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FILTERING APPARATUS.

The annexed engravings represent air-pumps, in connection with a rectifying or filtering apparatus. In Fig. 1 is seen an air-pump fastened to a support, a barrel supposed to contain liquid of any description, a stand on which rests the filtering apparatus, and another barrel to receive the liquid after being filtered. The filtering apparatus consists of a metal cup or receiver, at the bottom of which is placed, inside, a fine tin strainer, and on this is placed felt, filtering paper, or other material. At the bottom of the cup is a tunnel, which admits of the whole apparatus being placed in a circular opening, as the bung-hole of a barrel. It is kept tight by having the conical part of the tunnel covered with rubber. The filtering process is as follows: The air-pump, working both ways, forces the air when downward strokes are given, and exhausts the air when upward strokes are taken. The hose connections between the barrels are for exhausting or forcing the air, and conveying the liquid from one vessel to another. The air is exhausted from the receiver, and a vacuum is formed, at the same moment air is forced into the barrel containing the liquid, and, consequently, with a pressure on the surface of the liquid in one barrel, and a vacuum in the receiver, the fluid flows from one vessel to the other, leaving all impurities and muddy ingredients in the rectifier. The hose-pipe from the side of the air-pump, conducts the forced air to the barrel containing the liquid to be filtered. The pipe attached to the faucet conveys the liquid to the receiver, leaving behind all impurities during the passage through the rectifier.

Fig. 2 represents a simple and effectual filtering device, for assayers, druggists, apothecaries, &c. This can be used in warehouses, stores, or private dwellings. The filterer is seen inserted in a jar or glass vessel; the liquid to be cleared and purified is poured into the filtering cup, and a few strokes of the pump creates a vacuum under the strainer; the liquid is then forced down and flows into the vessel.

Fig. 3 shows the same application to a common bottle. On the side of the filterer is placed a small spherical nozzle by which the rubber hose is fastened or disconnected at pleasure.

The apparatus possesses much merit, and is advantageous for purifying and cleaning oil or water, and all liquids containing sediment, particles, or impure ingredients. Being quite portable, it becomes useful to miners, geologists, and particularly to wine merchants and chemists, as there is no loss by evaporation.

The apparatus was invented and patented by JOHN P. GRUBER, 182 Chatham Square, New York City, where he manufactures apparatus for water works and filtering purposes; also, air and rotary pumps, that will throw fifteen to twenty thousand gallons per minute; scales for bankers, brokers, mixers, and assayers; and many other articles that show good workmanship and finish.

Earth Circuit in Telegraphy.

The failure of the earth circuit of a short telegraphic line in the Pewabic copper mine, Lake Superior, is interesting from a practical point of view. The wire used was a one-sixteenth inch copper wire, wound in the same manner as waterproof fuse, the wire taking the place of the powder. To the surprise of all, no signals could be transmitted through the line. The end of the wire underground was put into a hole drilled into the rock and tramped in; a bed of earth was then made, and lastly a pool of water tried, but all to no effect.

Above the ground the line worked well enough. Though the earth, generally speaking, will conduct electricity, some substances, of which any specific portion of the earth may be composed, will not conduct it; for example, dry sand and dry freestone rock will not, and quartz rock will not any more

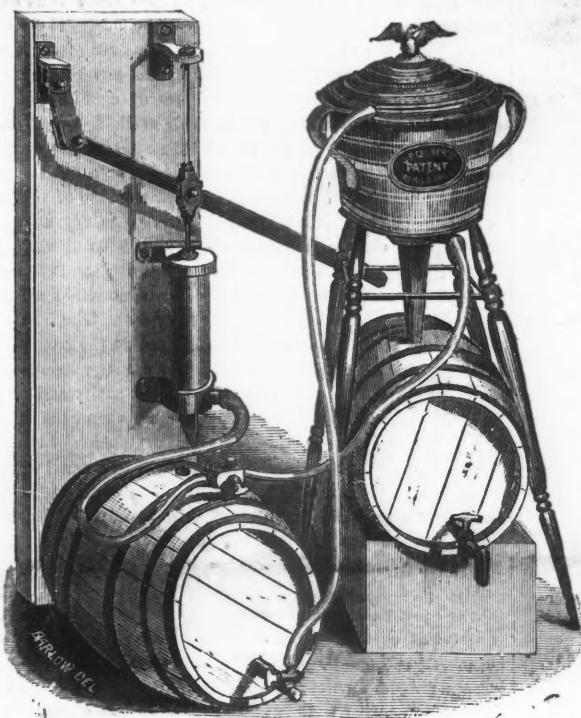


FIG. 1.

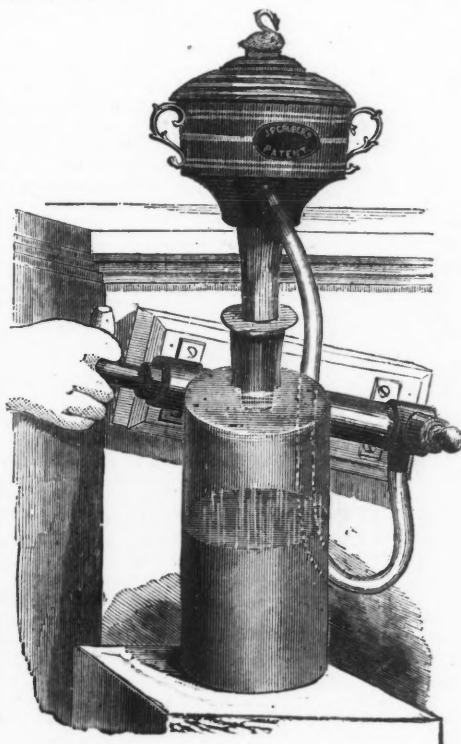


FIG. 2.

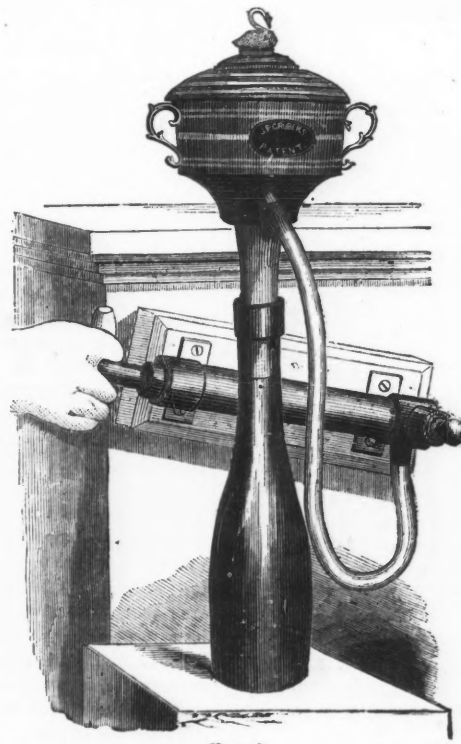


FIG. 3.

than glass; dry earth will not, as is recognized by all telegraph constructors, who bury the earth plates deep in damp earth. In this case an attempt was made to form an earth circuit in non-conducting material. The end of the wire in the mine was tamped into the solid rock, probably quartz, which would be about the same as tamping it into a glass bottle, filled with earth and water. The chances of electric communication would be still less, if the wire was not perfectly insulated in its whole length. The remedy would be to make a return circuit of insulated wire.—*Mechanics' Magazine.*

Growth of Mineral Veins.

The *Proceedings of the Royal Society*, No. 100, contain a paper by Mr. J. A. Phillips on the Gold Fields of California, in which, among other matters, he describes the growth of mineral veins, about seven miles from the Comstock silver mine, in the State of Nevada, in which boiling springs are active. One group of crevices in the rock comprises five longitudinal springs, extending in parallel lines for more than 3,000 feet. Sulphur, silica, and anhydrous oxide of iron are deposited; the silica and iron forming semi-crystalline bands. Another fissure exhibits a silicometaliferous deposit. He arrives at the conclusion that quartz veins have generally been produced by slow deposition from aqueous solutions of silica. That gold may be deposited from the same solutions appears from the presence of that metal in pyrites enclosed in silicious incrustations, as well as from the fact of large quantities of gold having been found in the interior of the stems of trees which, in deep diggings, are often converted into iron pyrites. Mr. Phillips thinks the sulphide of iron may be in some way connected with the solvent by which the precious metal is held in solution.—*The Student, London.*

A New Lamp.

The French, who were always strong in "lamps," have lately brought out a new invention, which is said to be as brilliant as the oxy-hydrogen and lime lights, while it has the recommendation of being much less costly. Coal gas, intimately mixed with air, is urged with gentle pressure along a tube, and made to pass through a metallic plate, pierced full of minute holes. By this means a vast number of jets are obtained, which, after being driven through a fine tissue of platinum wire, are lighted in the ordinary way. The platinum soon acquires a white heat, and gives out so brilliant a light that it cannot be supported by the naked eye. About one metre of gas is consumed per hour. It is called the *Bourbouze lamp*.—*Iron Trade Circular.*

Consumption of Gold in Potteries.

Nearly £50,000 worth of gold is annually consumed in the decoration of china and earthenware in England, by far the greater part of which is in the Staffordshire potteries, and the total amount used in decorating the pottery goods, and in gilding generally, in England and France, is estimated to be 40,000 ozs. This is lost to the currency for ever. To a large extent the gold is obtained in England from the Bank of England in the form of clipped sovereigns. The popular impression is that the light sovereigns go to the Mint to be re-melted and re-coined, but a vast number of trades in England require standard gold for all sorts of purposes, and these regularly go to the bank to buy these cut sovereigns.—*Mining Journal.*

Aerolites.

At the Academy of Sciences, M. Danbrée described a meteoric picked up in the Phillipine Islands, and supposed to have fallen in the year 1859. Upon analysis, it was found to possess the characteristics common to the majority of aerolites hitherto collected, its density being represented by 3.6. Its constituent parts are magnesia, protoxide of iron, a little oxide of nickel, and a very small quantity of alumina. It has been bequeathed to the Academy by the late Don Cassiano de Prado, inspector-general of the mines of Spain. Another paper on a similar subject was afterwards presented by MM. Daubrée and St. Meunier jointly, in which they gave a minute account of the meteorite that fell at Murcia (Spain) in 1853,

and excited much interest at the Great Exhibition last year. The density of this large block, which measures about sixteen inches in length, as many in breadth, and ten and a-half inches in height, is 3.54. It is nearly entire, being almost everywhere covered with the well-known crust, which, however, is not black in this instance, but ochraceous, a circumstance attributed by the authors to superficial decomposition after its fall. Its mass presents a peculiarity not marked in any other aerolite—a quantity of minute and very brilliant hyaline crystals. Its texture is very hard, sparks being elicited from it by a smart stroke of the hammer. It contains as much as twenty and a-half per cent. of ferric sulphuret, about fifteen per cent. of nickeliferous iron, and some traces of phosphorus; the rest is composed of silica and other minerals.

The Chemistry of the Bessemer Process.*

Analyses representing each successive step in the Bessemer process do not appear, as yet, to have been published. The following analyses of the raw material and the various products at different stages of this process were sent with the manufactured objects to the late Paris Exhibition from the Bessemer works of Neuberg, in Austria. In the absence of more complete analyses, they may be of some value.

The charge was a good dark-gray iron, weighing 62 cwts. 86 lbs. (Austrian); it was transferred directly from the blast furnace into the converter. Blast was applied for 28 minutes under a pressure of 20 lbs. to the inch; at the close of this first period a sample of the iron was taken. During the second period, of 7 minutes, the pressure of the blast was 18 to 19 lbs. per square inch; the third period lasted only 3 minutes, under about the same blast. The amount of slag was a little larger than usual, probably because of the taking of samples from the mass. The analyses of the raw-iron and of the samples taken at the close of the above period, gave the following results:

1. The iron taken was dark-gray, graphitic, containing considerable silicon, very little phosphorus and sulphur, and much manganese; in every respect an excellent material for the Bessemer process. A small amount of copper was present, but not enough of it either to hinder the process or deteriorate the product.

2. At the close of the first period spoken of, all graphite had disappeared, partly by combustion, partly by combination with the iron; almost four-fifths of the silicon had been separated; all but a trace of sulphur had disappeared; the amount of phosphorus remained nearly the same; also the total amount of the copper, while its percentage was a little higher; much of the manganese was lost. The product at the close of this period was a pure white raw iron, containing not over much of carbon.

3. During the second period the removal of the carbon progresses rapidly, so also the still remaining silicon and manganese are rapidly disappearing, while again the copper and phosphorus remain almost the same. The product at the close of this period of only about seven minutes was a good steel; according to the common scale, steel No. 3.

4. At the close of the third period, a steel No. 7, was obtained. The addition of 5 cwts. raw iron gave a Bessemer steel No. 6.

The slags obtained at the various stages were also analyzed; they always contained a great relative amount of silica, but, both before and after the second (or "boiling") period, remarkably little of ferrous oxide. During the last stages of the process, the percentage of manganese in the slag decreases, because most of the manganese is removed in the first period, so that the increase of slag during the last stages of the process can only add iron to it, i.e., reduce the percentage of the manganese. A little alumina and lime found in the slag is ascribed to the walls of the furnace.

From the composition of the raw material and the final product, the amount of the various elements removed during the process is obtained by the difference of the first two quantities. The amount of oxygen necessary for this removal may easily be calculated on the supposition that the silicon is converted into silica, carbon into carbonic oxide (CO), phosphorus to phosphoric acid (anhydride), sulphur to SO₂ or SO₃; iron to magnetic oxide (Fe₃O₄), of which but a small amount is found in the slag, the greatest portion being blown out in the shape of a red smoke (Fe₂O₃). The following table contains the results thus obtained:

	Raw iron taken.	Bessemer steel obtained.	Removed.	Requiring Oxygen.
	lbs.	lbs.	lbs.	lbs.
Carbon	258.59	12.79	245.80	327.73
Silicon	128.97	1.80	127.17	139.07
Phosphorus	2.63	2.40	0.23	0.29
Sulphur	1.13	—	1.13	1.69
Manganese	227.67	7.59	220.08	63.56
Copper	5.59	5.59	—	—
Iron by difference	25956.4	5429.82	525.59	200.22
Total	6580.00	5460.00	1120.00	732.56
			Producing	
			lbs. of	
Carbon			573.53 CO	
Silicon			266.24 SiO ₂	
Phosphorus			0.52 P ₂ O ₅	
Sulphur			2.82 SO ₂	
Manganese			281.64 MnO	
Copper			—	
Iron (by difference)			725.81 Fe ₃ O ₄	

This amount of oxygen can be had in 43,330 cubic feet of atmospheric air, or 1,140 cubic feet per minute, or 660 cubic feet per cwt. of the charge.

The supposition that the carbon burns to carbonic oxide (CO) and not to carbonic acid (CO₂) seems to be proved by the spectroscopic investigations of Lielegg.—*Chemical News*.

* Aus der Natur, 1867, p. 714, &c.

Origin of Coal.

Sir, R. Murchison's new edition of "Siluria" contains a full and exhaustive consideration of the present state of opinion relative to the origin of coal by growth *in situ* and driftage, and the author sums up in the following words:—"With such data before us we are, perhaps, warranted in believing that a theory of the formation of coal which should embrace as its chief element a widely extended series of shallow and partially enclosed seas, fringed with swampy forests of water-loving plants, subject to further submersion, accords well with observed phenomena."

Practical Letters.

A DEPARTMENT FOR MINING ENGINEERS AND METALLURGISTS.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

SKETCH OF THE SCRANTON COAL MINING DISTRICT—No. II.

BY DAVID COGHLAN, M. E., SCRANTON, PA.

(Continued from page 322.)

The coal formation attains a greater development on the western or Hyde Park side of the Lackawanna than on the eastern, as above the "big vein" are found the "rock vein" seven feet thick, and the "diamond," also seven feet thick. Another, having a band of two feet of rock inclosed between a lower bed of three feet of coal and an upper one of two feet, forms a mixed bed of seven feet thick. Above this occurs another of five feet, and finally a small unworkable seam of fifteen inches. The total depth of the measures is on the top of Hyde Park hill, which may be considered the synclinal axis of the basin, from six hundred to six hundred and fifty feet from the surface, which would be reduced to four hundred on the low grounds. These latter beds have been removed by denudation on the eastern side. The "diamond" and the "rock" beds are the only ones of these upper seams extensively worked; the others not offering the same facility of production in the present condition of the mines; but of course they will be made available hereafter.

The rolling nature of the beds in these anthracite regions, caused, doubtless, by the same forces which elevated the surrounding mountains, prevent the regular working of the coal in panels on the English system. Strange to say, notwithstanding the forces of upheaval which have been at work, no faults are observed, or at least none heaving the beds more than a few yards—except one in the Diamond mines which I believe heaved up the coal thirty or forty feet. The iron ores accompanying the coal used to be smelted in the iron works of Scranton, but at present these works are supplied entirely with ore from New Jersey—the greater purity and abundance of those from the latter State, more than counterbalancing the cost of transportation. The ventilation of the coal mines is effected principally by fans worked by a small engine. This method is vastly superior in all respects to the furnace ventilator, which is still used in some mines of this district. The engines used about the collieries are invariably non-condensing, and this class is doubtless the best in a place where fuel is cheap, owing to the simplicity of the construction and portability, should they have to be moved; and to the consequent cheapness in first cost. Those used for pumping are double acting—there being two plungers in the pump and but one column for the lift. One lift is generally sufficient in these mines, owing to their small depth. These engines have horizontal cylinders acting on a crank attached to a fly wheel. This crank works the two plungers, and the labored motion, when passing the dead points, forms a striking contrast to the smooth action of a Cornish engine. The duty must be very low, though the amount of work done by machinery so small in bulk, seems extraordinary. Steam worked from forty to seventy pounds to the square inch, is supplied from the same boilers to all the engines used about the colliery. Of course this class of machines could only be desirable in a coal mine; the expense of fuel would be too great in any other situation. The coal cars are hoisted on a safety-cage which works by means of slides running on two vertical rails projecting from the side-timbering of the shaft. The wire rope is attached to a heavy iron bar jointed in the middle and kept clear of the rail, while the weight of the cage and its load remains suspended from the rope; but should the rope break, the weight of the bar pressing on the centre joint, or point of suspension, causes the jointed bar to straighten from the angular position it occupied when upholding the weight of the car, and thus, by lengthening, the bar presses against the side rails so strongly as to stop the descent which would otherwise take place. This is a mechanism, difficult to describe, but when seen, quite simple, and answers its purpose very well. Wire ropes are invariably used for hoisting purposes, from one inch, to one and one-half inches in diameter, and are far superior to chains or hemp ropes. As the ascending cage and car are balanced by a descending load of the same weight, it follows that on starting, the coal in the car is the nett load to be raised—added to the weight of rope from the unloading point to the bottom of shaft. This, however, is not of much consequence at small depths, though in deep mines it may sometimes equal the remainder of the load, and in this case, to avoid a great waste of power, the drum on which the wire works must be contrived so that its diameter will vary in inverse proportion to the load raised. This may be done either by using a flat rope which winds on itself, or by making the rope roll on a conical drum. The engines used for elevating the coal have two cylinders to overcome the dead points of the crank, a fly-wheel not being applicable in this case. A pinion works on a large cog wheel projecting from the centre of the drum, which is about twelve feet in diameter. The shaft is generally ten by twenty feet, which gives room for the hoisting apparatus and the pit-work. It is generally timbered all the way down. The foul air of the workings is drawn out through the division appropriated to the pumps. The mines about Scranton do not often attain a depth exceeding three hundred feet. I should think that even in the middle of the

