	8 25	....	Stove	9 75	....
Egg	9 00				

Wilkesbarre Coal at Hoboken, Nov. 21, 1868.

(Corrected by Wilkesbarre Coal & Iron Co.)

Lump	6 50	....	Egg	8 75	....
Steamer	7 00	....	Stove	9 75	....
Broken	8 25	....	Chestnut	7 50	....

At Baltimore, Nov. 21, 1868.

Wholesale prices to trade.

Wilkesbarre by cargo or car load	$8 25	@8 50	Trevorton R. A	$....	....
Pittston and Plymouth	....	8 25	By retail, per ton of 2,240 lbs., delivered	10 00	10 50
Shamokin R., or W. Ash	....	8 50	Georges C'k & Cumberland f. o. b. at Locust Point for shipping	....	5 00
Lykens Valley, R. A	8 50	8 75			

At Havre de Grace, Md.

Cargo prices for shipment *south* of Patapsco River, (drawback allowed of 10 per centum.			Shamokin R. or W. Ash	$....	@8 50
			Lykens Valley R. A	....	8 50
Wilkesbarre and Pittston W. Ash	$....	@8 00	Trevorton R. A	....	....

At Georgetown, D. C. and Alexandria, Va.

George's Creek and Cumberland f. o. b .... @4 75

Prices of Gas Coals.

November 21, 1868.

PROVINCIAL. Duty, $1 25	Coarse. Gold.	Slack. Gold.	AMERICAN. Currency.	Coarse.	Slack.
Block House	$1 75	@$ 75	Westmoreland Co	$8 50	$8 00
Gowrie	1 75	75	Despard Coal Co	8 50	8 00
Lingan	1 75	75	Penn	8 50	8 00
Sydney	2 13½	71½	Newburgh Orrel Gas	8 50	8 00
Pictou	2 13½	1 18½	Delivered in New York.		
Little Glace Bay	1 75	1 00	West Fairmont Gas Coal	....	7 50
Caledonia	1 60	75	Run of Mine	....	7 00
			On Board at Baltimore.		

Prices of Foreign Coals.

Duty, $1 25 per ton.

Corrected weekly by PARMALEE BROS., 32 Pine Street, N. Y.

Liverpool Gas Caking	$ 9 50		Liverpool House Cannel	18 00	19 00
" " Cannel	14 00		" Orrel	16 00	18 00

Per ton 2240 lbs., Ex. ship.

PRICES FROM YARD.

Liverp'l House Orrel, scr'd	$20@23		Liverp'l House Can'l, scr'd	$22 00	25 00

Per ton 2000 lb., delivered.

Freights on Coal Sea-borne from Port Richmond, Philadelphia.

Nov. 21, 1868.—From Philadelphia and Reading R. R. Wharves, Phila., to

Bangor		3 50	New London	—	2 70
Boston	—	3 50	Dover	—	3 55
Providence		3 00	Cohasset Narrows	—	3 40
Lynn and discharging		3 50	Cambridgeport	—	4 00
Portland		3 50	Dorchester	—	3 30
Fall River	—	3 00	Fair Haven	—	2 75
New Bedford		3 00	Gloucester	3 40	3 50
Salem		3 50	Lawrence	—	3 40
Newport	—	3 00	Old Cambridge	—	3 80
East Cambridge	—	3 30	Saco	—	4 10
Newberryport	—	3 75	Roxbury	—	3 55
Portsmouth	—	3 75	Salisbury	—	3 80
Charleston	—	2 00	Greenport	—	2 75
Danversport and discharging		3 50	Norwich	—	2 75
Amesbury	—	3 90	Harlem	—	1 45
Beverly		3 50	New Rochelle	1 30	1 40
Charlestown		3 50	Sag Harbor	—	2 75
Hingham	3 35	3 40	Spuyten Duyvel	—	1 40
Marblehead		3 60	Williamsburg	—	1 35
Nantucket	—	3 50	Jersey City	—	1 80
Plymouth	—	3 35	New Brunswick	—	1 20
Provincetown	—	3 50	Alexandria	—	1 40
Washington	—	2 25	Fredericksburg	—	2 20
Calais	—	3 30	Wilmington, Del.	—	1 00
Machiasport	—	3 30	Bath		3 70
Hoboken		1 60	East Greenwich		3 ..
Hyannis		3 50	Providence		2 ..
Malden		4	Albany		1 95
Nahant and discharge		3 20	New York	1 50	@1 60
Weymouth and towing		3 50	Troy		1 95

Coal Freights.

(Corrected Weekly).

Rates of Freight from Newburgh.

RIVER.		EASTERN.	
On "Pittston" Coal, by boats and barges of the Pennsylvania Coal Co., per ton of 2,240 lbs.		Stamford	$1 60
Troy and West Troy	$ 55	Norwalk	1 60
Albany and Greenbush	50	Bridgeport	1 60
Coeymans	45	New Haven	1 60
Coxsackie and Stuyvesant	40	New London	1 80
Hudson and Catskill	35	Norwich	1 90
Saugerties and Barrytown	35	Mystic	1 85
Rhinebeck and Rondout	30	Stonington	1 85
Po'keepsie and New Paltz Land.	25	Sag Harbor	1 85
Fishkill Landing	20	Bristol	1 95
Cold Spring and West Point	30	Newport	1 95
Peekskill	40	Fall River	1 95
Haverstraw	45	Providence	2 00
Sing Sing and Nyack	50	Dighton	2 00
Tarrytown and Piermont	50	Warren	2 00
Yonkers	55	Pawtucket	2 20
The coal must be discharged with all reasonable dispatch, at the expense of the consignee, who shall also pay wharfage on the boat. Boatmen will tend guy while unloading.		New Bedford	2 10
		Boston	3 00
		East Cambridge	3 10
		Salem	3 00
		Newburyport	3 10
		Portsmouth	3 10
		Portland	2 90

From Elizabethport and Port Johnson.