basin the depth of the lower coal seams from the surface cannot exceed four or five hundred feet. This small depth of the coal is a great advantage in avoiding the heavy expense of hoisting water and coal a great distance—as has been done, or will have to be done, in the deeper basin of Wilkesbarre. The seams near the surface are not fiery, and natural ventilation is sufficient, but below water-level they generally become so. This is probably owing to the facility of escape afforded the gas by the proximity of the surface in the first case. Near the outcrops, the coal is of a poor quality, and sometimes is pinched in at this point. Boring is very much practiced before undertaking an important work, in order to find the lowest point of the bed and its distance from the surface. This is the surest, and best method. The coal industry, requiring a great capital, is mostly carried on by rich companies, which both mine the coal and carry it to market by means of a railroad or canal of their own. Five or six companies have thus almost monopolized the coal production of the Wyoming and Lackawanna valleys. The business, to pay, requires a great outlay—first, on the mine itself, next, on the line of communication with the great centre of population. These lines, in a region so difficult of access, are costly and the routes through the mountains, which offer facilities of communication, are but few. Hence the carriers can control the market and put a prohibitory tariff, should they be so inclined, on small operators. The present price of coal land in this valley is about \$500 an acre, and when worked under lease by the companies, twelve to fifteen cents a ton is paid to the owners for the coal taken out. The Lackawanna region is almost exclusively worked by the Delaware and Hudson Canal Company, the Delaware and Lackawanna Railroad Company, and the Pennsylvania Company; all of which have lines of communication under their own control. A considerable amount of coal is also mined by the Lackawanna Iron and Coal Company, which is exclusively consumed in their own furnaces and rolling mills, which are on a most extensive scale. The Delaware and Hudson company's railroad is mostly a gravity road—the trains of cars being drawn up planes by stationary engines, and then allowed to run along tracks with an inclination of fifty to one hundred feet per mile, by their own gravity. On reaching the foot of the next plane, they are elevated in like manner, and on the other side of the mountain are lowered along the planes. Two tracks are required for this system—one for the loaded and one for the return cars. This line connects at Honesdale with the canal, which conveys the coal to the Hudson. The Pennsylvania Co's railroad is also constructed on the same system; it connects with the Delaware and Hudson canal at Hawley, and also with a branch of the Erie railroad. The Delaware and Lackawanna railroad is a locomotive road, the mountain being passed by severe gradients of seventy or eighty feet to the mile; it connects with the New Jersey Central on the south, and with the Erie road on the north, and has a double track from Scranton, south. These lines are sufficient for the carriage of the present production of coal, but may not be in case of a considerable increase which may be expected from the rapidly augmenting demand made upon this district lately. The fire-clay so common, immediately underlying the coal beds in Wales and elsewhere, does not occur in these mines, though bands of this clay are frequent in the coal measures. The surface of the slate, on which the seams lie, is smooth as a mirror, whereas the roof is not nearly so smooth, often containing fossil trunks of the ancient trees which formed the coal, flattened out to a thickness of perhaps not more than one-half an inch, which would seem to prove that the core of the tree must have been of a porous or spongy nature like the palm or reed. The surface is beautifully reticulated where the leaves formerly grew. I have not heard of the roots or stumps of the trees being found in their original position under the seam, as so often occurs in England. The fact of the coal becoming gradually more non-bituminous eastward from Pittsburg, as it enters more into the broken regions of the Alleghenies, is remarkable, and would seem to depend on the action of the forces which elevated that range. It was probably caused, either by a greater exposure to heat, the volatile matters being thus expelled, or again to the number of fissures caused by the upheaval which, in the course of countless ages, permitted the gases to reach the surface. Such a result would not take place in undisturbed coal fields. This latter, I should think, is the true, or, at least, the main cause. As I have previously mentioned, the beds near the surface do not contain gas in dangerous quantities. The first tends to support my conclusion; and that such escape does take place, is proved to any one observing where the outcrops of the seams cross the Lackawanna. An ebullition occurs like that of boiling water, due to the escape of the fire-damp. The very remarkable abundance of fossil plants connected with the carboniferous formation when compared with any, either preceding or succeeding it, points to an excessively luxuriant vegetation, which must have been caused by a peculiar condition of the earth favoring this manifestation; it was probably owing to the temperature of the surface of the globe being too high, previously, to favor vegetation, and which, besides, would have had the effect of maintaining the carbon in a gaseous state. That an immense amount of carbonic acid existed in the atmosphere, is rendered probable in view of the absence of the fossils of air-breathing animals in this formation, and those antecedent to it. The deposition of the coal and the mountain limestone cleared the air of that substance, and prepared the way for a system of life more nearly resembling that existing at the present time. This amount of carbonic acid in the air would account for the vast vegetation required to form the coal beds in a reasonable time. The heat of the surface of the earth, which it had only partially lost by radiation, would have acted like a hot-house to force vegetation, and the copious rains caused by the same circumstance, would have favored the production of vast swamps and rivers. The importance of the Anthracite regions to the Eastern States, need not be mentioned. The Allegheny Mountains effectively cut them off from the great western coal fields, and the only other resource would be the coal of the Richmond basin, which must be considered as of very minor importance, so that the calculation of duration of these beds ought to interest the people of the Eastern States, as much as that of the English coal fields does the people of that country.

Mining Summary.

GOLD AND SILVER.

Nevada.

[From our Regular Correspondent.]

AUSTIN, May 12, 1868.

LANDER HILL.

Several of the standard mines on Lander Hill are looking better now than they were when my last letter was sent off. The North Star mine of the Manhattan company did not at that time show such a quantity of high-grade ore as it had shown previously, but a few days ago a fine body of ore was exposed, which is quite different from the ruby mineral so characteristic of this mine, being a heavy black sulphuret as rich as any of the best ever previously yielded by it. It is a rare thing to find a mine which always looks well; indeed every silver mine has its rich and its poor places, and it is alike foolish to get excited when it is looking unusually well, and despondent when the reverse is the case. The Troy mine, which yielded recently a bar of the value of \$1,323 26 from the working of 1,044 pounds of first class ore, assaying \$3,082 per ton, is still producing fine mineral. The second class, out of which this small batch was selected, gave a return of \$524 67 per ton, which entitles it to the name of "first-class," were it not surpassed by the other to such an extent. The Florida is not looking so well now as it was a few weeks ago, and quite a number of miners have been dismissed on account of the available ore being worked out. A new level is being run, and when it has been carried far enough ahead, there will probably be another fine breast of milling-rock at command. From the Diana a considerable quantity of fair mill-ore is being extracted, but the extent of the chimney yielding it is not yet known. As the hoisting requires to be done through an incline, starting off from the bottom of a perpendicular shaft, the work on this mine is carried on both slowly and expensively. There is no better mine in this region than the Diana, and its agent is one of the most cautious and economical managers in the country. If the mine were opened by a deep shaft, it would soon pay large dividends to its owners, whereas, now it is doing as well as could possibly be expected in merely paying working expenses. There is about thirty tons of ore assorted, ready for reduction, at the Timoko mine, and more is being taken out day after day. It will probably give a mill-assay of about \$250 to the ton. I understand that 5 per cent. per month of the capital stock is being remitted to the office of the company in Boston to the credit of the dividend fund. Work has been resumed on the Savannah mine, the agent of which returned from New York a week or two ago. When it has been properly opened, a good yield of ore may be looked for. The Old Colony, lying between the Savannah and the Diana, has had a great amount of work done on it, and yet nothing very encouraging has been struck. A few weeks, however, may place it in the front rank as a billion-producing mine. This is the experience of mining—it looks like a lottery; no deliberate calculation will avail in estimating beforehand where bodies of ore are or are not to be found. I believe some good metal has been found in the lower works of the Buel North Star, but how much of it there is cannot yet be estimated. Even if the deposit is extensive, there is no certainty whatever that it is the lode belonging to the North Star company. An incline had been carried down about five hundred feet, but long before this depth was attained, it had run away from the vein, which had been broken off, and showed its course only by a white clay seam overhead. A few weeks ago, after a level had been run from the bottom of the incline, at right angles to the course of the ledge, a considerable distance, a solid quartz vein was struck, but as it had no mineral, it was of course pronounced another vein altogether than the genuine North Star. The level, therefore, was run ahead still further, and the ore, now spoken of as being found, was reached. Probably a lawsuit will in due time determine the right of property.

THE COMBINATION MILL.

has resumed work, and is yielding much finer bullion now than it did when first started up. A change has taken place in the management, but whether for the better or the worse has yet to be proved. The new agent is not a man who has inspired confidence in the community, though he has lived here for years, but it is right now that he is in office to give him a fair trial, and see if he can bring up the affairs of the company to a dividend paying standard. The property has hitherto been operated upon more with a speculative end in view, than legitimate mining; and having failed to come up to the exaggerated expectations formed by its sanguine shareholders, it has now to come down to a bullion-yielding standard, and proved its worth by substantial arguments in the shape of silver bars. Several long letters on the mine and mill of this company have appeared in the *Reveille* within the last week. No attempt is made in these letters to deny the statements which have been made public in regard to the defective nature of the mill. On the contrary, a great deal is implied which is not actually stated. It will take \$50,000 in coin to put the mill in proper working order; this I have from a friend who has carefully examined the works and knows whereof he speaks. There are 38 new pans, costing \$1,000 each, required in the mill even now, as the light antiquated pans put in when it was built are nearly worn out, and many other improvements are needed to make it what it requires to be in order to its doing first-class work.

NEWARK DISTRICT.

The agent of the Centenary company, who has been in New York attending the annual meeting of the shareholders, has returned, and is making preparations to have the mill put into active operation. A supply of salt is now obtained, and several hundred tons of good ore are extracted ready for reduction. As I hope to visit this property in a few days, and will then write you a full description of it, I need not in this letter make any further allusion to the subject.

OF WHITE PINE

district, lying about about a hundred miles east of this city, great things are now being said, and I learn from a gentleman who has just returned from the mines, that it contains some very promising ledges. The Hidden Treasure is said to be a very rich claim, showing on the surface a large amount of high grade ore. Not being opened it is hard to say how extensive the rich mineral may be, but experienced miners assert that it is undoubtedly of great value. There are other claims in the district said to be almost equal in richness, and numerous prospecting parties have started out for the new El Dorado within the last few days. I will visit the district and give you my impressions of its mines in a future letter.

THE MANHATTAN MILL.

steadily at work on custom ore. The agent is shrewd enough to take all the ore he can get to work at \$45 per ton, while there is no other mill at work in the district to compete with it. Several hundred tons of ore have accumulated at the North Star mine, but if the mill had no custom work to do, it would soon be idle part of the time for want of ore. The capacity of the batteries is about 550 tons per month, and with small veins of highly concentrated ore, it takes extensive development as well as great activity to extract this amount monthly. I learn that there is some probability of the custom working rates being put up in this mill to \$55, and if so, the Metacom mill is likely to go into

operation with a good prospect of getting a large share of the custom work. I find from the quarterly returns up to the end of March, that the yield of the Manhattan mines for the quarter was 761 tons, 347 pounds; the actual return per ton being \$154 36 in currency value. The ore worked during the last quarter of 1867 was of a higher grade, its yield being \$248 to the ton. The coin value of the bullion extracted in this mill for April was \$98,167 73, and the number of tons worked 462, which, at \$45, would give a monthly income, for milling alone, of \$20,790. As shown by an article in the *Reveille*, the cost of roasting the ore while wood and salt are so high as they now are, is \$22 to \$23 per ton. Were it not for the fact that the mill saves more than eighty per cent. of the fire assay, which is the guarantee return to the mines, there would not be much profit on milling at \$15; as it is, however, custom work is very profitable when the batteries are kept in constant play.

THE PROFITS OF MINING.

as contrasted in the operations of the Twin River and the Manhattan companies, is very suggestive. During 1867, as reported in your pages, the net profit of the Twin River company was \$100,256 16 in gold, while that of the Manhattan company, as given in the *Reveille*, was \$246,823 59. The cost of production in the case of the former was \$26,971 51, besides \$25,495 17 for new hoisting works, while in that of the latter it was only \$192,081 97. The point I wish to allude to here is the enormous expense at which the operations of the Twin River company were conducted during the last year. A fast youth, whose career in this country was appropriately ended by a ride on a rail at Belmont, was the general agent of the Twin River company, and all things considered, it was a wonder even that there was any profit at all. Now that the business is in the charge of a practical man, who attends to his business, a very different showing is likely to be made during 1868. The ore reduced by the Twin River mill amounted to 3,847 tons, the product of which was \$111 04 per ton, in coin, or in the aggregate \$427,227 67. In the Manhattan mill 2,311 tons of ore were reduced, the yield per ton in silver being \$189 92, with a total of \$438,905 56.

THE ASSESSOR'S RETURNS.

of bullion yielded by the mines of Lander county, during the first quarter of this year, are published to-day. The total number of tons worked was 1,753, and the gross yield \$318,825 29, giving an average per ton, in currency value, of \$181 87. The following figures represent the yield of a few of our best known mines. Manhattan, as mentioned above, per ton: Magnolia, 98 tons, \$243 19; Florida, New York and Austin Co., 210 tons, \$361 24; Troy—New York Co., 28 tons, \$264 44; Timoko, 79 tons, \$222 83. The St. Louis mine, in Cortez district, yielded 12½ tons worth \$399 59 per ton, and the Gilligan lode, the property of the Social and Steptoe company, 217 tons, of the value of \$66 49. A great many names of persons given in the returns appear as if they were the names of mines. This is due to the blundering of the assessor who is incapable of giving us proper returns. If Tom Black goes to a waste dump, and after working a month has succeeded in picking up a ton of ore, which will barely pay him for the time spent, there is no reason why the assessor should return the Tom Black Mining company as producing only one ton of ore for the whole quarter. Dozens of the entries in the tables are of this stamp, and, of course, are not to be judged of as the product of any particular set of mines.

DEEP SHAFTS.

The Sherman shaft was started upon last week, but learn it has again been stopped on orders received by telegraph. The reason is not stated. A new operation has been entered upon under the name of the Murphy shaft, to be opened in connection with the Washington Irving and Eglet ledges. In a previous letter I mentioned that Capt. Page had refused to deed back these claims to their rightful owners. Since the burning of the Keystone mill Page has become a more reasonable man, and to this, probably, is to be attributed the fact that he has reconveyed the ground a week or two ago, which has since been made over to J. R. Murphy, the originator of the shaft alluded to. A new shaft has been started for the Timoko ledge, and the Toriyabe shaft is 100 feet deep. E. J. DAR.

Pahranaगत.—A resident correspondent writes from Hiko, April 20, that the first *silver brick* of the Pahranaगत Valley Silver Mining company, located at that place, has just been retorted, weigh 1,100 ounces, and 867 fine. He says that the Company's mill is a marvel of economy and perfection, and that shipments of silver bricks may be expected regularly hereafter. He continues: "Some gentlemen representing a Chicago company are prospecting the Webster lode, and intend commencing the erection of a 'twenty-stamper' as soon as they strike the vein from the point they start from. Another party of gentlemen representing another Chicago company are experimenting on our ores with a view of smelting. So far they have met with encouraging success in their experiments, and are very sanguine that the ores of this district can be more economically worked by this process than by that now in use. Great energy is being displayed by the parties in charge of the Alameda company, on the west side of 'Mount Irish,' in rebuilding a mill that was erected for the defunct 'Crescent company.' They are working with that soul and energy that warrants the belief that they will turn out bullion before the first of July. They have a mine that justifies this energy. The same spirit that controls the building of the mill is developing a mine which to-day has not a superior in this district. They are taking out more ore now daily—averaging about \$140—than a 'ten-stamper' will require. The mine they are developing is on the 'List lode,' and the point where they are working is about 600 feet below any mine being worked in Silver, Cedar, Springer, and other canyons, and with a continuation of that energy that animates every company interested here, you may expect, in due time, this district to be second to none in the State of Nevada." ... Contrary to the predictions of the resident correspondent quoted above, the mill of the Pahranaगत Valley Mining company at Hiko, after a single run, has been compelled to stop for a while. The *Reporter* says: "The reason for this is that the bricks of which the roasting furnaces were constructed, are made of unsuitable material and would not stand the required heat, but were badly injured immediately they were used, and rendered unfit for further service. This will be remedied soon, new furnaces built, and the mill again started. About \$10,000 worth of bullion was the product of this run, which is a great success. The ore worked was from the surface, and taken from several different mines, among which were the Indiana, Green Monster, Silver Chamber and others. During the time of running not the slightest defect was to be discovered in the mill machinery—not a bolt requiring readjustment nor a bolt starting from its place. It has a battery of ten stamps, and its capacity is about twelve tons daily. It was built by Benjamin Evans, well known in this section, and is pronounced by all who have witnessed its performance to be the best mill of its size in the State. It will soon be in motion again, and its product of bullion must make Pahranaगत famous, as there is no lack of rich ore in the district." ... In regard to the smelting works spoken of above, a gentleman from Logan, at which place they are testing ores by smelting, gives some additional particulars which the *Reporter* prints as follows: "The person making the test is a Mr. Woodbull, who has had large experience in the smelting business in Wales and other countries, and is confident of its entire practicability with most of the ores of this country. Since his arrival there he has made a great

many practical tests upon a limited scale, and has met with astonishing success. He is now engaged in building a furnace capable of reducing a ton at a time. The furnace is a reverberatory, the ore is broken in small pieces, and with the flux is placed therein, and in four hours is reduced—producing a 'cake' or 'button' of bullion, and leaving as slag a mass of glass. The flux is known only to the operator, who says it is easily obtained all over the country and costs but a trifle. But a small quantity of wood is used in the operation—about a cord and a half, we believe, to the ton of ore. Mr. Woodbull, as also those who have witnessed the result of his process, are of the opinion that ore can be reduced by this process at a cost of \$10 per ton, and that a much better result can be obtained than by any other known system of reduction."

Sheridan.—This is the name of a new mining district discovered about the middle of April last, and located about 45 miles southeast of Reveille district, and 35 miles west of Hiko, in Pahranaगत. A writer in the *Silver Bend Reporter*, writing from Hiko under date of April 28, says of its organization and discovery: "Within the past two weeks some of the finest lodes of silver-bearing quartz have been discovered and located that exists in any portion of this State." ... Samples of ore are now on exhibition which excite the admiration of all old prospectors. It is of state formation, with well-defined appearances of true fissure veins, with a width of sixteen to forty feet, and a northerly and southerly course. Wood and water of easy access. The principal locations made have been by Messrs. J. H. Ely, H. Raymond, Ben. Evans, and W. J. Haynes, and their immediate friends. The *Reporter* (May 9) gives later information, as follows: "The principal locations are, respectively, named Nevada Giant, ten feet wide; Potosi, six feet, and the Evans ledge, two first named running parallel and cropping boldly for a distance of five miles. Along the immense croppings, at intervals, large ore chimneys occur of such magnitude that thousands of tons of rich ore are said to be revealed to sight. Many persons have rushed thither from different places until the immediate vicinity has been pretty generally overrun and a great many locations made. The ore assays from \$100 to \$300 per ton. The location of the new district is about ten or twelve miles southwest of Penoyer's Spring, on the Pahranaगत road, and perhaps nearly forty-five miles southeast of Reveille district. Water and timber is not plentiful in the immediate vicinity of the mines, though there is a plenty of both these commodities upon Timplate mountain, which lies about twelve miles from the district in a south-southeasterly course. The fortunate locators of this new field for enterprise are sanguine that they have the big thing of Eastern Nevada."