Albany	$1 10	@— —	New London	$1 50	— —
Boston	2 60	— —	Newport	1 75	— —
Bridgeport	1 35	— —	New York	65	— —
Fall River	2 00	— —	Norwalk	1 35	— —
Hartford	2 00	— —	Norwich	1 75	— —
Hudson	1 10	— —	Pawtucket and towing	1 85	— —
Wareham	2 20	— —	Portland	2 00	
Middletown	1 85	— —	Portsmouth	3 00	
New Bedford	2 00	— —	Providence	2 00	— —
Newburyport	3 00	— —	Salem	2 50	— —
New Haven	1 35	— —	Augusta	3 25	— —

Provincial Freights.

TO NEW YORK.		TO BOSTON.	
Sydney	$3 50	Sydney	$2 75
Lingan	....	Lingan	2 25
Cow Bay	4 50	Cow Bay	....
Port Calidonia	4 25	Port Calidonia	3 00
Little Glace Bay	4 00	Little Glace Bay	2 75

Foreign Freights.

New Castle and Ports on Tyne	£13@£15 keel.		
Liverpool	12s. 6d.@15s. ton.		
Australian	9 50@10 00	Lehigh	15 50@16 00
do. Wallsend	10 00 10 50	Liverpool	13 00 ....
Bellingham Bay	11 00	Pittston, ton	14 50 15 00
California	7 00 9 00	Scrantou	14 00 15 00
Cumberland cks	30 00 32 00	Scotch	13 00 ....
do bulk	28 00	Vancouver Island	12 50 ....
Chili	10 00		

Rates of Transportation to Tide Water.

[BY RAILROAD.]

To Port Richmond, Philadelphia.

Philadelphia and Reading Railroad, from Schuylkill Haven $2 00

The following are the drawbacks allowed on all coal shipped East of New Brunswick and South of Cape Henry, until further notice.

	Drawback.	Freight.	Nett.
Lump	35	$2 00	$1 65
Steamboat	35	2 00	1 65
Broken	..	2 00	2 00
Egg	..	2 00	2 00
Stove	..	2 25	2 25
Chestnut	..	2 10	2 10

From Port Carbon, 8 cents per ton extra.

To Elizabethport.

L. V. Railroad from Mauch Chunk to Easton	$ 1 00
C. R. R., N. J., Easton to Elizabethport	1 55
Shipping Expenses at Elizabethport	25
	2 54
Total	.. ..

To Port Johnson.

L. V. R R	$ 1 04
C. R. R. of N. J	1 63
Shipping Expenses	25
Total	2 92

To Hoboken.

L. V. R.R	1 04
Morris & Essex R.R	1 63
Shipping Expenses	25
Total	$2 92

To Philadelphia.

[BY CANAL.]

From Schuylkill Haven to Port Richmond	$1 00
Freights and tolls by Raritan Canal	2 25
	3 25
No Drawback	
Total	3 25

To New York.

From Mauch Chunk to New Brunswick, by Lehigh, Del. Div. and Del. & Raritan Canal $1 56

Freights through	1 55
Towage	20
	3 31

To New York via Morris Canal.

Lehig Canal	$ 61
Morris "	80
Towage	70
Freight	1 80
Total	3 31

Expenses from Mauch Chunck to Jersey City for Re-shipment.

Lehigh tolls (net)	$ 49
Morris "	49
Freight	1 65
Re-shipping	30
Total	3 31

SAN FRANCISCO STOCK MARKET.

A telegram from San Francisco, dated Nov. 4, quotes:

STOCKS.	Per Sh.		SHARES.	Per Sh.	
Gould & Curry	104@	..	Belcher	....	..
Savage	70	..	Imperial	109	..
Chollar Potosi	..	147	Alpha	47	..
Hale & Norcross	64	..	Amador	..	..
Crown Point	50	..	Kentuck	..	240
Yellow Jacket	13.00	....	Ophir	..	..

SAN FRANCISCO, Nov. 16, 1868.

ASSESSMENT: Overman Mining Co., $20 in gold per share. Delinquent Dec. 16, 1868.

NEW YORK, Nov. 18, 1868.

Delinquent sale, Jan. 4, 1869.

London Copper Trade Circular.

Messrs. Vivian, Younger, and Bond (Nov. 6) write—The state of the Liverpool market for Chili produce has remained much the same, holders being indisposed to make concessions to buyers, and the latter declining to raise their limits. Values are quoted about the same. The arrivals of copper from Chili during the month of October have been very large, amounting to 6,650 tons; nevertheless, the stock has only increased to the extent of 3,000 tons. Small sales of fine foreign have been made at £79 to £79 10s. for both Burra and Wallaroo. The market closes with a quiet but steady appearance.

AMERICAN

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WESTERN & COMPANY, Proprietors.

ROSSITER W. RAYMOND, EDITOR.

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T. P. PEMBERTON is Corresponding and Traveling Editor.

W. B. HARRISON is Editor of the Mechanical Department.

☞ Correspondents, exchanges and others addressing us should be *extremely careful* to write "JOURNAL OF MINING," instead of "MINING JOURNAL," and to give the number of our Box at the Post Office, which is 5969, to ensure safe carriage. Communications intended for publication should be plainly written, and on one side of the paper only.

NEW YORK, SATURDAY, NOVEMBER 28, 1868.

CONTENTS OF THIS NUMBER.

NOTICE TO CORRESPONDENTS.

In consequence of a new regulation recently adopted by the Postmaster of this city to facilitate the early delivery of mail matter, we have to request our correspondents, in addressing us, to give the number of our post-office box, No. 5,969, in lieu of, or in connection with our business office address.

MORE SUBSCRIBERS WANTED—LIBERAL INDUCEMENTS.

We make the following very liberal offers to any who may feel disposed to aid us in increasing the circulation of the JOURNAL OF MINING. To any one who will send us the names and addresses of *five* new subscribers for the period of one year, and $20 in currency in payment therefor, we will give in return for such effort one copy of Kustel's new work on "Concentration and Chlorination." Price, $7 50. This is an offer that should most assuredly command the attention of all who are in need of the work.

Again, any one sending us the names and addresses of *four* new subscribers and $16 in payment therefor, will be rewarded with the newly bound Vol. No. V. of the JOURNAL OF MINING. Price, $5.00. For *three* subscribers we will present a copy of Hollister's "Mines of Colorado." Price, $2 00. Or again, for *two* subscribers, one copy of William Hopton's "Conversation on Mines."

Should none of the above works be desired, we will furnish any that may be called for under the above terms.

APPLICATION OF THE THEORY OF SPECIFIC HEAT TO THE DETERMINATION OF THE TEMPERATURE OF BLAST FURNACES, AND OTHER HIGH DEGREES OF HEAT.

The amount of labor spent in the investigation of the subjects of specific heat, latent heat, and the relation between heat and power, is almost incredible; but no labor spent on any subject of natural investigation was ever more fruitful in its results, as well in a practical as a purely scientific view. We will illustrate this in its relation to the subject of specific heat.

Carefully conducted experiments prove that the specific heat of a substance is not the same for all degrees of heat, and that it increases with the temperature; for instance, the capacity of water for heat is greater when the temperature of the water is raised to 100° than at 32°. Now, as water has been adopted as a standard, and the rise in temperature of one pound one degree is called the unit of heat, it is clear that this unit would not always be the same if no limitation of temperature were added; and, therefore, if we wish to express ourselves with perfect scientific accuracy, we must not only state that the unit of heat is the amount required to raise the temperature of one pound of water one degree, but, we must add, from the melting point of ice. That is, *the unit of heat is the amount of heat required to raise the temperature of one pound of water from* 32° *to* 33°, *Fahrenheit.*

It is true that the statement, as commonly made, is pretty near the truth (since this increase of capacity for heat, or specific heat, with the rise of temperature is only slight), and correct enough for ordinary practical purposes; but when these principles are applied to certain other investigations, it is necessary to take this increase of capacity for heat into account. Among such investigations, we may mention the determination of temperatures so high that no simple practical thermometer, as yet invented, gives uniform and reliable results. For instance, when we wish to measure the temperature of a blast furnace, we expose in it a mass of platinum of known weight, and when this mass has acquired the temperature of the furnace, we transfer it quickly to a vessel surrounded by a known weight of water. If now, taking all possible precaution against the loss of heat from the water, we observe, by means of thermometers, the elevation of its temperature by this mass of hot platinum, we possess all the data required for calculating the temperature of the furnace, if the specific heat of the platinum is known. In order to find the specific heat of platinum, we may make two experiments in the same furnace and at the same temperature, with unequal quantities both of platinum and of water, and thus obtain two equations with two unknown quantities, viz: the specific heat of the platinum and the temperature of the furnace. From these equations we may easily extract, first the specific heat in question, and then the desired temperature of the blast furnace.

Since the specific heat of the platinum, from 32° upward to 1,000° and more, has been found by other means, we may also calculate the temperature of the furnace from a rough estimate of the value of the specific heat of the platinum for the unknown temperature, and afterward use the specific heat corresponding to the temperature thus obtained, for calculating a new value of the temperature which will be more exact.

POUILLET was the first to determine the specific heat of platinum, at different high temperatures, for the above purpose; he used an air thermometer of peculiar construction, and found the following data for the

MEAN SPECIFIC HEAT OF PLATINUM.

From 32° to 212°	0.03350
From 32° to 572°	0.03434
From 32° to 933°	0.03516
From 32° to 1,292°	0.03602
From 32° to 1,832°	0.03728
From 32° to 2,192°	0.03813
From 32° to 2,732°	0.03938

It will be seen from this table that the specific heat of platinum, when taken at the common temperature, is nearly one-thirtieth, and when taken at some 2,700°, Fahr., is about one twenty-fifth of that of water; in other words, in the first case, 30 pounds of platinum losing 1° of heat, will produce one unit of heat, or raise the temperature of one pound of water from 32° to 33°; and that in the second case, 25 pounds of platinum, losing 1° of heat, will be able to produce the same effect.

It is thus seen that the same quantity of heat will not raise the temperature equally one degree in all parts of the thermometrical scale. The above table shows this for platinum, and in the case of water it has been proved that to raise the temperature of water from 212° (its boiling point) to 213° (of course in a close vessel), requires not one unit of heat, but 1.013 units—taking as a standard the unit mentioned above, namely: water heated from 32° to 33°.

It is thus seen that the increase of specific heat with the temperature is greater in the case of water than in the case of platinum, as it requires one seventy-seventh part more heat to raise the temperature of water from 212° to 213° than from 32° to 33°, while in the case of platinum it requires only one ten-thousand part more heat to raise its temperature from 212° to 213° than to raise it from 32° to 33°.

The very high temperature or great amount of heat of a small mass of platinum, when diffused through a large mass of water, being easily observed by the thermometer, we may thus, by the aid of the well known specific heat of these substances at different temperatures, deduce easily the high temperature which the mass of platinum possessed before it had surrendered its heat to the water, and in this way determine the heat of the furnace in which the platinum was exposed, until a caloric equilibrium was established.

This method of determining very high temperatures is very simple, very practical, and much less known and applied than it deserves to be. As the knowledge of the temperature of furnaces, etc., is of great importance, we will, in another article, explain the *modus operandi* with some detail.

THE DISCOVERY OF SODIUM AMALGAMATION.

It is by no means certain, as yet, whether the discovery of the metallurgical uses of sodium amalgam is as important as it was at first considered to be. In our recent journey through the Pacific States, we found the opinions of mill-men to differ widely as to the benefit derived from this agent in the amalgamation of gold. Some highly praised it, and others unqualifiedly condemned it. It is used in some mills, with alleged good results, while in others it is said to have been tried and rejected. This is not surprising. With all their acknowledged skill, the mill-men of California are frequently deficient in scientific knowledge—by which we do not mean book-knowledge, but that sort of comprehension of facts which recognizes correctly the relations of cause and effect. Hardly any two of them give the same explanation of the phenomena which they daily produce and observe. No light has been thrown on the question of sodium amalgamation by their experience, which can be regarded as conclusive in either direction.