Ophir Canyon.—The *Reveille* is informed that the Murphy mine, at Ophir canyon, is now looking better than at any previous period. A body of high-grade ore has been penetrated in the main incline, which is now down 250 feet. Till within the last twenty feet, the quartz has been comparatively barren, the good ore being reached only by drifting about 80 feet to the north. The ore now struck is thought to belong to a new chimney. The mill of the company is now in full work, there being abundance of high-grade ore at command.

Gold Mountain.—According to the *Reporter*, prospectors are flocking to this district, and the discoveries they are making proves that it is profuse in the precious metals. It says: "In January last a party left this place for the purpose of examining some lodes south of Palmetto district, which they had before been to, but had been driven away by hostile Indians. The names of the persons composing the party were Thomas Shaw, Grand Rhodes, George Ayer, Amasa Davis, B. Schram, and A. Pierson—organized under the name of Enterprise company. Proceeding from this place to Silver Peak, they thence travelled south into Lida Valley, through which they passed, and entering the hills to the southwest, discovered a monster lode, which they called the State Line ledge, and upon which they did considerable work—sinking two inclines upon it at a distance apart of about 100 feet. One of these shafts is 20 feet deep, and the other 14 feet deep; both follow the foot wall, and both, as well as the intervening croppings, disclose the fact that the ledge is exceedingly rich in gold. The ledge is from ten to twelve feet wide, and along the croppings, which are prominent for several fathoms and feet, three hundred feet show an appreciable quantity of gold wherever examined or broken. After remaining in the locality several weeks, the party brought a small load of the quartz here for the purpose of making a practical working test. Six hundred and sixty-six pounds of this ore were crushed by hand, and an assay of the pulp made by Thos. Luther, and gave a yield of \$131 per ton of gold. The pulp was then amalgamated by J. M. Robertson, graduate of the Imperial School of Mines, Paris, now residing here, who made the yield \$176 58 per ton, producing an ingot of gold of the value of \$58 86. The Enterprise company during their sojourn at the south, discovered and located a number of silver-bearing ledges, all of which, however, show free gold, among which are those named by them Empire, Gray Eagle, Elia Ptata, Rio Grande, Schram, Cornubian and others, and also organized a mining district which they called Gold Mountain district, establishing laws, electing a Recorder, etc. The location of the district is about 45 miles south of Silver Peak, and perhaps 25 miles from Palmetto. It is north of the Inyo mines about 40 miles, and quite likely may be south of the State line, and consequently in California. While there the party sunk a shaft upon the ledge, tunneled through it, and piercing a chimney to the surface, used it as a cabin, the room being 9 by 10 feet square, in every portion of which, ceiling, walls, fire-place, all sparkled with virgin gold. Specimens of the rock show the gold to be very fine, but regularly diffused throughout. The Enterprise company have made arrangements, so they inform us, with J. E. Clayton, an experienced mining engineer, to erect a small mill in the district for the purpose of more thoroughly testing the value of the State Line ledge. The mill will have a battery of two newly-invented steam pumps. The Enterprise company, thus far, are the sole occupants of the district, having located everything yet discovered, though doubtless there are many other ledges there. There is plenty of timber for fuel close at hand, and timber suitable for lumber at a distance of 15 or 20 miles. Water abounds in numerous springs a few miles from the mines, but wells will have to be dug to ensure a convenient supply. The company will leave here again in two or three weeks to commence operations once more. The success of the Enterprise will give an impetus to inspecting in that section which has scarcely been surpassed by the recent rush to Sweetwater."

Manhattan.—The *Reporter*, May 9, says: One of the very best and most promising veins of the district upon which work has been done is the Ophir, situated upon the crest of the hill at the head of Silver Spring canyon. This lode, together with others, became the property of Messrs. Bauer & White. The former named gentleman, Mr. J. Chris. Bauer, left here fast fall, went to England and formed a company for the purpose of developing the Ophir, and the prospect at present is that a company of English capitalists will soon have an agent at Manhattan who will commence extensive operations there. Mr. Bauer arrived here during the week and is now engaged in surveying timber lands, water privileges, etc., in the district for the benefit of the company. Mr. J. H. Boalt, a well known mining engineer, will shortly arrive and report upon the property.

Reveille.—The Rutland mill is reported to be again in motion and at work. At present the ore is worked wet, but about

the first of July it is the intention of the owners to erect roasting furnaces and adopt the dry-crushing method.

Northumberland.—It is stated that operations in this district will soon be commenced upon a more vigorous system than heretofore. Mr. White, of the Northumberland company, will erect ten-stamp mill during the summer, and will put additional workers into the mine for the purpose of extracting the surface-ore, preparatory to milling. The tunnel running for the ledge, which it will strike a considerable distance from the surface, is now quite near to it, and will reach its terminal point soon. The grading upon the new road across the mountain, near the mine, is progressing rapidly, and will be ready for teams shortly.

Cortez.—A little over two tons of ore from a new discovery in this district, says the *Reveille* of the 1st, were worked at the Manhattan mill yesterday, about the yield of which interested parties wish us to make no report. The reason is, the rock is too poor to pay expenses—miserable dirt, which assayed only \$122 81 per ton. In most other countries this would be considered worth some money; but here, after paying \$45 freight from Cortez and \$45 for milling, it won't pay the mining expenses. The claim, we believe, was discovered by some Mexicans, and the ore might be assorted, it is said, to pay a much higher rate by the ton.

Silver Bend.—We condense the following items of news from copies of the *Reporter* of the 1st and 9th inst.: From the back ledge of the Highbridge mine of the Combination company they are at present taking out an immense amount of ore. There is estimated to be in sight, near the surface, a sufficient quantity to keep the mill at work for several months, and enough above the water line to supply it until the shaft over which the steam hoisting works are arrested can be worked to another station. The average yield of the ore which the mill is now reducing, both dry and wet, is \$100 per ton. . . . Some remarkable developments have recently been made upon the El Dorado South. For a length along the ledge of 300 feet south from the shaft it has been discovered that the main portion of the ledge is composed of a very high grade chloride ore, working an average of near \$500 per ton. The greatest depth yet reached upon this surface-working is now about fifteen feet, with no diminution in either quantity or quality. In the incline of a depth of 125 feet from the surface, a very large body of wonderfully rich sulphuret ore has also been disclosed, exceeding anything heretofore found in the mine. The company now have ready for the mill 200 hundred tons of first-class ore, which will be worked shortly in one of our mills here. . . . A lot of chloride ore, taken from near the surface of the El Dorado South ledge was taken to Austin and reduced and yielded \$557 to the ton. The ore was taken from an immense chimney occurring in the vein which had been explored to a considerable extent and must produce an enormous quantity of ore similar to that already worked. A number of tons are already extracted and ready for reduction. . . . The Belmont company have a supply of ore at the mill from the back ledge of the Highbridge, and teams are constantly hauling more. . . . The new mill of Antonio Borgues, situated about a half mile south of the El Dorado mine, will probably start up to-day. It has a battery of three stamps—to which two more are to be added soon—and will be used in reducing ore from the Arizona.

Bullion Shipments.—The *Register* reports the following: Paxton & Co. shipped during the week four bars of bullion from the Combination company's mill weighing 4,712 ounces and averaging 796 fine. . . . Since our last issue the Combination company has shipped bullion of the value of about \$10,000. . . . Six bars of bullion, weighing 603 pounds, were received at Austin on the 26th ult. from the Murphy mine. . . . Five thousand ounces of crude bullion were received at Austin, last week, from Righy's mill, San Antonio.

Montana.

A writer in the *Virginia City Democrat*, May 9, thus reviews the silver mining region around Argenta, and Mr. Esler's results in smelting the ores thereof. He says: The reported successes of the furnaces erected by Mr. Esler, at Argenta, in reducing the rich and extensive silver lodes in that vicinity, induced several of our citizens to visit that place about a week ago, with a view of investigating the claims of the district upon public attention. The result of these investigations was highly satisfactory. There is nothing very remarkable about these lodes themselves to distinguish them from the lodes of other portions of the Territory. They differ in quality, but all exhibit the same general features. They are, almost without exception, well defined, and the crevices are of width sufficient to be profitably worked, and grow wider as work progresses. The ore contains a large admixture of galena, which insures an easy reduction by smelting. This element becomes scarce in the ore as the vein descends; but this is compensated by an increasing richness in silver, and as the fluxing metals, such as iron and litharge, can always be obtained, the gradual disappearance of galena is regarded as a merit rather than a defect in the mineral. At the depth of a hundred feet, the greatest depth yet attained, the ore smelts readily in combination with a light flux. At this depth the only lode yet opened continues to increase in width, the ore is of more uniform character, the crevice is completely filled with it, and it is much richer than upon and near the surface. Ores pronounced by the managers of the St. Louis furnace, irreducible by smelting, is now being run through Mr. Esler's furnace with a promise of a much larger yield than any heretofore worked in it. Its average, per ton, will probably run into hundreds of dollars. Mr. Esler's experiments have not been such as to test the value of any particular lode, but rather of all lodes in the district. He has worked entirely upon surface ores, gathered promiscuously from the lodes in the district, which have been smelted in combination, and without selecting the better from the poorer classes—a process which, while it demonstrates the general richness of all the lodes, leaves us in the dark as to the actual value of any. In sixty-nine working days he has taken out nearly \$12,000 in silver, and as much more in lead. This has been done under almost every conceivable disadvantage, and with one furnace only in operation at a time. Mr. Esler had great difficulties to contend with from the commencement, and his efforts, though fully decisive as to the success of the enterprise, leaves it somewhat conjectural as to what his success might have been, had he been more careful in the selection of ores, and entirely free from extraneous embarrassments. A question of economy will be settled by the run of selected rock; now being made from the Stapleton mine. The assays of metal made during its progress, indicate an increase in the selected mineral of more than one-half, probably two-thirds, over promiscuous surface ores. From the experiment so far made we cannot decide how profitable the furnace may prove; but that it will be an abundant success, and, in fact, the only practicable mode of working argentiferous galena, is proved beyond a peradventure. Argenta is favored with a location which unites all that is grand and impressive in scenery, with all that is desirable in mineral wealth and facilities for its development. The Rattlesnake, a mountain torrent, abounding with fine fish, and affording power to work an hundred furnaces, rushes in headlong course along the base of the mountain of silver, which it separates from the town itself. Large quarries of granite rise in misshapen knobs overlooking the town, and a plain composed of the debris which for centuries has been washed down their sides, affords material for brick equal to the best fire-brick of the States. Lime and clay are obtained within easy distance, and a kind of alka-

line deposit, which, upon exposure, hardens into rock, which makes an unexceptionable lining for furnaces, may be cut from inexhaustible banks within the distance of five miles. Three miles in an opposite direction lie immense pine forests, affording abundant material for charcoal of a superior quality. In short, nothing but labor is needed to construct a furnace at Argenta. The materials are there in profusion. Several furnaces are in contemplation during the present season, and work in developing the lodes is going on briskly. Why Argenta should not speedily become one of the most important mining towns in the Territory, it is difficult to conjecture. . . . From the same paper we learn that in Silver Star district the Everett-Green Campbell company, of Cleveland, Ohio, are busily engaged in sinking on their lode in four different places. They have four shafts sunk; one to the depth of twenty-five feet, one sixty-eight feet, and one eighty feet deep. The lead is said to improve as they go down on it, and at the bottom of the deepest shaft is eight feet in width. The ore by means of an arastra (the only way it has as yet been tested) yields very handsomely. Mr. Everett is now East, and has ample machinery on the way to work the ore, which shows gold, with slight traces of silver. Mr. Salisbury has already taken out five thousand tons of ore from this lead, which is waiting the erection of the mill. The Rocky Mountain company, the members of which also reside in Cleveland, Ohio, and are old copper miners near Lake Superior, are engaged in sinking upon the Tolin ledge, which is a crevice of from ten inches to three feet. Upon this lead this company have sunk three shafts; one twenty-eight feet, one seventy-five feet, and one one hundred and fifty feet deep, and have taken out a large amount of ore. They propose erecting a furnace soon to work the ore from this lead, and with that in view, Mr. Rouff is engaged in erecting a furnace upon a silver lode, which will soon be completed and in operation, with a promise of great success. Mr. Salisbury, who gives the above information, is, says the *Democrat*, an old miner of great practical experience. For seven years he has been in the copper mines of Lake Superior, and for the past twelve months has been actively engaged in the mines of this Territory. . . . A correspondent of the *Post* writes from Bozeman, April 25, of serious trouble with the Indians at that place. . . . From the same paper we condense the following items of news:—L. H. Hershfield & Co. have purchased the "Baker Mill," now situated on "Blue Cloud" lode, which they propose moving immediately, and locate upon the "Thomas" lode, near Cable City. This is a twenty-stamp mill, complete in every particular, and one of the best in the Territory. . . . Mining is very active at Lincoln gulch. One company cleaned up \$400 from refuse dirt. . . . Several clean ups have been made in Alder gulch, and there is already a great improvement in business. . . . Nowlan & Weary, bankers, have received from the Clarke & Kirby mill, at Bannack, 109 ounces of gold retort, taken from No. 9, on the Dakota lode, the product of about ten days' run.

[From an Occasional Correspondent.]

South Carolina.

EXTENT AND RICHNESS OF THE GOLD FIELDS.

HARMONY P. O.—May 23, 1868.

The extent and richness of the gold field of South Carolina is very imperfectly known and developed, but is destined, at no late day, to an investigation and development that will cause that little State to become famous for its production of the precious metals. It will be shown to be the central seat of the gold deposit south of the Blue Ridge, which begins southwest of Lynchburg, (Va.) on or near the Stanton river, a few miles southeast of the belt of primitive limestone which runs parallel with the Blue Ridge and the Atlantic coast through the States of Virginia, North Carolina and South Carolina into Georgia. Explorations have shown that the workable ores are chiefly found below or on the southeast side of the above-mentioned belt of primitive limestone; this is particularly the case from the Catawba river (S. C.) to the Savannah river. A particular exploration of this particular section by a line drawn at right angles to the strike of the strata, will show, first, on the northwest the limestone; second, the magnetite (or magnetic iron ore); third, red or hematite ore, and within from half a mile to a mile you strike a well-developed strata of manganese, and from ten to fifteen miles you pass into the gold-bearing strata consisting chiefly of flint or silicious rock, well and boldly developed, and in this strata are found the mines that have been so successfully worked in the vicinity of Charlotte, (N. C.) such as the Rodgill mine, the Reed mine, the Washington mine, Hocy mine, and the King's mountain mine. Passing into South Carolina, the Wilson mine, Bowlin mine, (in N. E. York,) and that large cluster of mines lying on the western side of York district, (on or near the Broad river,) consisting of the Martin mine, (now in successful operation by a New York company,) the Smith mine, Wisnet mine, Whiteside mine, and with some ten or fifteen other mines that have lately been opened and worked to a limited extent, and with flattering prospects.

Passing Broad river into Union district, from Smith's Ford, running up the river to Cherokee Iron Works, (a distance of eight or ten miles,) are some ten mines lying within a mile or two of the west bank of the river, some of which have been worked to a depth of sixty or seventy feet with no abatement in richness of ore. Continuing on in a southwest course with the general strike of the strata, near Packolet river, several mines have been opened and worked. A few miles south, in the same strike or general direction, you come to that rich bunch of mines known as the "Fair Forest" mines, including the Knott mill mine, the West mine, the Thompson mine, the Bogan mine and others. Some of these mines have proved very rich, the Knott Mill having yielded four thousand dollars from one day's work. (this was a pocket,) but the general character of the ore is rich. The West mine is known to have yielded one hundred and sixty thousand dollars, in the crude and imperfect manner in which it has been operated. This mine has been worked down to one hundred and fifteen feet in one shaft, and no indication of failure, but rather of improvement in the vein, both in richness and quantity of ore. Some eight or ten other shafts have been sunk on this mine, within the space of half a mile, and in each instance with indications of abundant and rich ores. The ores of this mine are easily reduced and easily collected, being saccharoid quartz without any admixture of foreign substances that would render the amalgamation of the gold troublesome. The average value of this ore, so far as it has been worked, is from fifty to two hundred dollars per ton. As to the yield of the Thompson and Bogan mines, we could get no definite information, but they had the reputation of being rich, when worked. Still passing on in the same direction with the strike of the gold-bearing strata, no mines of any note are found till you reach Domes' mine, in Abbeville district, near Savannah river, which is now being successfully worked, yielding, on an average, two thousand dollars per day, with from thirty-five to forty hands. This gold-bearing strata, from the North Carolina line to the Savannah river, has been very imperfectly examined, and less perfectly worked for the want of experience and proper machinery and lack of energy and capital on the part of the owners. The proprietors of these mines, before the war, directed the principal portion of their attention to the cultivation of cotton, as a pursuit with which they were better acquainted, and one more congenial to their tastes and habits, and requiring less exertion and less of their personal supervision. Since the termination of hostilities, they find themselves so impoverished that they are unable to purchase the necessary machinery to work them to ad-

vantage, and the unsettled state of the country has hitherto prevented northern capital from coming here to any extent to grasp these tempting and golden prizes. The few that have ventured into this region have met with flattering success.

B. W. REYNOLDS.

Dakota.

[From correspondence of the *Virginia (Nevada) Tresspass*, dated at Southpass City, March 16, we learn as follows of the new Sweetwater mining country:—Carter county, Dakota Territory, is in the southwestern corner, and adjoins Idaho, Utah and Colorado. It may also be said to reach the Montana line on the north, as the county boundaries are not yet accurately defined; but future settlements will undoubtedly necessitate the organization of three or four counties between the head of the Sweetwater and Montana; say one with lake Yellowstone about its centre, another including the headwaters of Gray Bull river and extending to Clark's Fork, another on Wind river, and perhaps one bounded by Shell creek and Big Horn on one side and Fort Phil Kearny on the other. However, Carter county at present is supposed to cover the mining regions of western Dakota, and the new county, with its courts, and officers, and juries, aided by an occasional Vigilance Committee in the "outside districts," will probably suffice for our government for two or three years. The officers of our new county are: W. M. Templeton, Clerk of the District Court; John K. Murphy, Sheriff; Archy G. Turner, Recorder (also our representative in the Legislature); H. B. Hubbell, Treasurer; County Commissioners—J. W. Lowry, William Rose, William Matheny; United States Commissioner, Major Patrick A. Gallagher.

MINING MATTERS.

There has not been much done in the way of mining lately, owing to the severity of the weather and horrible condition of the roads. The thermometer has dropped frequently of late to seven degrees below zero. Work has been suspended nearly everywhere throughout Pacific district. In the districts about here work has been steadily prosecuted in many of the claims, but under great difficulties. The Atlantic ledge, in California district, is more thoroughly prosecuted than any other in this neighborhood. The Bridger Mining company, under Superintendent Jackson Temple, has sunk a shaft about eighty feet deep, where the vein dips to the north twenty-five degrees. The vein at the bottom of the shaft is twenty feet thick, well defined, and is of exceeding richness. Mr. James Temple has nearly as good a thing in Atlantic Gulch, just below the above company, as the ledge itself. He has a string of sluices running in the gulch, and has been taking out \$25 per day to the hand. The gulches in this vicinity are generally free from boulders and clay, the stripping is light, and the gravel easily washed. Frank Hill, an old Washoeite, struck a good ledge last month, about three miles north of this town, which he named the Dexter. He now has a shaft sunk on the ledge to a depth of twenty feet, developing a vein ten feet seven inches in width, between well-defined walls of slate. Free gold can be seen all through the rock. In most of the ledges hereabouts the quartz seems to become more and more decomposed as you sink down upon the vein. Whether this is an argument against the permanency of the pay or not, I am not sufficiently versed in quartz mining to say. The general opinion here is that decomposition is not detrimental.

PACIFIC DISTRICT—OVER THE RIDGE.

The mines hereabouts are not confined to the eastern slope of the Rocky Mountains, but extend as far west as Green river. Pacific district is bounded on the north by the summit of the Wind River Mountains, on the east by the summit proper of the Rocky Mountains, on the south by the old emigrant road, on the west by Green river and Granite creek, and contains an area of nearly five hundred miles. It includes Big and Little Sandy, the Upper Sweetwater (that is, the headwaters of that stream), Granite creek, the lake north of the head of that stream, and the eastern bank of Green river, as far north as gold has yet been discovered. Indians report gold in the steams some distance above the north line of this district, in the vicinity of Fort Bonneville, directly west of Fremont's Peak, and the chances are that as soon as the snow will permit there will be another stampede in that direction.

THE BIG HORN COUNTRY.

Nothing definite or reliable has yet reached us from the stampede to the Big Horn country, but divers rumors leak out through the Wind river valley hitherward. Major Baldwin, of Wind river valley, with a party of twenty men, left camp on the 18th of February, and started down Wind river to the Big Horn Mountains, piloted by a Snake Indian. Since that time about two hundred men have followed, and as so many men penetrating into the Big Horn and Powder river country have been known there to cease banking for further adventure, fears are entertained that but few, if any, of these two hundred will ever return to tell the tale of the richness of the new Dorado; and as Fort Phil Kearny, where that wholesale and bloody massacre took place, on the head of Clear Fork of Powder river, is not far distant from the Big Horn, these fears may be well grounded. The Little Big Horn, Tongue river, and their tributaries, rise between the main Big Horn and Powder river—mostly among low hills and undulating prairies; but down about Fort Reno, on the main Powder river, and over toward where the Big Horn pours across the Montana line, the mountains are extremely rugged and inaccessible, except at a few points.

INDIAN WAR RUMORS.

The Blackfoot Indians are preparing for war with the Crows, north of us, and are encouraged and assisted by the whites—especially by Major Wright, agent for the Blackfeet. This encouragement is given by the whites in the belief that a war between these tribes will enable prospectors and miners to pursue their avocations in peace and safety. Your correspondent has little faith in such a policy. So long as the war can be kept up between them it will assist the whites, it is true—but that is all; and the assistance may terminate at any moment and disastrously to the whites. Indians make peace with one another more readily and with less negotiation than with whites. Let two hostile Indian camps be situated twenty miles apart, and a camp of whites with considerable plunder at the other extremity of a triangle, and the chances are ten to one that the white camp will be first attacked—and by the combined force of the hostile Indian camps. There is no doubt in my mind but there will be a long and bloody struggle for the possession of the country lying between the Sweetwater and the Montana line, and between torts Reno and Phil Kearny and the summit of the Rocky Mountains. Disaffected Sioux, Cheyennes, and stragglers from other tribes who make peace with the Government, will take refuge in this region, and, banding with the Blackfeet and Crows, will wage a relentless war on the hardy gold hunter. The country is undoubtedly as rich in mineral as it is known to be in agricultural resources, and the whites will have it, at whatever sacrifice of life.

IMMIGRATION.

The spring tide of immigration has set in, bad as the roads are. Some few reach us by various modes and routes of travel, and I hear of hundreds waiting at Salt Lake, Cheyenne, and other points, for the snow to clear away. Colonel Tozer, of California, and James Duncan, of Nevada, have just arrived, and report a large number of men at Salt Lake and Fort Bridger, on their way to the gold mines. Some parties from the West have got as far as Big Sandy, and there been "caught out" by snow storms; while others have reached Green river and stopped fo

the weather to moderate and the roads to improve. Stock caught by these storms has suffered terribly, and some parties have lost every head caught at the Sandy. At Green river they fare better, for Robinson & Terry have a depot of supplies there, where emigrants can purchase flour, bacon, grain, and whiskey. The winter here has been an unusually severe one, is now broken and fitful, but not by any means cleared away. Provisions, in consequence, are becoming scarce, and prices are crawling up daily. There is danger that when the roads do become fit for hauling, men will pour in faster than grub can be brought here to feed them.

MISCELLANEOUS.

We are soon to have a national bank here, with a cash capital of \$100,000, and an authorized capital of \$500,000, with D. K. Allen, president, H. B. LeQuatte, vice-president, and J. B. Hartman, cashier. This will enable our miners to turn their dust and amalgam into greenbacks, will supply the country with that great desideratum, "change," and make business of every kind more prosperous.

PROVISIONS.

Since my last whiskey has gone up to twenty dollars a gallon, Flour has fallen five dollars per hundred pounds within ten days and may now be bought for thirty dollars.

Minnesota.

We have news from the Vermillion mines to the 25th ult. Col. Tindall writes that he is taking out nuggets of gold. He has his mill in fine running order, and some quartz out of thirteen different veins. He says: "The amalgamators are well up, together with the washing arrangements and the sieves, which we have so arranged as to be worked by machinery. The dry stamping works splendidly, and produces but little dust. We ran the machine one day for the purpose of seeing how it would work. We have just finished the furnaces and fired up. We shall run the whole thing to-morrow, (Saturday, April 24th.) We will begin stamping and amalgamating on Monday, and will be able to finish up all the quartz that we have now at the mill. We will then have to lay over two or three weeks, as the lake will be breaking up so that we cannot obtain any more until the lake is free of ice, and the weather settles, so that we can get the quartz from the other locations by boat. The washing of the ore is all done by steam. Three men can run the whole thing, in the way I have it arranged in my process. Any one coming must bring along provisions for themselves. I have made from one to two small assays every day since I arrived here, and have had very fine results. I have a good-sized bottle full of little nuggets of gold and silver." The Superior Waconia *Gazette* of the 16th inst. brings still later intelligence. It says: "Colonel Henry Tyndall arrived here from the Vermillion district late last evening, and started for St. Paul this morning. Tests have been made from several of the veins, all with the most favorable results. The quantity of rock tested in each case was not less than five hundred pounds. In every experiment, so far, the yield has been largely over \$100 per ton; and some of them have gone to thousands. A private letter informs us of one instance where one hundred and fifty pounds yielded a pound and one-half of bullion. Colonel Tyndall pronounces the country rich; and in his statement he is borne out by the amount of bullion he brings with him—amounting to between seven and eight pounds of gold and silver. Letters from Messrs. Post and Rakowsky, both well known to our readers, ratify every statement made by the experimenter. Owing to a fatal break in a portion of the machinery, the Colonel thought it best to start at once for St. Paul and confer with the parties who are the projectors of his operations. The result of his trip will, we think, be the immediate ordering of machinery from Chicago."

[We hope none of our readers will be so foolish as to get excited over the statements printed above.]—Ed.

Colorado.

We condense the following news items from files of the Central City *Herald* to the 16th instant: The Smith & Parmlee Gold Company took out, during the month of April, 448 ounces of gold, upon which there was a clear profit of \$3,000. Mr. Herick has a button of silver which weighs 260 pounds, and is worth four thousand two hundred and thirty-two dollars in silver, or \$5,713 currency. This button is the result of a five days run of the Georgetown Silver Smelting Works, and is 103 pounds heavier than any button sent from Colorado, and 133 pounds over any sent from Georgetown. The Equator lode, at a depth of about eighty-five feet, is yielding ore that will work over \$100 per ton. Mr. Fields is running the Bobtail mills on ores from the Cotton, Bobtail, Nehama, and Omaha lodes. The Herkimer lode, Griffith district, Clear Creek county, is opening out splendidly, and bids fair to turn out an immense quantity of ore. The mine shows 18 inches of the fine rich ore, besides a good show of second quality. Charles Moore and Henry Scott, just in from a trip through Boulder county, report that times are somewhat dull in Ward district, but the people are cheerful, and confident that they will be brisk this summer. The Long Peak company are at work on the Comet lode, and will soon go to work on the Manhattan. Their mill is idle at present. The Ni Wot company's fine 50-stamp mill is crushing ore from the Columbia lode, which yields \$100 per cord, the ore being taken just as it comes from the mine, without selecting. The lode has a shaft sunk to it 190 feet deep, and a drift 20 feet long, which shows a three-foot vein of beautiful, rich ore. The Etina lode, the property of Brookfield & Co. has a 40-foot shaft, and shows a vein of solid ore one foot wide, which runs \$100 in a stamp mill. The Nelson lode, owned by the Ni Wot company, is being worked for the surface ore, which is paying \$300 per cord. This is an old discovery, but has not been worked for several years. The shaft is now 50 feet deep. Mr. Trear and Mr. Erickson have found a lode which they have not yet named. They are now down 15 feet, and have a good strong vein of ore. The Mohawk lode, which is owned by Haswell & Co., has a shaft 46 feet deep, from which magnificent black iron and copper pyrites are being raised. They have just got through 15 feet of cap-rock. This mine will be worked steadily this summer. The top quartz paid \$156 in a stamp mill. Brookfield & Co. have got through the cap on the Connor lode, at a depth of 33 feet, and have a good vein of nice-looking ore, which assays in gold \$89, and in silver \$35 per ton. In Gold Hill district the Hope lode shafts are quite full of water. The Horse Fall lode, which is the oldest discovery, and until recently considered the best lode in the district, was worked extensively in '61 and '62, and yielded a good deal of gold. Quite a little town was built in its immediate vicinity on the top of a mountain, which is now deserted. It is evidently a good silver lode.

Idaho.

Wells, Fargo & Co.'s bullion shipment from Silver City, for April, amounted to \$80,000, a considerable falling off from March, as the mills could not work on account of scarcity of quartz, occasioned by the breaking up of the roads, which prevented hauling. The *Avalanche* says that the May shipment will also be light, from the same cause; but that during the remainder of the season the monthly shipments will be larger than ever.

Canada.

The *Madoc Mercury* of the 23d brings the following good news from the Richardson mine. The editor says: Mr. Taylor called at our office this morning, bringing with him a splendid ingot of pure gold, weighing 32 oz., 7 dwts., 20 grs., worth \$647 80, with which he was on his way to Belleville, to hand it over to the

directors of the company, as the first product of the working of the pay rock of the mine by their own machinery. The following is the official account of the crushing at the mine, up to the present time, with the new machinery:

First crushing—common wall rock, 62 tons—yield \$35.	
Second crushing—pay rock, 49 tons—	
Yield..... 32 ozs., 7 dwts., 20 grs.	
Value.....	\$647 80
Or less 15 tons (remaining in the slime pits) at 50 cents.....	7 50
	49)640 30
Per ton.....	13 28
NOTE.—This amalgam was got by straining the mercury.	
The retorted mercury, 19 lbs., gives 3 dwts. 10 grs.—\$3 80; or \$95 on 480 lbs.	
See above.....	\$640 50
Retorted in mercury.....	95 00
	Tons 49)735 30
Per ton.....	\$15 00

COPPER.

Michigan.

We have the following additional statements of products for the month of April this week: South Pewabic mine—barrel work, 1 ton, 679 lbs.; stamp, 90 tons, 22 lbs.; total, 91 tons, 701 lbs. Ogima mine—masses, 1 ton, 712 lbs.; barrel, 3 tons, 1,960 lbs.; stamp, 12 tons, 168 pounds; total, 17 tons, 840 lbs. Knowlton mine—mass, 830 lbs.; barrel, 2 tons, 1,536 lbs.; stamp, 10 tons, 1,694 lbs.; total, 14 tons, 60 lbs. Shelden-Columbian mine—stamp, 30 tons, 185 lbs.; barrel, 8 tons, 1,304 lbs.; total, 38 tons, 1,489 lbs. Douglass mine—barrel, 5 tons, 1,403 lbs.; stamp, 23 tons, 545 lbs.; total, 28 tons, 1,948 lbs. The *Gazette*, from which we have borrowed the above, has the following items of news bearing date the 21st instant: At the Cliff the 160 fathoms level is looking very well. They expect to weigh off 125 tons mineral for April product. At the Delaware. Drum-house vein still opens rich and promising, and appears to be as important as the Delaware vein, as far as copper is concerned, and when opened up through the cross-cuts now being drilled, must materially assist the returns. Hecla is averaging ten tons per day. From the 1st to the 14th inst., seventy-eight tons of mineral was weighed up at the stamp mill. The Portland and Scott Copper companies have been fully organized. The former taking the land lately known as the Red Jacket property. Work has been commenced by sinking two shafts to reach the Calumet vein, and also to cut a lode which is believed will fully equal Calumet. It is understood that operations on the Etina have been totally suspended. The Copper Falls mine produced in April over 100 tons of mineral.

Arizona.

The superintendent of the Planet Copper Company's mines, at Williams' Fork, Yuma county, reports in the Prescott *Miner*, of the 18th inst., that recently the Indians have been very troublesome in the vicinity of that place. On the 17th they attacked and drove into camp, a party of men who were cutting hay for the Great Central Mining company. Major Price and Capt. Young, with soldiers from Fort Mohave, had arrived at the Fork, and started out to find and chastise the Indians. The steamer *Cocopah* was expected at Aubry City, with goods for the mines. A great deal of rich copper ore was taken out, and would be shipped by first conveyance.

LEAD.

Wisconsin.

In continuation of a series of articles on the lead mining region of Shullsburg, the *Monthly Advertiser* of that place for May has the following: Running along the south part of the south-east quarter of section ten, and being within the incorporated limits of the village of Shullsburg, is a range or lode of lead ore known as the "Elevator Range." This has been one of the best defined lodes that has yet been discovered in the Lead Region, and the most extensively worked. It stretches along in one continuous course, N. 72° W., for three-fourths of a mile in length, in one continuous vein. As we shall discuss the entire vein, we will take it up under the several different names, as near as it is possible, in the order of their discovery. [The writer here proceeds to give an interesting account of the early working of this lode by different individuals, from 1826, the time of its discovery, to 1857, which we are reluctantly compelled to omit from want of space, and content ourselves with that portion of his narrative which relates to the present time.—Ed.] Messrs. Weatherly & Beebe are now successfully working this mine, taking out large quantities of ore every year, and to all appearances it is growing better. Farther west the range is known as the "Miller Diggings," and is now owned by Dr. George W. Lee and partners. There has been a large amount of ore raised here, but as all the ore dips deeper going west, this part of the range is now under water, and can not be worked at present. The Doctor has been engaged for the past two years in running a level into this portion of the range that will drain off the water some ten or fifteen feet lower, and when it is completed, it will no doubt prove as remunerative to him as it has done to Weatherly & Beebe, in working their portion. The west end of the range, known as the "Nick Walsh," or sand range, has, on account of the water, been abandoned for many years. Being situated where the range dips into the deep clay basin, the mineral lies deeper, and the water is very strong. There was a large quantity of mineral taken out of this range above water, and was left going down into it, indicating that there are large deposits deeper down, awaiting the working of some active company to bring in an adit that will unwater the range. The east part of the range, known as "Davenport's North Range," has been worked since the year 1852, and has yielded large amounts of ore, paying a large per cent. on the capital invested, and making several parties very wealthy. It is estimated that over fifteen million pounds of lead ore has been raised on this range since its first discovery; and it is not at all probable that the largest deposits of ore have been reached yet. There is ore going down all along the range into water. Mr. Weatherly informed us that in one place, by the aid of a hand pump, he sunk a hole four feet by eight, and fourteen feet deep, and took out one hundred thousand pounds of ore, leaving it going down better than at the top. There is now an adit being run in, that will drain off about forty feet more of water; and although it will require several years to complete it, yet the enterprising owners who have it in charge are putting it through, knowing they will be well repaid for the capital invested. Upon the land being brought into market by the United States Government, upon which this range is located, it was purchased by William Hempstead, of Galena, Ill., and is now owned by his heirs.

COAL AND IRON.

Pennsylvania.

The *Wilksbarre Record of the Times*, May 12, says: We are informed that Mr. Adam Driesbach, who has been lately engaged

by Dr. Linderman, of Manch Chunk, in exploring his Newport lands, late the Northampton Coal company, has discovered and opened a remarkably fine vein of coal. It is fourteen feet in thickness, and having but about six inches of slate between the roof and the pavement. Mr. Driesbach is now sinking a slope on the vein, and has penetrated far enough to prove both the quality and quantity of the coal. There are indications that the basin is very large and will be very productive. The quality of the coal is said to be remarkably good. This discovery will undoubtedly be the means of extending immediately the Lehigh Valley road to this locality. The Northampton is about a mile below the Newport colliery. This occupation of the Northampton, or Linderman property, will very nearly close up the lower valley; there being, we believe, but one more property of any considerable size between it and the Schickshiny. When that is occupied the stakes of the coal field in that direction will all have been set—the march westward will have an end. The Upper Dauphin *Register* says: Messrs. James Savage and Col. E. G. Savage, two of the contractors of the Lykens Valley mines, have entered into co-partnership with Benj. Kaufman, merchant, of Winconico, in the lease of a portion of the Munson Coal lands, situated about seven miles above this place, which they intend opening at once, and have ready for shipping extensively by next spring. Their lease is for fifteen years, with the privilege of an extension of time. They have two miles run of coal land and the coal is of excellent quality. They expect to ship next year from 50,000 to 75,000 tons from the new mines. The *Mahanoy Gazette* says: The Ringgold iron company, with a capital of \$200,000, was organized this month, with A. Focht, late President of the National Bank of this place, as President, and G. Bast, of Schuylkill Haven, as Treasurer. This company proposes, under a patent which they hold, to manufacture blooms direct from the ore. One furnace erected last winter has been in successful operation ever since, and with the most flattering results. The company is now erecting five additional furnaces, making six in all, upon and lately purchased by the company at Ringgold, in this county. The works will be erected contiguous to the Little Schuylkill branch of the Reading railroad. The tract of land owned in connection with the works, we understand, contains an abundance of iron ore and limestone.

Colorado.