Mr. CROOKES, however, one of the editors of the English translation of KERL's Metallurgy, is remarkably confident of the merits of this process. He introduces an extended eulogy of it in the chapter on *silver*, between the descriptions of the patio and AUGUSTIN processes for treating silver ores. All the experiments cited only refer to its use in the amalgamation of gold ores; and Mr. CROOKES' recommendation of amalgamated copper plates for silver ores (p. 351) will scarcely be received with applause by those who understand the process of silver amalgamation.

We have already noticed the fact that the name of the American inventor has been studiously omitted from this notice, although, with incredible audacity, the experiments instituted in this country by the friends of Prof. WURTZ, with reference to *his* discovery, are cited as so many triumphs of "Mr. CROOKES' process of sodium amalgamation." The "distinguished discoverer of thallium" was once more modest in his claims. Did he never write these words?

"The priority of discovery of any scientific truth is a fact which must be settled for one or for another by an appeal to *facts*; and it is as much out of the power of either party in controversy to make concession of this point to the other, as it is opposed to any wish to inaugurate or prolong an utterly fruitless *argument* on the subject. The history of invention abounds with instances of simultaneous discovery; and I am very willing to believe that the discovery of the practical value of sodium in gold and silver amalgamation was a *bona fide* discovery on the part of Mr. WURTZ, as I hope he will believe it to have been so on mine."

"Simultaneous" is a word skilfully chosen; in point of fact, the only possible claim was that of an honestly *independent* discovery. The question of priority rests on Mr. CROOKES's favorite authority, facts. We here recapitulate the official dates; and if we mistake any of the English ones (to which we have not at this moment complete access, but quote from memoranda) we shall be ready to make correction. As we understand the case, it may be thus presented.

July 16, 1864, is the date of Prof. WURTZ' letter, now on file at the Smithsonian Institution, containing his oath of invention, and specifications of his invention to that date. This document is sworn to, stamped and attested before a notary. A single extract from it will show that it describes the same invention as was afterwards patented:

"Third—When the common mode of saving gold by washing the crushed ore or tailings, on amalgamated plates of copper is used, in sprinkling from time to time over the amalgamated copper surfaces small quantities of fluid or finely divided solid amalgam of sodium or potassium." (CROOKES' KERL's metallurgy (1868) p. 35, says: "By employing amalgam, A, in coarse powder, and sprinkling it over the wetted metallic surface to be amalgamated," etc.

December 27, 1864, is the date of the granting of the U. S. patent for sodium amalgamation to Prof. WURTZ. According to our patent law, Prof. W. had the privilege of leaving the patent six months in the archives of the office. This provision is intended to give patentees the opportunity to secure their rights in foreign countries; and he availed himself of it, in order to apply for a similar patent in England. The U. S. patent therefore bears date Dec. 27, 1864, and was publicly issued June 27, 1864.

Feb. 11, 1865, is the date, we believe, of Mr. CROOKES' application. His patent was issued in August of that year, but we are informed that in June he published an article on the subject.

Prof. WURTZ antedates Mr. CROOKES therefore nearly seven months in his oath of invention, six weeks in the grant of his patent, and about a month in the issuing of his patent. This is "simultaneous discovery" with a vengeance!

Mr. CROOKES desires to avoid a "fruitless argument on the subject." This argument is not fruitless. It gives considerable point to the question, why, after the American chemist had by magnanimous silence allowed the claim of Mr. CROOKES as a "*bona fide*"—i. e., an honest, though not a very early discoverer, the latter takes pains now to exclude his predecessor from all share of the credit. We do not charge him with having borrowed the invention; but this certainly resembles an ungrateful and unmanly attempt to monopolize the glory. He should remember that the

general esteem in which he is held is what causes the scientific men of both America and England to accept his word of honor that the suspicious case presented by the dates is only an unfortunate coincidence; that even the wonderful similarity of his specifications to those of a patent already granted in Washington six weeks before he made his application in London, was accidental; in short, that his discovery, though far from simultaneous, was independent. He "hopes this will be believed," and so it is believed (though not yet proved) on the authority of his honor as a man. It is certainly his best policy to confirm that trust by fair dealing towards those who might make his position more uncomfortable than it has yet been. We have not presented all the evidence in the case, but we have given enough to justify us in demanding, on behalf of American science, a prompt apology for the omission of Prof. WURTZ' name from Mr. CROOKES' last book.

It may be said that this is but a small matter. We think these small things unworthy of great men, and this man is great enough to be above the ordinary motives to such conduct. Millionaires shouldn't play unfairly for twopence. But in many aspects the thing is not small among scientific men; it may turn out to be considerable among all men. Arrogance and narrow-mindedness are not small things; and it is really important, in our opinion, that as little as possible should be done to justify the severe judgment of the English poet, TENNYSON:

"The man of science himself is fonder of glory and vain;
An eye well practiced in nature, a spirit bounded and poor."

DO FISSURE-VEINS GROW WIDER IN DEPTH?

A true vein is a fissure in the earth's crust, filled subsequently to the fracture with mineral matter. It need not necessarily be valuable to man; it need not even carry metallic minerals, but it must be a filled fissure. It is distinguished from beds or layers, even when they have been tilted so as to resemble the majority of veins in having a steep dip, by the fact that a fissure-vein carries a vein-matter more recent than the material of either wall, while a bed is more recent than the underlying, and more ancient than the overlying rock. A vein is distinguished, on the other hand, from a mass or an impregnation, by the fact that it occupies a fissure. Contact-veins are generally not fissure-veins; yet they may in special cases, be such. The evidences of the fissure and its subsequent filling are the only ones which conclusively establish the character of the vein. This statement is not intended to be exhaustive, but only introductory to the consideration of the question at the head of this article. Especially is it not intended to offer a means of making legal distinctions. We shall at no distant day take up that aspect of the case, and show how the law must and can discriminate between different classes of mineral deposits.

In answer to the question, do fissure-veins grow wider in depth—we reply:

Every fissure-vein passes through three epochs; the formation of the fissure, the intrusion of vein-matter, and the subsequent transformations resulting from pressure, movement and chemical change. The width of the vein at any given depth depends upon two things: the original size of the fissure, and the subsequent closing of it by the weight of the hanging wall, or even, when the footwall is soft, by the rising of the latter—also an effect of the superincumbent weight. It is the tendency of every fissure not absolutely vertical, to close, before the period of intrusion of vein-matter commences, and during the progress of that process, until the vein is so filled with hard mineral as to resist further motion. But the hanging wall, in closing on the footwall, rarely comes into its former relative position. On the contrary, it is apt to slide, generally downward. When a fragment of the hanging wall, splitting off and becoming wedged in the fissure, prevents its closing, the sliding movement frequently produces polished surfaces, which are called "slickensides." These are also caused by the friction of wall on wall, wall on vein-matter, and vein-matter on itself. Whenever they occur, they indicate previous motion. A less degree of motion, together with the percolation of water, produces the layer of clay along the walls, known as "fluccan," "selvage," or "gouge." Finally, the motion of one wall up or down relatively to the other causes the width of the vein to vary. Draw two parallel wavy lines upon a sheet of paper, and imagine one of them to be moved along until the curvatures are opposite, not parallel. It is easy in this way to see how the movement of one wall of a vein may cause the vein alternately to "bulge" and "pinch."

To recapitulate: the width of a vein depends first, on the original fissure, and the width of *that* is a function of circumstances unknown and various. A force, for instance which presses vertically upwards until the crust is fractured, must make the fissure wider at the top than anywhere else, while a fissure produced by settling might be wider towards the bottom.

The width of a vein depends also on the degree to which a fissure closes before and during the entrance of vein-matter. This again directly depends on the dip, on the presence of "horses," and on the speed and uniformity with which the vein-matter is deposited.

The width of a vein depends again on those movements of the walls which produce alternate wide and narrow zones in the fissure.

Now all these things, though they may be partially investigated and known in a single given case, cannot be reduced to a general law; hence, a priori there can be no general law that fissure-veins grow either wider or narrower in depth. Experience signally corroborates this conclusion, showing that while veins of certain limited districts have a similarity of character, there is no uniformity that covers large regions, or different circumstances. Some veins "behave" one way in depth, and some another.

But an argument which cannot be evaded may be deduced from the fact that we have no standard of depth. We have frequently heard miners discussing whether their veins would "give out" in six hundred feet, when the whole surface of the mountain on which the veins cropped out had been so enormously degraded by denudation, that the very outcrops on which these philosophers began to work were five thousand feet under the original "grass." Until we can decide how wide was that portion of a vein which floods and glaciers, and the slow work of time have swept away, we cannot very well attempt to argue a priori whether, because it is a vein, it must or must not widen as we sound our puny depths upon it.

The question, whether or not a fissure-vein should increase in richness or value with increasing depth, we reserve for future discussion.

The Last Wonder of the Spectroscope.

The spectroscope, which, since its invention eight years ago by BUNSEN and KIRCHOFF, has contributed so much to the progress of science, was used with signal success in observations of the recent total eclipse of the sun, by English and French parties, in different parts of Asia. By this means the nature of the protuberances on the rim of the solar disc, observed in former eclipses, has been satisfactorily explained. They are found to be columns of incandescent gas, possibly containing hydrogen. Of course an eclipse, which is nothing but the result of certain relative positions of the sun, earth and moon, does not produce these phenomena; it only allows us to see them. M. JANSSEN, leader of the French expedition, conceived, during the eclipse, the idea of a contrivance which would enable him to study these protuberances at any time, undisturbed by the brighter light of the body of the photosphere. Particulars of these and other discoveries are expected soon. We are likely to have before long new and more satisfactory theories of the physical constitution of the sun.

Nitrate of Ethyl—A New Anæsthetic.

This substance, of which the chemical formula is $C_4 H_5 O, No_5$, possesses remarkable anæsthetic properties; it has a very fragrant and agreeable smell, a sweet, but of a bitter after taste. Its boiling point lies at 185° Fahr., and its specific gravity is 1.112 at 62.5° Fahr. It burns with a white flame, is not soluble in water, but easily so in alcohol. This ether is generally produced by the reaction of nitric acid on alcohol, in presence of nitrate of urea, but the yield is too small to admit of its being applied as an anæsthetic. We propose, however, to describe on a future occasion a new mode of preparation by which it can be produced at a rate so cheap that it may be introduced into the market.

ANSWERS TO CORRESPONDENTS.

P. C. C., OF PA.—"If a boiler with pressure of steam at 30 lbs. to the square inch be heated until its pressure is 100 lbs., has the last mentioned steam less moisture in it, and if so, has part of the steam first mentioned (30 lbs.) been condensed by additional pressure back to water?" In reply, we remark that a steam-boiler is not like a bladder, which yields to internal pressure, and expands when the air inside is heated. In a bladder the quantity of air and the pressure is the same at all temperatures, whatever become its volume—in an unyielding steam-boiler, the density of the steam varies very nearly in ratio to the pressure, which truth is expressed by the so-called law of Mariotte. When water is heated to 248 degrees, corresponding to 30 lbs. pressure, the steam formed will occupy nearly 900 times the original volume of the water; when heated 320 degrees, corresponding to nearly 100 lbs. pressure, the same volume of the boiler will contain more steam, since the steam at this pressure occupies only about 300 times the bulk of the water from which it was generated; in other words, a boiler of 900 cubic feet steam room contains, when at 30 lbs. pressure, one cubic foot of water in the condition of steam; when at 100 lbs. it contains 3 cubic feet of water in this condition, therefore, in the last case, in place of steam having been "pressed back to water," three times as much water has been changed into steam, and the steam contains three times as much water as in the first case. This is upon the supposition that there is not only steam but also water in the boiler, which we accept as a matter of course. When using the so-called superheated steam, however, by pressing the steam through heated tubes, and changing it into so-called dry steam, the amount of water it contains remains the same, but by the temperature it attains a relative dryness, and when coming in contact with water, will absorb part of it, till the conditions above mentioned are satisfied.