The iron works on South Boulder still continue to be idle from want of a market for their product. They have stood thus for two years. The *Herald* says: The immense shipments of Freiburg pans and all manner of ridiculous iron concerns, which were sent out here by fancy mining agents (a generation of vipers once common here, but now happily called hence) have kept the foundries of Colorado abundantly supplied with iron, and there are still enough old castings in the country to supply the demand for some time to come. There is a good show for a large production of iron ore from this mine, running as high as 75 per cent. The vein is horizontal, and has on the surface a three foot stratum of first-class fire-clay. One other layer of fire-clay occurs under the iron, and beneath that again is found a vein of coal "three feet wide." Of Marshall's coal mine the same paper is informed that "the outcroppings occur in a little bluff, situated about four miles distant from the base of the mountains. The vein, as far as developed, proves to be 12 feet thick, and has three levels driven in a distance of 350 feet each. The vein rises as you go in just enough to drain the water off; the mine is consequently dry and pleasant to work in. The face of the drift is gouged out at the bottom and sides where a single shot at the top is then sufficient to turn it all out. Twenty tons of coal are frequently broken in this way at one shot. It is worth \$4 at the mine. Denver is the principal market, from which place it is eighteen miles distant. The coal business is slack during the warm weather, and it is no trouble to mine it—only sufficient to supply the demand is brought to the surface."

Montana.

The people of Montana are devoting some attention to coal mining, and with what success is told in the following clipping from the local columns of the Virginia City *Post*: Eight thousand pounds of bituminous coal came in to-day from Bozeman. It is taken from a drift in the hill in which the lead is located, and the supply appears to be practically inexhaustible, as the drift has disclosed a width of fifty feet already. It is of quite an inferior quality at present, but there is little doubt that it will improve as a greater depth is attained, as is the rule with all coal formations. This lot was for Len Robinson's gas works. We hope it may prove of a sufficiently good quality to obviate the necessity of further importations from the States.

Mexico.

The *Two Republics*, an American newspaper published in the city of Mexico, says of the iron works of Zimapan: "They are carried on by an English company of great enterprise, and the country is indebted to their spirit and energy which have overcome so many obstacles to a successful consummation. They comprise two establishments about two and a half leagues apart, and are called *La Negocion de la Encarnacion y Guadalupe*; the number of persons who receive steady employment at these works are between 500 and 600, all natives except five Englishmen, the directors and master mechanics. The amount of ore taken out is not here calculated, but over 600 tons of iron is manufactured, in bars and other varieties of merchantable iron, and is sent to market annually, mostly to this city, over a difficult road through the mountains, which was constructed and is kept in traveling condition by the company at their own expense—the Government never having contributed one dollar or one day's labor to it."

SLATE.

[From our Buffalo Correspondent.]

BUFFALO, May 26, 1868.

My attention was lately called to an article in the *Welch paper Y Dryck*, which, after having been translated by a worthy Welsh friend, I found to be the article recently published in the *JOURNAL OF MINING*, together with an answer thereto. This answer was designed to refute my assertions, and he may have succeeded in doing so, according to the *Welch* method of argument, but he has said nothing to prove my statements to be false. It would dignify the article to call it a criticism, and possibly it is not worthy of an answer in a respectable journal, for the author resorts to blackguardism to vindicate his position, and entirely ignores the manners of a gentleman in such matters. He certainly has placed a low estimate on the intelligence of the quarrymen in supposing that his remarks made in this way would effectually convert the facts asserted by your correspondent. He labors earnestly to disprove that the quarrymen are demanding too high wages, and that they are thereby injuring the trade. He says:

"The Bohemian of Buffalo has been very much enlightened in favor of the quarry owners. His remarks are entirely for their benefit, and are greatly against the interests of the laboring classes, tending to elevate the former and degrade the latter." I can hardly see how he can separate the two interests. The owners make nothing by low wages. They do, it is true, endeavor to keep wages at a reasonable figure. They know, and the more intelligent working men should know, that high wages necessitate high prices, and that high prices prevent the general use of slate; so that, as was the case last winter, quarry war

suffer from having on hand an unsaleable stock at a high rate of cost. Nevertheless, as soon as cold weather approached they looked to the interests of the men, and offered \$2 50 per day, as I before asserted, to keep them at work during the winter, and now, the men get the highest wages claimed, they will not be as well off by hundreds of dollars as though they had worked all winter; besides, they have seriously damaged the prospects of a year's business by compelling owners to sell at a higher price than they desired, as they only wish to sell at a fair rate of profit.

This correspondent has great ideas to see into things in the interest of the proprietors, grand ideas of things in their favor. And again he says: "If the American believes what the correspondent says, or the things he reports, the Welsh people are not fools, and will not give in to these proprietors, and whoever does think so must be foolish. It is to be regretted that a spirit of opposition to their best interests should be encouraged in this manner, and it is to be hoped that the experience of last winter will prove the fallacy of this statement."

It is seen that he finally admits in this last quotation that more men are wanted, and that they receive higher wages than at home—to which, perhaps, they are entitled. An inquiry will show that it was the workmen in Fairhaven that purchased the bonds spoken of. The habits of "Beelzebub" as indicated above, need no comment; a descendant of the European branch of this prince's family hants the Granville quarries, and under the title of the "Green Man," frightens refractory children and timid adults. He is a migratory individual, like his great ancestor, and is generally conceded there to be perfectly harmless, though noisy.

MARKET REVIEW.

FRIDAY EVENING, May 29, 1868.

Gold and Silver Stocks.—We have some little change to report in prices this week. Edge Hill is stronger, and Consolidated Gregory is held at \$3 90; Smith & Perrine, Sensitive and Rocky Mountain have also advanced. Owyhee is asking \$35, a great advance since our last; the selling price is not reported, but is probably about \$106 15; Twin River is held at \$70, and Manhattan still at \$140; Combination is unchanged. The stock board publishes prices as follows:

Table with 4 columns: Bid, Asked, Bid, Asked. Lists prices for various stocks including Alameda Silver, American Flag, Atlantic and Pacific, etc.

Table with 4 columns: Bid, Asked, Bid, Asked. Lists prices for Copper Stocks, Petroleum Stocks, and Miscellaneous Stocks.

Table with 4 columns: Bid, Asked, Bid, Asked. Lists prices for Government Stocks and Foreign Exchange.

Table with 4 columns: Bid, Asked, Bid, Asked. Lists prices for Gold, Silver, and various international exchange rates.

Table listing steamship arrivals and departures for May 21-23, including ship names like Steamer Deutschland, Steamer Eagle, Steamer South America, etc.

Summary table for the week ending May 26, showing receipts and exports for various commodities like pig iron, copper, and tin.

Table showing total receipts and exports since January 1, 1868, for various commodities.

Table showing the quantity of pig iron exported from other ports for the week ending May 26.

THE SLATE TRADE.

Trade in this city shows but little life. Prices are easy, and rule about the same as last quoted. The prospects for a good season, however, are quite flattering, and with pleasant weather and a better supply of slates, a change for the better is anticipated.

THE WESTERN SLATE MARKET.

Trade throughout the West promises fairly. The drawback is that prices are too high, but a larger enquiry is noticed, and when more favorable figures can be given, a greatly increased consumption will result.

THE IRON TRADE.

Scotch Pig continues dull, with some sales of lots from yard at \$40, and from vessel at \$39. American Pig is scarce, and without sales of any note. One 50 ton lot of Allegheny was sold at \$40. Forge is scarce and firm; the best brands of No. 1 Foundry are worth \$38.

High Valley Iron Trade.

Table showing the amount of pig iron transported over the Lehigh Valley Railroad for the week ending May 23, 1868.

Market Prices.

Table listing market prices for various commodities such as pig iron, anthracite, and English machinery.

Table listing market prices for English machinery, including items like English German (2d and 1st quality), American Blister, etc.

Pig Iron and Bloom.—Crude iron, says the Commercial, remains without important variation. A noticeable feature of the transaction of the week was the large proportion of the charcoal iron; these were principally to steel and other workers in specialties.

Table listing prices for various grades of pig iron, including White and Mottled at furnace, Open Gray, etc.

Table listing prices for Anthracite and other coal grades.

Table listing prices for various types of iron, including Fancy Forge Iron, Foundry, etc.

Metals meet with a very limited demand, says the Register. Prices have undergone no change since our last. A sale of foundry iron has occurred at \$37 75 on time. This may be considered somewhat out of the market rate.

THE COAL TRADE.

New York, May 29, 1868. There has been a fair trade doing the past week, as dealers are beginning to realize that coal must advance, and are purchasing quite briskly. Good grades of coal continue scarce but the market is full of indifferent lots, and we advise purchasers to look closely to the coal they receive.

Table listing auction sale prices for Scranston Coal, including Lump, Steamboat, and Grate grades.

Table listing prices for various types of iron, including Lump, Steamboat, and Grate.

One of our correspondents has furnished us with the following circular: OFFICE OF THE VESSEL OWNERS AND CAPTAINS' ASSOCIATION, No. 309 Walnut Street, Phila.

At a meeting of the Board of Directors of this Association held on the 11th day of May, 1868, the following resolutions were passed: "From and after the 1st day of June, A.D. 1868, no freight will be carried unless shipped as per Bill of Lading adopted by this association."

Our Boston correspondent gives the following in relation to the demurrage question, but is silent upon freight rates. He says: "The bill of lading adopted is one that does not meet the good will of the trade. Although when shipped to railroads we believe that the captains are unnecessarily delayed, and demand" to govern their rates, and thereby keep on good terms with those whom they have heretofore found to be their best friends.

Table listing market prices for various commodities, including pig iron, anthracite, and English machinery.

the flats, are willing to make a compromise, and no doubt a satisfactory arrangement will soon be made.

Baltimore, Md., May 28, 1868. Columbia, Pennsylvania, has become an important point for shipping coal since the opening of canal navigation this season.

PHILADELPHIA, May 27, 1868. The market continues dull, with a tendency towards lower prices for Lehigh coals.

The following table exhibits the quantity of Coal passed over the following routes of transportation for the week ending May 23, 1868:

Table with columns for 1867 and 1868, showing coal quantities for various routes like Phil. & Reading R. R., Lehigh Valley R. R., etc.

Report of Coal Transported over Lehigh Valley Railroad and Canal

For the week ending May 23, 1868, compared with same time last year:

Large table with columns for Shippers, RAILROAD, CANAL, and Grand Total, listing various coal companies and their transport volumes.

Table listing coal prices by cargo from various locations like George's Creek, Savage Mountain, etc.

Total. 18,292 00. By C. & O. CANAL.—There were despatched from this port, during last week, 5,369 07 tons of Coal, forwarded by the following companies:

Table showing coal quantities forwarded by companies like American, Borden, Central, etc.

Prices of Coal by the Cargo

[CORRECTED WEEKLY.] At New York, May 29, 1868.

Table listing coal prices at New York for various types like Schuylkill R. A., Ordinary, etc.

At Philadelphia, May 29, 1868.

Table listing coal prices at Philadelphia for various types like Lehigh Lump, Broken, etc.

Scranton Coal at Elizabethport, May 29, 1868.

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

Table listing coal prices at Elizabethport for various types like Lump, Steamer, etc.

Prices for Pittston Coal at Newburgh, May 29, 1868.

Table listing coal prices at Newburgh for various types like Lump, Steamer, etc.

Lackawanna at Rondont, May 29, 1868.

Table listing coal prices at Rondont for various types like Lump, Steamer, etc.

Lehigh Coal at Elizabethport, May 29, 1868.

Table listing coal prices at Elizabethport for various types like Lump, Steamer, etc.

Wilkesbarre Coal at Hoboken, May 29, 1868.

Table listing coal prices at Hoboken for various types like Lump, Steamer, etc.

At Baltimore, May 29, 1868.

Table listing coal prices at Baltimore for various types like Wilkesbarre & Pittston W., etc.

At Havre de Grace, Md.

Table listing coal prices at Havre de Grace for various types like Wilkesbarre or Pittston W., etc.

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

Table listing coal prices at Georgetown and Alexandria for various types like George's Creek and Cumberland f. o. b., etc.

Prices of Gas Coals.

Table listing gas coal prices for Provincial and American regions.

Prices of Foreign Coals.

Table listing foreign coal prices for Liverpool House Orrel, etc.

Coal Freights.

(Corrected Weekly.) Rates of Freight from Newburgh.

Table listing coal freight rates for various destinations like Stamford, Norwalk, etc.

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

Table listing sea-borne coal freight rates for various destinations like Boston, Portland, etc.

Table listing coal prices for various locations like Pawnee, Norwalk, etc.

From Elizabethport and Port Johnston.

Table listing coal prices from Elizabethport and Port Johnston for various destinations.

Rates of Transportation to Tide Water.

(BY RAILROAD.) To Port Richmond.—(Philadelphia.)

Table listing transportation rates to tide water for various destinations.

To Elizabethport.

Table listing transportation rates to Elizabethport.

To Port Johnson.

Table listing transportation rates to Port Johnson.

To Hoboken.

Table listing transportation rates to Hoboken.

(BY CANAL.)

To Port Richmond.

Table listing canal transportation rates to Port Richmond.

To New York.

Table listing canal transportation rates to New York.

To New York via Morris Canal.

Table listing canal transportation rates to New York via Morris Canal.

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

Table listing expenses for re-shipment from Mauch Chunk to Jersey City.

Provincial Freights.

Table listing provincial freight rates for various locations.

Foreign Freights.

Table listing foreign freight rates for various locations.

New York Imports of Metals, &c.

The following will show the imports of Metals, &c., at the port of New York from foreign ports, for the week ending May 22, 1868.

Table showing metal imports with columns for Quantity, Value, and Metal Goods.

BOSTON STOCK MARKET.

(By Telegraph.) BOSTON, May 23, 1868.

The following were the prices of mining stocks bid to-day:

Table listing mining stock prices for various companies like Calumet, Copper Falls, etc.

San Francisco Coal Trade.

[From the Commercial Herald, May 6, 1868.]

The cargo of 1,630 tons English Steam, per Hoglev, from Shields is, we believe, still upon the market unsold.

Weekly London Metal Circular.

LONDON, E. C., May 8, 1868.

The metal market has experienced but little change since our last report, and the business done has not been of importance.

IRON.—Welsh bars are firm, makers being fairly supplied. Staffordshire is steady, without change in price.

AMERICAN Journal of Mining.

WESTERN & COMPANY, PROPRIETORS.

ROSSITER W. RAYMOND, EDITOR.

OFFICE, 37 PARK ROW, NEW YORK.

By publishing contributions, the JOURNAL OF MINING does not necessarily endorse the positions assumed by contributors.

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Mr. T. P. FENDERTON is Editor of the Mechanical Department and Agent for the JOURNAL OF MINING.

Correspondents, exchanges and others addressing us should be extremely careful to write "JOURNAL OF MINING," instead of "MINING JOURNAL," to ensure safe carriage. Communications intended for publication should be plainly written, and on one side of the paper only.

NEW YORK, SATURDAY, MAY 23.

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NOTICE TO SUBSCRIBERS.

Subscribers receiving their paper in a blue wrapper will accept the same as a notification that their subscriptions have expired, and that the JOURNAL will be discontinued unless we are otherwise authorized.

A NEW GEOLOGICAL MUSEUM.

Perhaps no department of the government has better facilities for the collection of a cabinet that shall illustrate the mineral wealth of the country, than is possessed by the general Land Office, at Washington. Its ramifications extend into all of the newer regions; its agents are to be found in all the mining districts, and more especially in those places which will one day prove our most valuable possessions; and their being constantly in the field, brings them in contact with the "lowest miner" on the whole broad expanse of our western territory. With a vivid appreciation of this important fact, the Hon. JOSEPH WILSON, commissioner of the general Land Office, has recently inaugurated a bureau of Geology, in connection with his department; has started a museum, and is actively engaged in building up a collection that, if fostered, will eventually prove of incalculable value to the mining and manufacturing interests of the country.

Space will not permit us to give as many of the details as we could desire; and we will have to content ourselves with a brief notice, being convinced that an enterprise like the present one, will, in a short time, speak for itself. Mr. WILSON has devoted a fine suite of rooms to the cabinet already accumulated, which he intends to make the nucleus of a national museum of the economic minerals of the country. The rooms are in the Land Office wing of the Patent Office building; they are fitted up with a series of cases corresponding to all the States and Territories; and his plan is that every State and Territory shall be represented by as full a series as possible of its ores, coals, fire, porcelain and potter's clays, soils, minerals, native manures, &c. in their crude state; together with all of their products, in the shape of partially, and perfectly reduced metals, fire-brick, manufactured porcelain and other wares; in short, everything that comes out of the earth, and everything that can be, or is made of it. He also proposes to include the fossils and the other minerals which have no special economic value. The latter may be well enough, since we cannot tell how soon a substance, for which we know no present use, may become of great value; but from the including of organic remains in this, which is proposed to be essentially a Mining museum, we beg leave to hint at a respectful dissent; not that we would wish to be understood as underrating their practical value, but because a more fitting place would be in the national museum, already in existence, in the custody of the Smithsonian Institute.

The object of founding such a cabinet need hardly be explained to our readers. We believe that all will concede, without an argument, that one of the most important branches of our national industry is mining; and not only is our mining population concerned, but every branch of manufactures that is dependent on mining has a direct interest in the matter. The present enterprise will fill a deficiency that has long existed, and been severely felt. We sincerely trust that Mr. WILSON will be enabled to carry out his plan to the fullest ex-

tent of its details, and that the two or three rooms now occupied by half empty cases, will be the basis of a National Mining, and Geological Museum that shall prove a credit to the enlightened policy that has inaugurated it, and be commensurate with the extent of our country and the richness of its resources. By means of this collection the miner can see at once how his ore agrees with, or differs from, that of other localities; can compare the relative merits of the various methods of reduction, and can select from the many "processes" that which elsewhere has been found most effective and economical; the capitalist can gather some idea of the value of the different districts that offer inducements for investment; the manufacturer can learn where he can best obtain his crude material; the technologist can find matter for scientific investigation, and lastly, perhaps, even the legislator can glean some hints on the ever-tinkered-at and never-settled questions of revenue and taxation.

We are not informed as to what plan has been decided on for the carrying out the present undertaking; we have no doubt, however, but that some efficient scheme has been devised. The museum, from its beginning, has been placed under the direct care of a perfectly competent gentleman, Mr. A. R. ROESSLER, who has worked assiduously at its arrangement, and who is gradually bringing system out of a chaos of dusty boxes. Unfortunately, much of the material disinterred, loses a great part of its value for want of proper labeling, and we would here take occasion to warn collectors that they cannot write too much on a label; the state, county, mining district, mine and any useful memoranda, should be attached to each specimen. Let every man who has charge of a mine, whether of coal, iron, copper, or the precious metals, every quarryman, every man who owns a marl pit, every one who takes from the earth any mineral substance, send to the museum a series of his products; let every mill send the crude ore it works, the stamped, dressed and roasted material, a small quantity of the amalgam and a bar of its metal; let every smelting establishment send a full series of all the stages of its metal from the ore, to the bar or pig; its slags and accidental furnace results, and in a few years we will have a museum that will rival anything of the kind in the world. This is not visionary; it is perfectly practicable, and the benefits to be derived from it will be of great value to the country. Much can also be accomplished by the branch offices and their employees. We trust that such orders will be issued, or, if necessary, such legislation procured, as will make it obligatory on every person employed by the land office, to collect specimens of all the useful material in the region in which he is employed, and to forward them, properly labelled, to the central office of his district, as being the most suitable channel through which they can reach their ultimate destination. This, or some similar plan, will effect a more systematic collection than can possibly be obtained by voluntary contributions; though, as soon as miners learn that their interests will be advanced by having a series of their ores exposed safely and permanently to public examination, they will not be slow in availing themselves of the opportunity.

MINERAL PHOSPHATE.