E. DENNIS, Road Master, Laramie Division, U. P. R. R., Laramie, Wyoming Territory, writes—"I wish to subscribe for a good reliable Railroad periodical. Your house being recommended as one well posted in that class, I would take it as a great favor if you would suggest the name of a good journal. If a sample number could be conveniently forwarded to me I would be greatly obliged." There are several good railway journals published in New York, Boston, Philadelphia and Chicago. We do not care to specify which is, according to our notions, the best. We prefer to give you their names, that you may send for specimen copies and judge for yourself. Probably you will conclude to to take them all. They are as follows: *American Rail Road Journal*, New York: *Rail Road Times*, New York; *American Railway Times*, Boston; *U. S. Railroad and Mining Register*, Philadelphia; *Western Railroad Gazette*, and the *Railway Review*, both at Chicago, Ill.

C. R. JR., MARQUETTE, MICHIGAN.—To obtain the number of cubic feet in an irregular stope under ground, divide the roof into triangles, and measure the distance from each corner of every triangle to the floor. Then calculate the area of each triangle, and multiply it by one-third the sum of the heights of its three angles above the floor. Add these products together; and if all your measurements have been expressed in feet, the final result will be the contents of the stope in cubic feet. The smaller you make your triangles, the more accurate will be the result. Of course, however, you need not make more than one triangle on a smooth plane surface; since the object of the triangulation is to accommodate the inequalities of the roof. In our opinion, you could arrive at a sufficiently accurate conclusion by measuring the stope as if it were regular, and then making such deductions as you estimate the irregularities to require.

R. W. OF PHIL.—The so-called self-fermenting flour contains simply powdered tartaric acid and bicarbonate of soda, which, by being moistened, combine to tartrate of soda, and set the carbonic acid free, and thus make the bread or cakes rise. This flour, however, loses this quality after some time, as these two chemical substances slowly combine. It is much better to divide common flour in two equal portions, mix one with a solution of bicarbonate of soda in water, and the other with very dilute hydrochloric acid. Those two portions of dough then well mixed and baked, will raise also by the development of carbonic acid gas, meanwhile the result of the combination will be chloride of sodium, or common salt, which, in any event has to be added to bread or cake. The proportions are two parts of the dry bicarbonate to one of the strong acid, by weight, as the atomic weight of the first is 73 and of the second 37.

S. M., OF NEW YORK.—To make India Ink which will not wash off with water, mix the lampblack, ivory black, or other form of carbon you use in place of it, with gum-water with glue dissolved in a solution of bichromate of potassa; when the drawing or writing made with such an ink is exposed for a few minutes to the day or sunlight, it becomes entirely insoluble in water, and cannot be washed away.

S. B., OF MO.—The trouble with your grind-stone is probably that you leave the same side always in the water; this side will get too soft, and will be used up more. It is a good plan to have a small stream of water running on your tool when grinding, and keep the stone dry when not in use, or to have the water-tank below the stone arranged in such a way that it can be lowered, and only raised when grinding.

C. SMITH, OF BOSTON.—Metallic cerium has not yet been applied to any useful purpose, although it might prove valuable in the state of oxide for painting on porcelain or for coloring glass. In appearance it is a white, brittle metal, volatile at high temperatures, and soluble in aqua regia.

Original Papers.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

PLUMBAGO.

BY DR. LEWIS FEUCHTWANGER.

Among the most refractory substances in nature is the mineral plumbago, which is called black lead, graphite, and carburet of iron. Its name, plumbago, is derived from the Latin "plumbum ago," meaning "I act like lead;" as metallic lead was, up to the fifteenth century, used for drawing on paper; the name black lead has the same origin; graphite is from the Greek, $\gamma\rho\alpha\varphi\omega$ "I write;" the name carburet of iron is more appropriate, as the mineral consists of ninety odd per cent. of carbon, and a fair per cent. of iron. The Brazilian plumbago, however, is pure carbon. All the the names just mentioned are used in daily life.

It is quite soft, has a specific gravity of 2.09, a metallic lustre, a shining streak, and an iron-black to steel-gray color. It is opaque, soils paper, and feels greasy. When of laminated structure, its laminæ are flexible; but it also occurs massive and granular. Its regular crystal form is a rhombohedron, but hexagonal tabular crystals are also found. It burns at a high temperature, without flame or smoke; is infusible before the blow-pipe, and not affected by acids. Its geological position is in the primary rocks or altered rocks lying at the base of the palæozoic series. It is mostly disseminated in calcareous or argillaceous shales. Extensive formations of plumbago occur in the Laurentian series of rocks in the northern part of the State of New York, near the head of Lake Champlain, at Ticonderoga, Lake George, and in the range across the lake, in Canada West; in the metamorphic region of Massachusetts, at Stnbridge. In the gneiss of North Carolina there is an extensive formation; large blocks have been quarried from this locality a few years ago. England boasts of the first known and best locality, at Borrowdale, in Cumberland, discovered in the year 1564, during the reign of Queen Elizabeth. It is found there in a greenstone rock, in nests and beds of clay. From the date of this discovery, a new epoch in the industrial operations of domestic economy was opened; and its importance was manifested by the mandate of the English Government prohibiting the exportation of graphite. In Bavaria, Germany, and Bolivia large deposits have been worked. Ceylon has furnished immense quantities of the best laminated graphite. In addition to those above mentioned, the United States furnishes many localities, among which we may mention Morristown, N. J., Concord, N. H., Brandon, Vt., Amity and Hillsboro, N. Y. An extensive deposit has been lately discovered near Saco, Me. California has exported a thousand tons of superior graphite. Greenland, Spain, Mexico, Norway and Siberia have of late years supplied the world with excel-

lent material. Canada has furnished beautiful specimens of laminated graphite from Burgess and Grenville, and much of it has been disposed of in this market. Other localities could be mentioned where plumbago has, from time to time, been obtained in greater or less abundance. New York, Ceylon, Siberia and Bavaria are, however, the main sources of supply.

APPLICATIONS OF GRAPHITE.

1. The lead pencil, made from the best quality of graphite, has contributed more to the spread of the arts and sciences in modern times than any other article that can be mentioned among the contrivances in daily use.

2. The black lead crucible is of immense benefit to the brass-founder, assayer, and steel manufacturer.

3. Graphite is valuable as a lubricator, to prevent friction in machinery, the journals of engines, etc.

4. To impart lustre to iron, especially for stoves.

5. In the process of electrotyping or depositing metals by galvanism, this material is useful to coat the wax of the moulds, and render it a conductor of the electric current.

6. In the manufacture of green glass wine bottles, called hock bottles.

7. In the manufacture of gunpowder, for glazing the grains.

8. For "facing" in iron foundries.

9. For lubricating the action in piano-fortes.

These are the principal uses made of plumbago in the arts.

It is well known that the first traces of drawings in lead are contemporaneous with the earliest development of modern art. Mention is made in the fourteenth and fifteenth centuries of the use by masters of a pencil-like instrument, on paper surfaced with chalk. This was called the silver drawing. Later, smooth boards, covered with a preparation of calcined bone-dust, were employed in place of chalked paper. The Italians made a pencil of metallic lead and tin, which they called a *stile*, and with that instrument "PETRARCH'S Laura," a portrait from life, is known to have been executed; while MICHAEL ANGELO is said to have made use of the instrument in the sixteenth century. VASARI speaks of the advantages that artist derived from the stile, the quill, and both black and red chalk.

The discovery of the Borrowdale mine, in Cumberland, dispelled all other contrivances for writing, and the manufacture of lead pencils became quite universal. The mineral, as it came from the mine, was sawed into thin slabs, and these again into long strips of the requisite size, which were, without further preparation, glued into the wood. These pencils are not surpassed in delicacy or smoothness, and to this day are made in the same manner as they were 300 years ago. The black lead mine at Borrowdale had a yearly revenue of £40,000, sterling, from the monthly public sales. The mine was only allowed to be open six weeks in a year, that the market might not be overstocked. This great mine is now exhausted, and nothing but impure refuse is obtained from that celebrated locality. English manufacturers and men of science have been searching for new supplies, but the discoveries in Spain, Ceylon, Greenland, California, France, Italy, Canada and the Atlantic States, made from time to time, have not yet produced a complete substitute for the Borrowdale mineral. Long before the final exhaustion of that mine, processes were invented for cleaning and refining the impure refuse which had been cast away, and improving coarser and less valuable minerals by its use.

In this way, although the Borrowdale lead could not be had in its palmy days for less than $10, gold, per pound, many manufacturers could obtain fair material for 10 cents per pound. It was, therefore, well worth while to excite the ingenuity of men of science to discover either some equally valuable mines, or, in default thereof, a process whereby the foreign matter could be separated from inferior graphite, and an absolutely pure product obtained in every respect fit for pencils and crucibles.

It is, however, a remarkable fact that the Borrowdale graphite owed its fine quality rather to its peculiar state of aggregation than to its purity, as it was ascertained to contain more foreign matter than Ceylon and Canadian graphites. The attempts to refine and clear the impure graphite were carried on by the English mechanics, BRODIE and BROCKEDON, who contrived methods of overcoming the difficulties of the case. BROCKEDON was long occupied to render the powdered graphite coherent by submitting it to enormous pressure, and in 1851 I had occasion to examine his whole apparatus in the London Exhibition. It operated in vacuo, and the difficulty of introducing apparatus under the receiver of an air-pump was avoided by an arrangement of simple character. The powdered graphite was compacted by moderate pressure, and enclosed in very thin paper, which was glued over the whole surface, except a small hole for the air to escape from within. The block thus prepared was placed under an exhausting receiver, the air removed, and the orifice closed with a small piece of paper; and in this state it was left for twenty-four hours. It was then submitted to a regulated pressure once more; the different particles became agglomerated, and a black graphite was produced as solid as the natural mineral. I examined the specimens exhibited by Mr. BROCKEDON in the exhibition. They consisted of various graphites from Cumberland, East Indies, Greenland, Spain, Bohemia, and many other localities; compressed powdered graphite; powdered graphite prepared in a block, by the process mentioned, and the graphite in small solid cylinders, for MOODAY'S pencil cases and other drawing pencils.

Many other methods were devised, by adding various ingredients, intended to be combined with the powdered graphite, without detracting from its writing qualities; glue, isinglass, gum arabic, and other gums were applied in vain; metallic antimony succeeded but partially; sulphur came nearest to perfection, but produced too brittle a compound, and the marks made with it remained faint.

In 1795 an important discovery was made in France, which proved a great success, and has become the basis of the present manufacture of pencils. It was the admixture of fine clay with the purified graphite; it not only restored to the graphite the necessary consistency, without materially diminishing its writing qualities, but also any degree of hardness or softness, a result that could not be obtained from the pure Borrowdale. This process is now generally practiced in the following manner:

The graphite is crushed, washed and floated in large vats, and the clay undergoes the same operation. The floated materials are dried in pans at low temperature, and then mixed together in the requisite proportions. The combined substances are now ground in iron mills as fine as possible, and then kneaded by skilful hands like dough, and put in a cast iron cylinder, from which it is forced by a severe but low pressure through a small hole at the bottom, through which it passes in the shape of a continuous thread, coiling itself like a rope on a board below. This continuous thread is straightened out into the requisite lengths and laid close together in layers, kept in their places, and prevented from warping by a slight pressure. It is then dried at a moderate temperature, and when properly dry, packed in crucibles, hermetically sealed, and submitted to high heat in ovens of a peculiar construction. The graphite is now finished. The most important operation of trying its qualities is now undertaken; and as the entire reputation of the maker of lead pencils depends upon it, it requires a very skilful hand. The approved black lead is now ready for the wood, which is mostly cedar. No other has been found to answer as well. This cedar is imported from Florida; it is cut up in small strips and grooved out, and the lead glued in, and another strip glued over it. The pencil is to all intents and purposes finished, but has to undergo a variety of processes, which change this crude pencil from a rough, square stick, covered with glue, into a smooth, polished, rounded or curved, stamped, gilt, headed, and, in fact, a completed article, which every man, woman or child handles with pleasure and satisfaction, without pausing to consider that a lead pencil has passed through twenty-five hands before it is complete. The ever-pointed pencils are made in the same manner, except putting the graphite into the wood frame. The pencil-makers have met with great difficulties in procuring their necessary supplies, and to substitute the exhausted native Cumberland. They were not successful until the year 1846, when a French merchant, JOHN PETER ALLIBERT, discovered in the mountains of Siberia, not far from Irkutsk, an extensive deposit of graphite, which has proved equal to the Barrowdale in every respect. The great pencil-maker, FABER, the pioneer of this industry in the world, who has a branch in this city, has possession of this mine, and he received a shipment of 200,000 lbs. by the overland route, via Amoor River, the freight of which amounted to $20,000, of which he is using now 2,000 lbs. per week for his best pencils. The German black lead has been used for a century past in the manufacture of crucibles and for small furnaces for assayers and chemists, while the finest varieties of graphite for pencils have been furnished from Cumberland and Siberia. The Ceylon and German, as likewise the Ticonderoga graphite furnish the sole material for crucibles. All other localities yield materials for lustres, lubricators and other purposes. Argillaceous matters are not prejudicial to the manufacture of crucibles; but the presence of carbonate of lime is very objectionable, since the lime forms a fusible compound at the great heat to which the crucibles are exposed, and the object is defeated.