We are glad to be able to lay before our readers some of the facts in relation to a very interesting geological discovery that has lately taken place in the district of Charleston, South Carolina. The numerous discoveries in the almost boundless field of geological investigation that are occurring at the present time, possess very different relative values. He who finds the fossil *femur* of an extinct race of mastodons, or the tooth of a shark that ranged the oceanic waters long before man existed upon the earth, contributes another interesting fact to the vast number that, at the moment, make up the totality of the geological information of the age. He who discovers some long extinct species of flora or fauna, and thereby necessitates, perhaps, a modification of the order of classification given to the geological rocks, contributes to the science not only an interesting, but also a very useful fact; he makes broader the foundation upon which the science of geology is being built up by the untiring hand of her votaries. But again, he who, after careful, patient investigation, makes the discovery, for instance, of a fine, workable stratum of mineral coal, brings to light a fact, not of interest and use to the scientific world alone, but also of great economic value to mankind at large. He confers a lasting benefit upon his fellow man. It is to a discovery of this latter character to which we have alluded—a discovery interesting, useful in a scientific, and very valuable in an economic point of view. For a long time, there has been known to exist a bed of mineral phosphates in the District of Charleston, S. C. This bed was discovered years ago by Prof. SHEPARD. It has, however, as we are informed, remained unopened until quite recently. During the past winter, Mr. OTTO A. MOSES, a young and promising Geologist, returned to this country after five years of scientific study in the schools of continental Europe. An experience of two years in making geological surveys and maps with Prof. NAUMANN, the ablest Geologist of Germany, gave him a practical knowledge that might well be coveted by many a young man just entering the field of geological research. Upon his return, he proceeded to make an investigation of the local and structural character of the phosphate bed of which we have spoken. As the result of a careful examination, he was led to the conclusion that it was not an original deposit, but only debris from the original stratum. After a patient research of three weeks, during

which time he examined the length and breadth of the Charleston District, Mr. MOSES succeeded in finding what has every appearance of being the original phosphate bed. It is situated in Charleston district, only seven miles from Charleston, and connected by rail with that city. The deposit belongs to what is known in geology as the Post Pliocene formation of the Tertiary Period. The mineral is perfectly amorphous in its physical structure, and is more soluble than any other mineral phosphate in the market. On account of the great ease with which it can be run through pulverizing mills, it has been very appropriately denominated "the soft bone-phosphate." The stratum is, we understand, of very uniform thickness, and stretches over quite an extent of territory. As the result of a careful chemical analysis, this mineral phosphate is found to contain 69 per cent. of phosphate of lime, 8.06 per cent. of carbonate of lime, and 2.2 per cent. of sulphate of lime. The residue is made up of peroxide of iron, sand, and moisture. This analysis shows that this deposit is 20 per cent. richer in bone phosphate of lime than any other beds that are now worked, or, in fact, that are known to exist. Its geographical position gives it an advantage over all others. This is at once apparent, when we consider the fact that there is direct railway communication from the bed to the wharf in the city of Charleston. We learn that the deposit has been already opened, and that very flattering offers have been received from European as well as American manufacturers of fertilizing products. On account of their scarcity, mineral phosphates have not figured very largely as fertilizers. They have not been a means of adding largely to the general sum of the nation's wealth. We believe that, beside these deposits, there are none known to exist, other than a few inconsiderable beds in England and Germany.

NEW SAFETY-LAMP.

We learn that an outburst of gas in the Stafford Main colliery has lately taken place. It was upon a very extensive scale—"so extensive that the large underground workings in which 300 men and boys are employed, was filled with an atmosphere so explosive that a single defective lamp would have fired the pit." From the fact that the Stephenson lamp was in use, and no explosion took place, we are informed that absolute reliance can be placed upon it. That, under certain conditions, it serves its purpose well, we have no doubt, but that under all circumstances it can be absolutely relied upon, we do not believe. The true value of the Stephenson lamp has been already discussed in our article on "Lamps and Damps." It seems, however, that notwithstanding this "absolute reliance," there are those who appreciate the fact that under certain peculiar conditions it could not be trusted to fulfill its very important mission. The London *Mining Journal* tells us of having just received a lamp that embodies the latest improvements, and if it is really as meritorious as is claimed, it would seem there remains but little more to be sought for in the way of a perfect safety-lamp. To quote substantially the words of the *Journal*, the agents claim that, with it, the necessity for an efficient lamp has been thoroughly met. It is claimed that it is perfectly safe, having been tested in an explosive mixture with a velocity of 35 feet per second; that it gives an excellent light, and burns steadily; that the glass being double, it is not in the least liable to break from overheating, owing to the current of fresh air passing between them; that it cannot be extinguished by currents of air of the highest velocity, having already resisted currents with a velocity of 70 feet per second; that it is very susceptible to fire-damp, the presence of the smallest quantities of it being shown in the flame; and, finally, that it is at once extinguished as soon as the proportion of gas reaches explosibility. Should this all prove true, most assuredly there is a lamp before the public that displays more of the requisites, and in a higher degree, than any invention hitherto brought out. It is stated that the Stephenson lamp, if brought in contact with an explosive current of gas, moving at the rate of only 9 feet per second, can not be relied upon. It would seem that in this particular there is a great gain; if, in actual use, it will resist, as claimed, a current moving at the rate of 35 feet per second. The very first point to be considered in the working of coal mines is good ventilation. But with a mechanical ventilation, there is even then, under favoring conditions, danger of the forming of explosive mixtures, and of course the greater the velocity the greater would be the danger. This is a case that seems to be provided for by this new invention. In our mines let us have, as we have said heretofore, effective ventilation, the severest discipline, and the best of safeguards. This having been done, with the working of our mines to great depths, we may hope to escape the great loss of life that has, in the past, characterized the mines of England.

STIRRING NEWS.

The late eruptions of Mount Vesuvius in Italy, Mount Hecla in Iceland; the terrible earthquakes at St. Thomas, etc., are perhaps only the preliminaries to grander catastrophes. They seem to have already commenced, in a remote region, on a majestic scale. The latest news from the Sandwich Islands give the details of the most terrific earthquakes and volcanic eruptions ever experienced there—putting into the shade the most terrible records found, either in history or tradition—even the proverbially cool philosophers are getting alarmed. Prof. LOOMIS, of New Haven, begins to consider the earth a very unsafe place to stay on any longer, from the

fact that the late volcanic manifestations have been so general in their character, that there is no longer any doubt about the theory that all volcanoes have not a local, but a general and common origin in the central, liquid parts of our globe, where the most intense heat prevails. In comparison to this interior liquid mass the crust on which we live must be excessively thin. PROF. LOOMIS thinks that it is proved now, that these eruptions are caused by water getting into that central fire, where, after having been converted into steam by the heat, it exerts a most enormous pressure on the earth's crust, upheaving, shaking, bursting it open, ejecting the interior liquid mass which we call lava, etc. He thinks there is now great danger of a part of the water in the ocean getting through the crust into that central fire, and having been changed into steam, at any moment blowing the whole ball to pieces. In fact, he compares our earth to a huge steam-boiler, under extra high pressure.

The fate in store for us poor mortals is, in accordance with our learned Professor, the same as that which befell the inhabitants of the planet once existing between Mars and Jupiter. This planet, about fifty times larger than the earth, was, from such a cause, it is thought, blown into several hundred pieces; of these ninety-seven have been discovered by astronomers; they are called asteroids. The smaller ones are thus far lost to us. Some German speculative philosophers have given us touching descriptions of the emotions experienced by the inhabitants thus suddenly separated—parents on one piece, children on another—husband on one, and wife on another; and that, too, without the least probability of ever sending to each other messages by mail or telegraph. Let us then, be better prepared than they, for the worst!

SUN-SPOTS AND RAIN.

The changes from maximum to minimum, and vice versa, that occur in the number of spots visible upon the sun, take place periodically. Each period has a duration of five years. The number of spots reached their maximum in the years 1842, 1852, and 1862. The minimum number were observed during the years 1847, 1857, and 1867. Five or six years ago there were a great many spots visible. This fact was brought forward by some would-be philosophers in explanation of the great quantity of rain that fell during that summer season. They argued that, on account of the great number of spots, we received a less amount of heat. Last summer, the sun was quite free from spots, and it was said that the increased heat produced an increase of evaporation. The moisture thus taken into the atmosphere had, of course, to fall in the form of rain. This summer there are a few spots visible. They are now held responsible for the unusual quantity of rain. In accordance with the old saying, we may remark, it is indeed a handy rule—one that works both ways.

The facts in the case, however, are these. The quantity of water carried into the atmosphere from the surface of the ocean, in the form of moisture, amounts to about the same each year, viz.; fifty inches, upon an average. The ocean, it is well understood, extends over about three-fourths of the surface of the globe. Of course, at the equator, the evaporation is much greater than that; near the poles, much less. These fifty inches of water fall again upon the ocean and land in the form of rain. The Northern States receive, as their yearly quantum, a fall of rain to the depth of forty inches; the Southern States, fifty inches; Minnesota, western California, and Colorado, thirty inches; Nebraska and Utah, twenty inches; Kansas and Western Arizona, fifteen inches; while there are some regions almost entirely rainless. Occasionally we find that changes occur in these average quantities; some regions receiving more, and consequently others, less than their usual share. The reason of this, we are utterly unable to explain. During the past year, for instance, too much rain fell in New York; in the North-west, too little. It is the same at the present time. We are undoubtedly getting the lion's share. Time will tell us where there is a lack of it. Evidently the sun-spots have little or no influence upon this peculiar phenomenon, which, perhaps, future researches may explain.

EDITORIAL CORRESPONDENCE.—No. I.

From New York to Aspinwall.

AT SEA, May 15, 1868.

If there be in this crowded world other editors of highly valuable mining journals, who have, like ourselves, busied themselves with the mysteries of that particular art, until life itself has come to be for them but a waste district full of "undeveloped resources," and tenanted only by people with specimens, and people with stock, and (now and then) people with dividends; if those said hypothetical other editors would fain escape for awhile from the everlasting tune of "shaft and level and drift, drift and level and shaft"—let them straightway ship before or behind the mast, and put blue water under their keels as soon as possible. The sea is the only place where an American citizen can take refuge from the mineral resources of his country. Elsewhere there is no peace. Wandering mineralogists discover "traces of copper" in a man's stone walls; speculators bore for oil in his barnyard; professors with new processes extract untold sums in gold from his granite doorstep, and propose to make a company to exploit the same; his wife secretly invests her pin money in the capital stock of some highly metalliferous enterprise in Cathay; his clergyman privately asks his opinion of the new Compound Desulphur-

izer and Sarsaparilla Flux; yea, even himself is betrayed, in spite of much caution and determination, into the acceptance of sundry directorships, with now and then a presidency, accompanied with the responsibility of placing among his intimate friends a few hundred shares at par. But, once afloat, all things suffer a sea-change. Blessed be the element where deep shafts and drainage are impossible; where the most active speculator finds himself interested in the rise and fall of something besides stocks, and, if he "pays commission," pays it to breakers, not brokers. There is another "scientific cuss" on board besides ourselves—a very sensible fellow, who knows how much out of place his mineralogy is at sea. We two avoid each other with admirable tact, or only converse on purely non-professional topics, such as boobies and flying-fish. (For the benefit of the ignorant and the cynical, let us add that boobies are huge ungainly birds, who go flapping over the ship in the neighborhood of the guano islands of these latitudes—lands which they delight to frequent, and are popularly supposed to assist in creating.)

If, then, you fondly suppose, O gentlemen left in charge of the statistical, mechanical, scientific, news and advertising departments of our unequalled Journal! that the frisky Editor-in-chief will furnish you with valuable information or wise advice, every time he takes in hand that presentation pen of which you wot, let this first epistle undeceive you. If anything useful shall find its way into these pages, it will be sorely against his will. Soon enough, alas! he will be called upon to utter sage maxims of science, propound high old theories, descend into deep old pits, climb ladders as long as Jacob's, whereon never angel sets foot, and comfort himself generally as becometh a representative of the United States government, and of that other institution, equally respected, though slightly less wealthy, the AMERICAN JOURNAL OF MINING.

Nay, in spite of myself, we have gathered from conversation with ancient mariners, bold sea-kings of our gallant navy, ambassadors en route for their posts, judges of high degree, gentlemen going to see the world, mysterious Chinese and Japanese, who have seen the world, and don't like it, clergymen, fiddlers, crying babies, and that vast crowd of travellers who have no peculiarities whatever—who appear (or do not appear, according to the weather) at breakfast, lunch, and dinner, mind their own business, of which they seem to have but little, keep company with you for three weeks, and then depart, anywhere, without leaving any more substantial trace of their acquaintance in your mind than the good ship *Henry Chauncey* is leaving at this moment in the sunlit waters of the Indian seas, (by looking carefully for the beginning of this sentence, and parsing it according to the most approved system, you will discover that it is our grammatical duty to say, before availing ourselves of a friendly period, that we have gathered from all these sorts and conditions of men) numerous bits of wisdom, which lie heavy on our mind, and of which we shall relieve ourselves, perchance, in a subsequent letter. But for the present, *vive la bagatelle*.

One fact we will condescend to communicate, since we surmise that it cannot be of the least use to any body, to wit, that our passage hitherto has been a very marvel of fair weather. Just showers enough to make rainbows for our admiration; just breeze enough to freshen the languid air of the tropics, tip with white the crests of peaceful waves, and give the noble ship that steady rise and fall which deludes the land-lubber into the belief that the bounding billow is quite an agreeable institution, and that the terrors of the *mal du mer* have been greatly over-rated. As for old salts like myself, it is all one to us. We have felt uncomfortable but once, and that was in our berth, where, all on a sudden, we found ourself heaved with strange and disagreeable commotion. Deeming ourself superior to the elements, we nevertheless could not avoid some agitation. The result, however, saved our reputation. It was not the elements at all, but the sprightly inhabitant of a lower berth, who was ingeniously creating beneath us what he called a "stern swell." A glassful of water, emptied into his ocean cave, and the promise of more, if the storm continued, soon stilled his angry waves; and we have since, indoors and out, had nothing but fair weather.

There now! you ravenous fellow in command of the editorial page! we promised you a letter from the sea, and these are it! If you don't like the quality of the article, let it teach you not to extract such pledges from a man, who, under the circumstances now surrounding him, finds his only satisfaction in doing nothing and keeping cool. We bid you farewell, brother quills, with much affection. The drops fall fast upon the paper as we write. Yet mistake them not; they are not tears, but perspiration—not tropes of rhetoric, but tropical realities. R.

NEW PUBLICATIONS.

PRACTICAL GUIDE FOR PUDDLING IRON AND STEEL—RESISTING PROPERTIES.—This is a small work that has been for some time upon our table awaiting that notice which its merit deserves. This book is translated by Mr. A. A. FESQUET, of Philadelphia. It consists of two papers—the first is a prize essay, by Mr. Ed. URBIN, read before the association of engineers, graduates of the School of Mines, of Liege, Belgium—the second paper is an extract from the of the Society of Civil Engineers, Paris. Mr. FESQUET has snatched a great want to the metallurgist and the engineer, in giving a translation of these two papers, and in placing them side by side where they naturally belong. Although the translation is not, in every instance, as clear as we could have wished, it is perhaps as good as we have a right to expect, more especially when we take into consideration the technical character

of the subject. Mr. URBIN's paper is divided into six parts. He deals first with the theory of the puddling process, then with the physical characteristics of slags; in the third instance, he considers the means for changing the chemical composition of slags; afterward, the influence of the fuel on the working, the influence of the furnace on the working, and lastly, the puddler's work. Mr. URBIN divides the operation of puddling when theoretically considered, into five parts; the fusion and purification of the pig iron, and refining and carbonizing for grain, and refining by flame. He then discusses the action of the slags or cinders on pig metal, and the action of the slags on iron, the deportment of pig iron, and the formation of the refining slag for grain. Under this latter head, it is observed, that the refining slag for grain, must always be ferrous and basic enough to purify and carbonize the iron to the proper point; that the mixture must be compounded and the working varied, in order to make a slag from the products of the smelting and refining. With the same conditions of oxidation, these products depend upon the nature and quantity of foreign matters in the metal, upon the quantity of carbon in that metal, and upon the affinity of the carbon for that iron. With regard to the physical characteristics of slags, we learn that a ferrous basic slag is of a bright white color in the puddling furnace, while an acid slag has a reddish color. A basic slag can also be discerned from an acid one by its cooling rapidly outside the furnace, an oxidation taking place meanwhile. It has a greasy look, while an acid slag is thin, runs easily outside the furnace, and cools slowly. In regard to changing the chemical composition of slags, the importance and method of studying the flame of the fire-place, and of making mixtures of pig metal, are commented upon. In regard to the mode of operation, it is emphatically stated that a general mode of operation cannot be prescribed for manufacturing a certain iron or a certain steel, because the affinity of carbon for iron in a pig metal cannot be ascertained, and that the quantity of ferric oxide made during fusion depends mostly on that affinity.

Under the head of influence of the fuel on the working, Mr. URBIN observes that the flame of the fire-place has a great influence in the puddling process. The puddler must be able to produce at will an oxidizing, or a reducing and carbonizing flame, whose action extends over the whole surface of the bed. The false meaning of the words hot and cold are pointed out. This false meaning, it is said, constitutes nearly all the technical language of the puddler, and has given rise to the construction of furnaces and fire-places, which are far from answering the object. By the words hot and cold the puddler means the state of the bath and its temperature. Bituminous coals are said to give a hotter slag, because, under the action of the heat of the fire-place, they distil a quantity of gases, and thus easily reduce the ferric oxide. In reference to the influence of the furnace on the working, the dimensions, bed, and fitting and lining of the boshes are spoken of, in their regular order. In the construction, the first rule to be observed is that the area of the grate must be in proportion to that of the bed. This proportion of course depends largely upon the nature of the fuel and the amount of the charge. It is stated that in the manufacture of fine grain and steel it is of capital importance to use small beds in order to have the iron always in a carbonizing atmosphere, or covered with slags; by doing so, the effect of overheating is partially overcome.

Under the sixth head the working of the puddler is briefly explained. Above all, observes Mr. URBIN, the puddler must keep his furnace in perfect order, as the smallest introduction of air prevents regularity in heating. An expert puddler, it is said, can go faster by working with a flame slightly oxidizing, but the iron will be often hot short. In this case, if the man is unskillful, there will be much waste; the mass of iron will become hard outside, will become very difficult to divide, and there is no longer a possibility of manufacturing a homogeneous iron. Mr. URBIN says that bleeding the furnace in order to hasten the refining by the flame, is a bad practice, which produces much waste and an inferior iron. As a last practical hint, it is suggested that the puddler must weld together the hottest and most refined parts of the iron, and put on top those which are cold and not quite refined. It is the conclusion of the translator that the puddling process must remain in use, notwithstanding the new processes of Bessemer and others, and with this view he has given us his able rendering of Mr. URBIN's paper.

In his paper on the resisting properties of iron and steel, Mr. BRULL demonstrates that the objections to the use of steel are vanishing. His theoretical and practical observations will have to the engineer and the iron-master a peculiar interest. Mr. BRULL, in speaking of the adverse conclusions of Mr. Nozo, which were also supported by Mr. TRESCA upon scientific grounds, says: "We think that all that has been actually said in that kind of opposition to the use of steel above referred to, can be summed up in two propositions, as follows: that, first, theoretically, steel cannot be preferred to iron except in case of friction; because steel, even of good quality, will break more easily than iron, under the action of shocks, and that shocks are to be considered in most industrial applications; secondly, that the use of steel is to be avoided, because under that name very different metals are manufactured, of which little can be known beforehand; because these metals are inferior to the old kinds of steel, and not homogeneous; because a certain number of facts demonstrated bad results from the use of steel such as is found in trade."

Mr. BRULL then proceeds to discuss the two sides of the question, in a theoretical point of view, and in the end claims to have proved "that with a progressive tension, the use of steel will require a section nearly one-half that of iron, or, *ceteris paribus*, will present a greater security against rupture or deformation; that with a sudden tension, as in the case of a shock of a given intensity, the employment of steel will necessitate a section four times smaller than that of iron, or, *ceteris paribus*, will present a great deal more security against permanent deformation. The case of compression, he says, would be analogous to that of tension, while the same argument will be applied to the phenomena of tension."

Mr. BRULL sums up his theoretical conclusions as follows: "If the object to be constructed will never be submitted to shocks, but must only have permanent strains, steel, *ceteris paribus*, will offer more security against both permanent deformation and rupture; under the same strains it will not be more deformed than iron. If the piece has to endure shocks, the question is, to know if it may lose some of its shape without injury. If by deformation alone it becomes out of use, steel is to be preferred to iron, more so than in the previous case. If the object may be deformed without being put out of use—if rupture alone is to be guarded against, iron is to be preferred to steel."

Mr. BRULL then proceeds to give numerous instances in the case of which theoretical conclusions can be applied in practical operations. After this, he considers the Limits of Elasticity, Breaking Weight, and Expansion of Iron and Steel. He then gives Mr. KIBLADAY's experiments with iron and steel, and examines Mr. Nozo's facts. He also gives the interesting experiments of Mr. E. HONKINSON, on the breaking, weight and extreme extension of a wrought-iron bar, and those of Mr. BAENET on the chain-cable. In his final summing up, Mr. BRULL says: "The Engineer must study the properties of the materials he has to use; he will thus become familiar with their varieties; he will learn to adopt, to a particular practical use, those various marks and fabrications. Such an education is to be made, or rather effected, in regard to steel, which is a comparatively new material; and, I think, the best way to obtain a success which appears certain, is not to be afraid at the beginning of certain difficulties in its use, but to master a complete knowledge, by practical experience, of all the various kinds of steel and of their most proper uses." To the American reader, who desires further knowledge in regard to the theory and practice of puddling iron and steel, and in regard to their resisting properties, we would suggest a reading of this truly meritorious work.

This book is published by HENRY CAREY BAIRD, No. 406 Walnut street, Philadelphia, from whom it can be obtained at the price of \$1.00 per copy.

Original Papers.

[PREPARED FOR THE AMERICAN JOURNAL OF MINING.]
SMOKE OF SMELTING WORKS.—No. II.

By L. H. MITCHELL, M. E.

As observed in your paper No. I., the injurious influence of the smoke of metallurgical works upon vegetation was found

to be much the greatest, and most widely extended, at Swansea, and St. Helens.

At Swansea, many large copper smelting works are crowded together in the valley. The gases, which escape in the process of roasting the ores that, for the most part, contain sulphur, and in the following processes of smelting, pass in an uncondensed state into the atmosphere. This results from the fact that the canals leading from the furnaces to chimneys of medium height, have but little influence upon the gases passing through them. Eastward, all vegetation has disappeared from both sides of the valley, with the exception of here and there a small patch of grass, where buildings or elevations have prevented the smoke from striking directly upon it. Farther away, now and then a tree appears, and even at a great distance from the works the influence of the smoke is perceptible. On the contrary, to the westward, some very beautiful gardens are found, while still farther away, vegetation is in a very good condition, although even there, especially on quiet evenings, one can detect the presence of the smoke distinctly, by the sense of smell; but the wind is then in the East, and generally accompanied with clear dry weather.

An idea of the extent of the works at Swansea can be obtained from the fact that, daily, about eighty tons of sulphur escape into the atmosphere in the form of sulphurous acid.

The injury done to vegetation in the level regions of the country around St. Helens, is not less striking than at Swansea. Near by, the trees are completely stripped of their leaves, and even at a great distance, more especially toward the south-east, no tree is entirely covered with foliage. Eight chemical manufactories are the great source of injury at this place, although five copper smelting works, crowded together, are also found here, and with them, moreover, soap manufactories, glass, and other works. At the copper works, pyrites already roasted in the process of manufacturing sulphuric acid is smelted, and consequently the smoke is not as injurious as that of the works at Swansea, where the greater part of the ores are roasted without using the sulphurous acid in the manufacture of sulphuric. Until within a few years, however, the chemical works for the manufacture of soda, let a large part of the hydrochloric acid, which was generated in great quantities, pass off into the atmosphere. In consequence of this, the neighboring regions of the country were stripped bare of its vegetation. As a result of the Alkali Act, lately passed, the hydrochloric acid has been absorbed for one or two years; but time enough has not yet elapsed, in order that one can perceive any change for the better in regard to the vegetation of the neighborhood, although the men then, and now working upon the spot, assert that an improvement has taken place. The extent of the injuries brought about by the smoke at the other works that were visited, was much less than at Swansea and St. Helens. Next to the latter, the noxious influences of the smoke were the most extensive at the Frankensharn works, and at the Oker works in the Lower Hartz district. The great age of these works has, without doubt, something to do with this.

In the vicinity of the Frankensharn works agricultural pursuits are not carried on to any very great extent. The principal injury is, therefore, that which is done to the growth of evergreen timber. In the neighborhood of the works, the valley, on both sides, is barren of vegetation. This desolation extends the farthest, toward the East or up the valley. The influence which even small elevations in the surface of the ground exert upon the vegetation, can be clearly observed. No trees remain along the sides of the road that runs up the valley, until a change in the course of the latter prevents the smoke from striking directly upon them. It was also noted in many instances that, in case of groups of trees, only those that stood on the side next the furnaces had been severely injured. Only here and there had the smoke injured the branches of the others, more especially, the projecting ones.

It is found that young growths of evergreens suffer the most of all, while older trees resist the noxious influence of the smoke for some time. The roasting of the *mat* in the open air is considered to be the principal cause of the injury to the vegetation effected by the smoke of the works, and that, too, when the heaps of *mat* that are being roasted are covered with a roof. The greater effect of the smoke from these heaps of roasting *mat* is thought to have its origin in the lead contained therein. It has, indeed, been shown that both the ground in the vicinity of the works, as also the branches of the trees that have been injured, contain lead. Chronic diseases among the workmen were very common at this place. This was brought about by the fumes of lead inhaled by them. This evil has been counteracted to a considerable extent by arranging a better draft for the removal of the volatilized substances.

At the Oker works in the Lower Hartz, the sulphuret ores of the Rammelsberg mine have been roasted for centuries in the open air. It is, therefore, not at all to be wondered at, that in the neighborhood of the works, especially in a northeasterly direction from it, the land that has been subject to the influence of the smoke is completely bare of vegetation. This desolation extends, however, only a distance of about one-third of a mile, from the fact that, farther away, small elevations in the surface prevent the smoke from having a direct influence upon vegetable life. Toward the west, one could observe, though only within a very short distance of the works, the blighting effects of the smoke upon the grain fields. Among trees, its influence was more especially seen upon the plum tree. In respect to these, one could, however, clearly perceive that those which had been protected by the intervention of buildings, fences, or other trees, from the direct influence of the smoke, had not suffered anything. Toward the south, and therefore up the valley, all indications of injury to vegetable life very soon ceased. This is accounted for on the ground that a gentle wind, in times of moist, foggy weather, seldom blows in that direction. From the fact that, at the present time, the sulphurous acid that escapes in the process of roasting the ores, is nearly all used in the manufacture of sulphuric acid; it is to be presumed that the smoke from the works is much less injurious than formerly. In regard to this matter, however, in so far as is known, no observations have as yet been made.

[MS. FURNISHED TO THE AMERICAN JOURNAL OF MINING BY HON. J. BOSS BROWNE.]

NOTES ON LOWER CALIFORNIA—NO. III.

BY W. M. GABB, ESQ., PHILADELPHIA, LATE OF THE CALIFORNIA GEOLOGICAL SURVEY.

[Continued from page 330.]

GEOLOGY.

The three geographical divisions into which I have separated the peninsula, are dependent for their peculiar features on their geological structure. The rough mountains of the south are almost wholly granite, the table-lands of the middle are made up of nearly horizontal sandstones and volcanic rocks, while the more northern portions combine the rugged and irregularly disposed ridges of the south with occasional flat-topped mountains capped by rocks of sedimentary or eruptive origin.

All of the higher ridges of the southern extremity of the Territory are made up of granites and syenites; and formed, during the deposition of the heavy bedded mesa sandstones, an island of considerable height and very irregular outline. The structure of these mountains is so simple that a further description is unnecessary. It is not until within half a mile south of the mining town of San Antonio, that any change in the geology occurs. Here mica slate is encountered for the first time, forming a belt several miles wide, and running from Todos Santos on the southwest, past San Antonio and Truinf northeast. It probably extends into the Cacachiles range, and forms there, as at the other mining districts, the country rock of the metalliferous veins. Beyond the mica slate again, on the road between Truinf and La Paz, granite is encountered, making the face of the ranges and extending to near the latter town.

In all of the valleys scattered through these mountains, and in some of the lower hills on the east side of the peninsula, are sedimentary formations of a comparatively late geological age. At Santiago I was informed that three miles northeast of that place, is a locality where large fossil oysters occur in great abundance, and that they are collected and burnt for lime. I had no opportunity of visiting the locality, a circumstance which I have regretted ever since. A short distance further northeast, near the coast, at a rancho called Los Martyres, is a high hill of sandstones, without fossils, dipping to the westward at an angle of about 15°. From its general appearance, it is in all probability of the same age as the sandstones which make up the mesas above La Paz. In none of these sandstones have I ever succeeded in finding fossils, by which to obtain a clue to their geological age. They probably, however, belong to the same group as the miocene sandstones of Upper California. They have in many respects the same lithological character, and bear the same relation to the granites that these rocks held, where we have had an opportunity of proving their age. Besides this very doubtful testimony, there is still another item of evidence which, in the absence of any better, should have some weight. Mr. JOHN XANTIS, an able collector, sent from Cape San Lucas to the Academy of Natural Sciences of Philadelphia, a few fossil oysters, which, if my memory does not deceive me, belong to a species very characteristic of the Upper Californian miocene *O. titan*, Conrad. Should I be correct, this is important; though half a dozen years is a long interval, particularly if one had never devoted any especial attention to the specimens remembered.

With so little evidence of this age, therefore, I have hesitated about pronouncing a decided opinion, preferring to leave it an open question, trusting that some future explorer will be more lucky than myself, and discover fossils from which these rocks can be assigned to their proper place in the geological scale. In consequence of the difficulty, I have adopted the provisional name of mesa sandstone in speaking of the formation.

In addition to this sandstone, which will probably be found to have a considerable development along the gulf side, below La Paz, there is an extensive deposit of horizontal gravel, filling or bordering all of the valleys, sometimes making in part or in whole the division between them, and lying unconformably on the upturned sandstones, as at the Martyres. This gravel formation is evidently the most modern deposit in the country, perhaps newer than the recognized Post Pliocene beds, which will be described further on. It is usually made up of debris of the underlying granite, but in some places contains boulders of a porphyry closely resembling some which we encountered several hundred miles further north, overlying Post Pliocene strata. This porphyry is most abundant in the vicinity of the Martyres, and further northward. In a few places, the gravel is replaced by a fine-grained sandstone, and is occasionally, though rarely, disturbed, as at the Cuevas, where it is tilted three or four degrees. Almost everywhere, this formation takes on the form of level terraces, though often very much cut up by dry gullies. At Santa Anita and at Santiago, where they are best developed, these terraces are about sixty feet high and well defined. They also exist at Todos Santos, and northwards, along the coast, for many miles. At Todos Santos, the main terrace is about sixty feet in height, but there is also another in the arroyo, of about half the height. The latter is limited in extent, and seems to be very local. Going northward, the elevation diminishes, until at last the tabular character is entirely lost.

On the northern border of the mountains, approaching La Paz from the South, are encountered, for the first time, volcanic rocks in place. These form hills of from five to seven hundred feet high, of volcanic ash, overlaid by beds of compact porphyries and trachytes. The rocks are pretty regularly stratified and mostly dip to the west and north-west, though northeast of La Paz the disturbance is general, and the dip in every direction. The ash is, to some extent, quarried for building purposes, and the new church, or cathedral, now in process of construction, is being built of this material.

[TO BE CONTINUED.]

Scientific Meetings.

POLYTECHNIC BRANCH OF THE AMERICAN INSTITUTE.

MIRAGE—NEW CREATIONS—NEW PUMP—ARCADE RAILWAY—LAMP-POST RAILWAY.

This society held its usual weekly meeting on Thursday evening, at its room in the Cooper Institute building. PROFESSOR S. D. TILLMAN occupied the chair. A large, attentive audience was present. After the opening of the meeting some remarks were made upon the mirage. DR. SMITH related a very peculiar incident that once occurred in the Arctic seas. A navigator saw in the air what seemed to be his father's ship under sail. He made the proper mathematical calculations to determine the direction in which he should sail to meet the vessel. After keeping his ship upon that course a short time, sure enough he fell in with the vessel, the outline of which he had seen pictured in the heavens. DR. SMITH stated that he had an authentication of this incident from DR. SCORESBY, the navigator, with whom he had had a personal interview years ago. DR. SMITH then read a short paper on the mooted question of new creations, remarking that the Darwinian theory has provoked investigation in this direction. DR. SMITH took the ground that since the last great geological change no new plants or animals have appeared upon the earth. He sought, however, to maintain his position by simple assertion rather than by substantial argument. A short dissertation upon aquatic life, in which the shark with his array of teeth played a prominent part, finished the Doctor's paper. DR. FEUCHTWANGER and DR. BRADLEY now made some remarks in opposition to the position taken by DR. SMITH in reference to new creations. It was very clear, in the random discussion that followed, that there was a good deal of floundering in deep water.

MR. ONOFRIO ABRUZZO brought to the notice of the audience his invention of a pump for compressing air. The invention consists in arranging a series of vessels and providing each one with a separate pumping apparatus. When the apparatus of the first vessel is set in motion, it will compress the air to a certain degree, in all the vessels, according to the power of the pumping apparatus, and to the rapport between the two volumes of air contained below the piston at the end of its upward, and downward stroke, which volume determines the compressing power of pumps. If the volume below the piston, when the same is at its lowest stroke, is, for instance, the twentieth part of that volume which is below the piston at the end of its upward stroke, the pump will be able to compress twenty times the former volume at each stroke. When all the vessels are filled with such compressed air, the apparatus of the second vessel is set in motion, and compresses the air in all the vessels except the first, etc. It is claimed by the inventor that such air can be used for driving vessels or engines of any kind; and will, with a less dangerous, and a more convenient motion than that obtained by the use of steam, and with insignificant cost, do better service, and be better adapted to the wants of the present and future generations, than the motors now in use.

MR. GARDINER again brought up the subject of the Arcade Railway. His remarks were hardly more than a repetition of what was said at the last meeting. It is MR. GARDINER'S opinion that the entire road could be constructed in the short space of six months, though such a course would not be advisable. It was his belief that it would take about three years to build the road. MR. EMERY, of the Novelty Works, as an engineer, favored the Arcade plan, but thought that engines emitting smoke and gases could never be used for a motive power—some other means of propulsion must be sought out.

GEN. BARNUM occupied the rest of the evening in unfolding a plan, in a stump-orator-style of speaking, in which he proposed to relieve the travel on Broadway, by constructing railways along the avenues upon the tops of lamp and awning posts. He also proposed to combine with his road a pneumatic tube, through which he will shoot, not only dispatches, packages, etc., but also women and babies, at the rate of sixty or eighty miles per hour.

Correspondence.

[To insure insertion of Correspondence in our columns the full name and address of the writer must be given.]

The Patio Process

SAN FRANCISCO, Cal., May 1, 1868.

EDITOR AMERICAN JOURNAL OF MINING:—

In the JOURNAL of March 18, 1868, I read a communication on "Mining and Metallurgy in Mexico," by D. COGHLAN, in which the writer points out "several errors" (?) in my description of the patio process; viz.: that "ores containing gold, cannot be treated by patio;" again, that "gold ore and argentiferous lead ores are entirely excluded from this process." These statements MR. COGHLAN thinks are incorrect. He admits, however, himself, that the gold in Guanajuato is partially separated during the grinding process in the *arastra*. The use of quicksilver during the grinding, in case the ore contains gold, is practiced, without exception, throughout Mexico, for the very reason that, by this method alone, the great waste is prevented to which the gold would be exposed were it treated directly by the patio. But gold extracted by amalgamation in the *arastra*, is not obtained by the patio process.

JAMES NAPIER, in his description of the patio process, referring to the loss of gold in Guanajuato, states the loss to be "25 to 30 per cent., and it is estimated by some to be as high as 40 per cent." Again, "the silver of the patio, in Guanajuato, always contains a certain amount of gold, and the *pulvillo*, from the tailings, always contain some gold." NAPIER shows that auriferous ore is not excluded from the patio, but this fact should not prevent establishing the rule, that "gold ores are excluded from patio amalgamation," when we consider the 40 per cent. loss, which would result, if calculated only on the patio process, not taking into account the extraction by the *arastra*.

It is the same thing with the barrel process, which excludes auriferous ores, in spite of the fact that such ore was treated in barrels in Virginia City, Washoe Valley, and in Australia. The tough slimes, obtained from crushing the ore for the pan process, in Washoe, gave by this mode of working such unsatisfactory results without roasting, that the patio process

was tried several times on that stuff, but the yield in gold was then so low that this process had to be abandoned.

As to the other supposed error, I must remark, that "argenteriferous lead ores" signify real lead ores, containing silver, but not lead ores mixed with silver-glance and other silver ores. It is here, moreover, not the question whether lead ores can be worked for silver by the patio, but to what advantage; and if no more than 50 per cent. of the silver can be extracted, it is evident such an ore must be excluded from the patio process.

In the State of Guerrero, at Guadalupe, decomposed ores containing lead, etc., were worked by the patio, and not more than 50 per cent. of the silver obtained. The blame was always thrown upon the *azogueros*, but the latter having had a good deal of experience, blamed the lead. NAPIER gives an analysis of ores worked by patio in the district of Reyes; one sort containing 2.07, another 38.7 per cent. of lead, sulphide of silver, etc., and says, "not more than from one-half to three-quarters of the silver can be obtained from the ores by the patio amalgamation."

In Sonora, Chihuahua, and Sinaloa, there are many haciendas where the patio process is used, but I never saw argenteriferous lead ores treated by it unless mixed with silver ores; or unless they have plumbiferous decomposed ore. In each case they have to submit to a heavy loss. On this account, wherever fuel can be obtained, such ore is first roasted. A better result is thereby obtained. But roasting is no original part of the patio process, and if it must be done, the patio is soon replaced, either by barrels, or pans.

These "several errors" (?) Mr. COGHLAN can also find in other books on metallurgy, but I doubt very much whether he can find a confirmation of his assertion, "that auriferous ore, and argenteriferous lead ores are proper material for the patio process."