The German Bavarian crucibles, which stood in high estimation for centuries past, are composed of very impure materials, not half of their constituents containing black lead; while the American crucible, first introduced in the United States by that pioneer, JOSEPH DIXON, contains nearly three parts of black lead and one part clay. He began manufacturing the black lead crucibles in 1837, and drove the triangular pots out of this market. This firm consumes at the present day more plumbago than any other one concern in the world. Their crucibles are now introduced all over the civilized world, where the precious metals, steel, or alloys, as brass, German silver, are made or melted. They consume 40 tons of it per week; they procure their supplies principally from Ceylon and from Ticonderoga, in New York. The consumption of crucibles for pyro-chemical operations is very considerable; I saw last year, in Pittsburgh, in one establishment, 200 large black lead crucibles, in the furnaces at the same time; considering the number of ten or twelve crucible manufactories in the United States, the amount of plumbago consumed in the country cannot be less than 10,000 tons per annum. This quantity of graphite is not used up for the manufacture of crucibles alone, a very large amount is wanted for the lustre, so-called British or Mexican lustre, which forms a very considerable branch of industry; there are no less than fifty manufacturers of lustre in the United States, of which DIXON & Co. put up 150 gross, or 20,000 packages of the lustre per day. Large establishments exist in Philadelphia, Boston, Cleveland, and in this city, so that we may compute the amount manufactured in the U. S. at 1,000 gross per day.

In conclusion, a few remarks on the great American locality of graphite, situated at Ticonderoga, may give an idea of the extent to which this branch of industry is now carried on. The mining property of the American Graphite Company is comprised in the Arthur and Joes Mountains, at Ticonderoga, on Lake Champlain, and at Warrensburgh, on Lake George; the latter contains veins of the granular or compact graphite, which, after having been purified, furnishes excellent pencil lead, while the Ticonderoga mines have only the foliated graphite, containing disseminated carbonate of lime, which requires to be concentrated by proper machinery. This is done in the most practical manner, so that from five to ten tons per day are forwarded ready for crucible-makers.

Not less than 150 veins or deposits have already been discovered; some of them have been worked to the depth of several hundred feet; parallel veins are constantly discovered at a distance of 12 feet.

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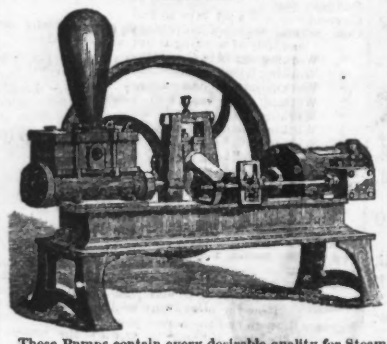

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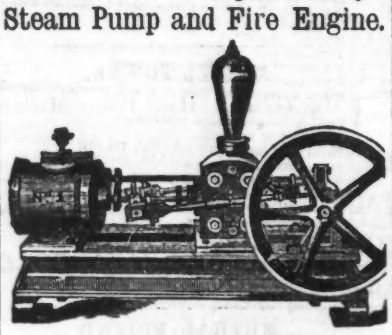

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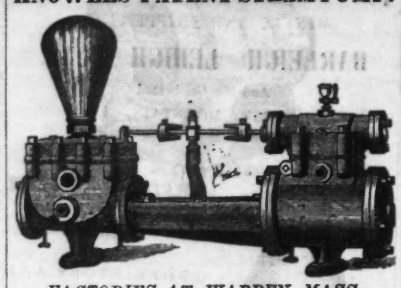

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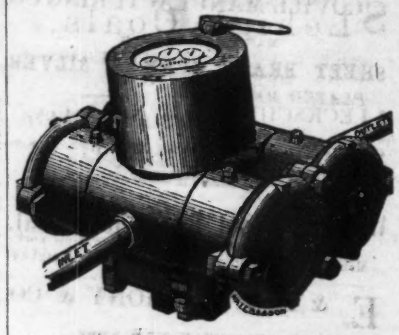

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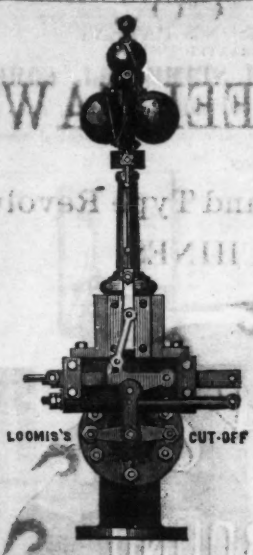

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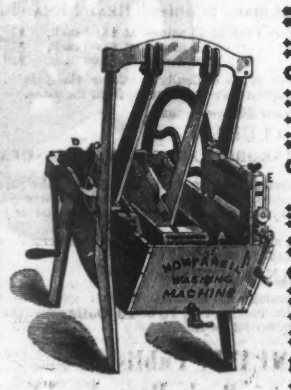

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