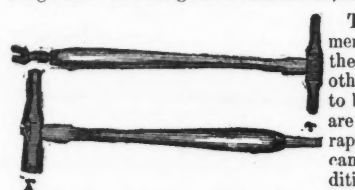
G. KUSTEL.

USEFUL INVENTIONS.

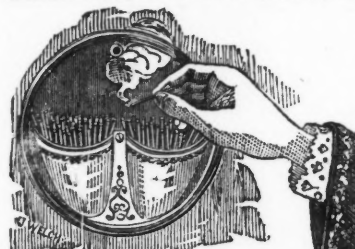
The annexed engravings represent three articles of a very different description, viz.: An ornament to a weather vane, a magnetized tack-hammer, and a mirror in a safe. They may be considered as symbolic of national enterprise, human industry, and home protection, but these subjects we leave to those who indulge in spread eagle-ism and talk of political economy more than we do. The gilt eagle perched upon a globe high up on the tip of a flagstaff or weather vane, is screaming the joys of liberty over the whole world, and is certainly a more pleasing national emblem than a savage growling lion or an uncouth and grumbling bear. The design is executed well, showing life and spirit.



The magnetized hammer comes useful to the carpet stretcher or others, when tacking is to be done; the fingers are saved from being rapped, and the work can be done very expeditiously.



As to the neat little match-safe we can only say, it should be seen in every kitchen, smoking-room, and library, on gentlemen's desks, and on ladies' bureaux, and is only to be seen to be admired. These things are more than common "notions" since their general usefulness makes them favorites with all classes of society. Inventors, patentees and manufacturers of all such articles can find a commodious depot at I. S. Clough's new store, 42 Nassau street, in this city, where can be seen in great variety patent inventions, such as patent archery bows, weather vanes, lanterns, fly-traps, boot-jacks, bird cages, and other small and useful articles too numerous to mention. Seventeen medals and thirty diplomas have been awarded for goods exhibited by the proprietors, who regard utility and economy as the greatest recommendations to an invention, whether it be great or small.



Patent Claims.

77,950.—FURNACE FOR ROASTING ORES.—Nathan Bartlett, Centerville, N. J., assignor to himself and Franklin Osgood, Richmond county, N. Y.

1. Claim 1st, The sectional arrangement of the oven, and the breaks or openings by which the sections are coupled or united together, constructed and operating substantially as described.

2. The combination of the sectional oven with a furnace and chimney, constructed and operating substantially as described.

3. A sectional oven, as herein described, in combination with openings or doors in both ends of each section of such oven, for the purposes stated, constructed substantially as described.

4th. Constructing a sectional oven with the sections alternately inclined to each other, for the purposes stated, arranged and operating substantially as described.

5th. The arrangement and combination with each other in pairs of the sectional ovens, the furnaces, and the chimneys, in the manner and for the purpose substantially as described.

77,970.—CONSOLIDATING COAL DUST FOR FUEL.—William Footner (assignor to Wm. J. Footner), Chicago, Ill.

I claim consolidating particles of coal by mixing with a solution of glue, and compressing, substantially as and for the purposes specified.

Patent Claims.

Interesting to Miners, Millmen, Metallurgists, Oil-Men and Others.

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THE FUEL SAVING

FURNACE COMPANY,
No. 205 BROADWAY,

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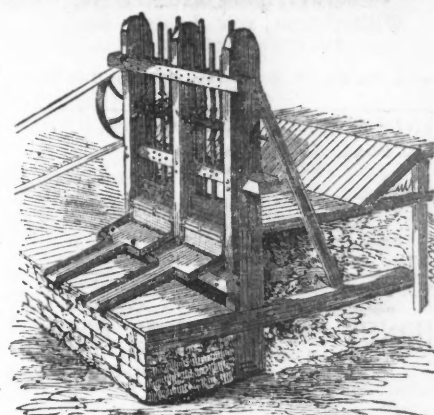
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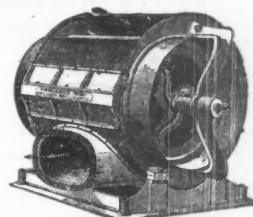
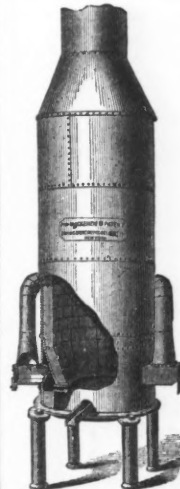
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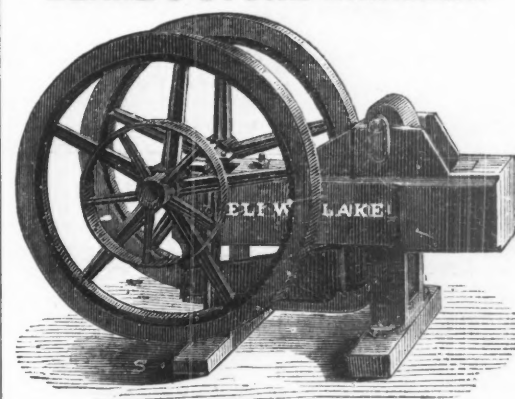


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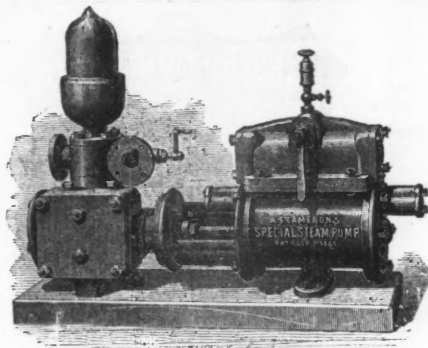
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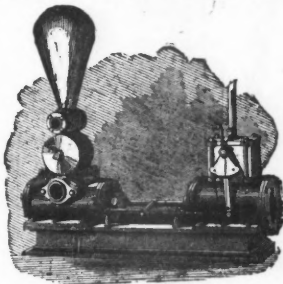


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First Premium
AT FAIR.



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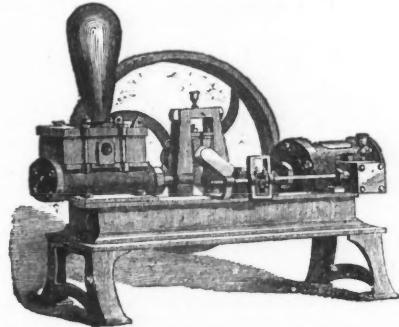
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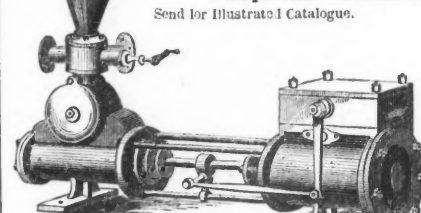
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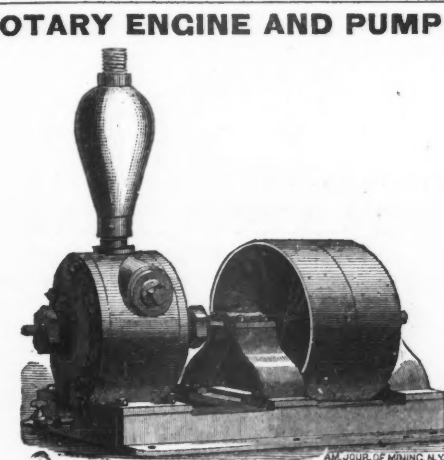
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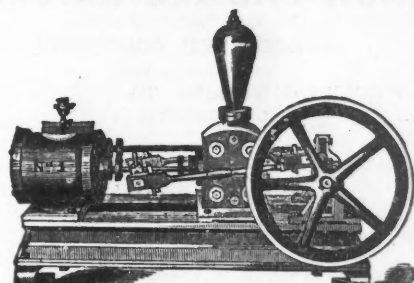
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The best and most effective Steam and Belt Pump adapted for general use. Warranted to form a vacuum of 28 inches. Mine owners should call and examine it as a MINING PUMP.

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IVES' PATENT LAMPS,

Give a better and cheaper light than GAS, can be lighted, filled, and trimmed without removing shade, globe or chimney, or unscrewing the burner. We make a specialty of furnishing

SAFE STATIONARY LIGHTS

(in place of those that are movable and dangerous)

AND

PURE, NON-EXPLOSIVE OIL,

In place of Lard, unsafe Kerosene commonly used.

Every barrel received from us, with our brand on the head, can be relied on as

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Shipped in "hermetically tight" barrels of 44 to 48 gallons, ONLY on receipt of

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NEUMEYER'S PATENT SAFETY POWDER.

Now in universal use for blasting and mining purposes in England, France and Germany. You can handle and ship this powder with no more danger than you handle oil, sulphur, or charcoal. To explode it has to be confined and ignited by means of a fuse. One feature that specially recommends its use in mines and confined places is that very little smoke results from its combustion, and this smoke is very light, and not at all injurious to the lungs.

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RUNNING WEST FROM OMAHA ACROSS THE CONTINENT, ARE NOW FINISHED. WHOLE GRAND LINE TO THE PACIFIC WILL BE COMPLETED IN 1870.

The means provided for construction have proved ample, and there is no lack of funds for the most vigorous prosecution of the enterprise. JOHN J. CISCO, Treasurer, New York.

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WIRE ROPE. The Subscribers, agents for GARNOCK, BIBBY & CO.'S Celebrated Steel and Charcoal Wire Rope.

LINDSAY'S PATENT. The merits of this Wrench are too well known to need comment. Go to the nearest hardware store and LOOK AT IT BEFORE PURCHASING ANY OTHER.

IRON & WOOD WORKING MACHINERY TURBINE WATER-WHEELS. LUCIUS W. POND, No. 98 LIBERTY ST. N. Y., and Worcester, Mass.

McNAB & HARLIN, MANUFACTURERS OF BRASS COCKS, PLUMBERS' BRASS WORK, WROUGHT IRON PIPE, FITTINGS, &c.

IMPORTANT TO MINERS. Every description of Analysis and Assays carefully attended to, and returns promptly made, by WESTERN & COMPANY.

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ARION PIANO-FORTE.—PATENTED. Pre-eminently the best Piano ever constructed, unrivalled for tone, durability and elegance of finish.

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Has no large sheet iron shell to explode, is composed entirely of wrought iron tubes tested to 300 pounds, water and steam inside of them, offers POSITIVE SAFETY FROM DESTRUCTIVE EXPLOSION.

NEW YORK BELTING AND PACKING COMPANY, MANUFACTURERS OF VULCANIZED RUBBER FABRICS, ADAPTED TO MECHANICAL PURPOSES.

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With the Latest, Political, Commercial and Marine News. The Latest Law Reports, and with the very latest news from the adjoining Cities, States, and all the States of the Union.

The importance of the crisis of 1868 to the saving of the Government of our fathers—the re-establishment of the Constitution and restoration of the Union, and the necessity of a more healthy and steady business to the people...

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Devoted to the advocacy of Evangelical Truth against Ritualism and Rationalism; the defence of the "Liberty of Preaching," and the cultivation of fraternal relations with Evangelical churches.

THE CHURCH UNION. "The Freest Organ of Thought in the World."

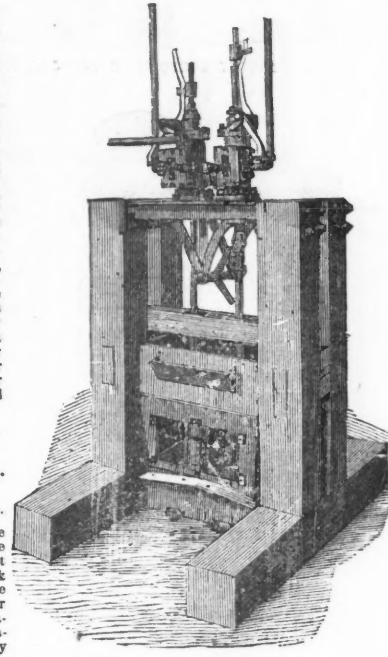
The largest Religious Paper in the World, averaging nine columns of reading matter each week more than any other competitor.

METALLURGY.

WILSON'S PATENT STEAM STAMP-MILL COMPANY, OF PHILADELPHIA, PA.

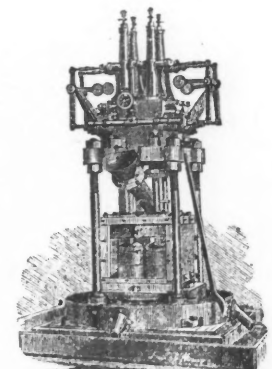
Are now prepared to supply Miners and other parties with their NEW STEAM STAMP MILLS, AT THE SHORTEST NOTICE.

These Mills, for durability, efficiency, and facility of transportation are not excelled by, and are believed to, be superior to, any other Mills manufactured.



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NEW YORK STEAM ENGINE COMPANY, Manufacturers of



STEAM STAMPING MILL, STATIONARY AND PORTABLE ENGINES,

Engine Lathes, Planers, Bolt Cutters, Upright Drills, and Machinist's Tools of all Descriptions.

THE WHELPLEY AND STORER METHOD OF USING PULVERIZED FUEL.

The undersigned offers for sale Rights and Machinery for employing this method, by which the Slack and Waste Coals are utilized, and made equal to solid coal, and a vastly increased efficiency obtained for all kinds of Fuel in the generation of Steam...

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PROF. H. DUSSAUCE, Chemist. Advances and consultation on chemistry, applied to arts and manufactures, agriculture, metallurgy, etc.

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Would undertake to inspect or manage Gold or Silver Mines. Has had a long experience in directing mining concerns and metallurgical works.

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W.M. GABB, late member of the Geological Survey of California, offers his professional services to the mining public.

METALLURGY.

KUSTEL'S NEW WORK.—A TREATISE ON THE CONCENTRATION OF ALL KINDS OF ORES,

INCLUDING THE CHLORINATION PROCESS FOR GOLD-BEARING SULPHURETS, &c., BY GUIDO KUSTEL,

(Mining Engineer and Metallurgist, author of "Nevada and California Processes of Silver and Gold Extraction.")

This great work should be in the hands of every mining engineer in the country. It is the only manual in the language containing the latest improvements which Science has made in the important department of concentration...

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Formerly Chemical Examiner in the U. S. Patent Office, may be employed professionally as a SCANNING EXPERT, Geological Examinations and Reports, Analyses and Assays, etc.

Important to Gold and Silver Miners and Companies PROFESSOR WURTZ,

Who is the Inventor and Patentee of the new and wonderful uses of SODIUM IN WORKING GOLD AND SILVER ORE AND JEWELERS' SWEEPINGS.

Will furnish at the above address information relating thereto together with experimental packages of

SODIUM AMALGAM.

All preparations and instructions elsewhere obtained are spurious and unreliable.

Working Experiments on Amalgamation of Ores, Etc. Prof. W. has in operation a large and small Hepburn Pan, for working 1,000 lbs. and 20 lb. charges of material for experimental purposes.

MANHATTAN

METALLURGICAL AND CHEMICAL WORKS, 552 and 554 West Twenty-eighth Street, N. Y.

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Examinations of, and Reports on Mineral Lands and Mines, furnished on application. Analyses and Assays of Ores executed with accuracy.

CHARLES SCHENCK, a resident of Pah-Ranagat Silver Mining District, and County Surveyor of Lincoln county, Nevada,

begs leave to inform the mining public, that he is able and ready to give true and valuable information about mining property in this District.

ADELBERG & RAYMOND, MINING ENGINEERS AND METALLURGISTS, 90 BROADWAY, N. Y.

Mines, Mineral Lands, Machinery and Metallurgical or Chemical Works examined and reported upon. Advice given to miners, chemists and manufacturers.

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SHEFFIELD SCIENTIFIC SCHOOL OF YALE COLLEGE,

NEW HAVEN, CONN. INSTITUTED IN 1846. Practical Chemistry, Metallurgy, Mineralogy, Geology, Mining. Instruction given in Mechanical and Civil Engineering, etc.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]
LESSONS IN MECHANICAL DRAWING—No. 1.

BY T. P. PEMBERTON.

There are many mechanics and tradesmen who, even in this day of schools and education, are laboring under disadvantageous ignorance of mechanical drawing. They are constantly producing new ideas and improvements in art and science; they modify, design, and invent; but find that other hands, not theirs, must delineate the necessary plans for general comprehension. A few hours' study with some evening class at a mechanics' institute frequently, for more reasons than one, fails to give a sufficient insight into architectural or mechanical drawing; and what is more, all taste for acquiring the art is sometimes entirely lost, owing to the dry and uninteresting manner in which the subject is presented. To keep students poring over geometrical problems, without explaining their application to useful design and construction, is very likely to send them away from the drawing-board in disgust, perhaps in despair of getting that practical knowledge which can be applied to business purposes. There are some who depend upon the information afforded by books on practical drafting and mechanical drawing; but who find much time consumed in puzzling out what could be easily comprehended, if expressed in simpler language and divested of mathematical formulae. Others again have neither teachers nor books, and suppose that mechanical drawing can only be learned by the employment of both. To all engineers, machinists and mechanics, therefore, we will state that, if the following instructions, rules and examples, are studied, remembered and practiced, the science of mechanical drawing will become both interesting and useful, since it will be our earnest endeavor to lead the student, by easy stages, to a thorough understanding and practical knowledge of mechanical drawing, without which the education of any mechanic is incomplete. The student must, however, be informed at the outset that the essentials required from him will be patience, perseverance, neatness, accuracy and taste. By the exercise of the two first, the latter may in due time be obtained, even if he has no natural gift for design and good taste.

We will, in the first place, give a list of the tools, implements and materials necessary for the draftsman's tool box, as no student can be expected to make any progress in the profession unless he has the proper tools, and plain instructions about their quality and the manner of using them.

LIST OF ARTICLES REQUIRED IN MECHANICAL AND ARCHITECTURAL DRAWING.

- | | |
|------------------------------|--|
| 1. Drawing board. | 16. A complete set of drawing instruments. |
| 2. T Square, Straight-edges. | 17. Thumb tacks. |
| 3. Triangular pieces. | 18. Parallel ruler. |
| 4. Drawing paper. | 19. Rule, scales, tape line. |
| 5. Pencils. | 20. Beam compass. |
| 6. India ink. | 21. Tracing paper. |
| 7. India rubber. | 22. Tracing vellum. |
| 8. Gum Arabic. | 23. Fine writing pens. |
| 9. Fine sponge. | 24. Camel's-hair brushes. |
| 10. Eraser. | 25. Sable-hair brushes. |
| 11. Wash leather. | 26. Cabinet saucers. |
| 12. Smooth file. | 27. Oil-stone. |
| 13. Horn centres. | 28. Penknife. |
| 14. Shellac varnish. | 29. Alcohol. |
| 15. Isinglass. | 30. Sketch book. |

WATER COLORS.

- | | |
|---------------------|--------------------------|
| 1. Cake of carmine. | 7. Cake of burnt sienna. |
| 2. " Prussian blue. | 8. " Crimson. |
| 3. " Indigo. | 9. " Sepia. |
| 4. " Gamboge. | 10. " Chrome yellow. |
| 5. " Raw sienna. | 11. " Yellow ochre. |
| 6. " Scarlet lake. | 12. " Neutral tint. |

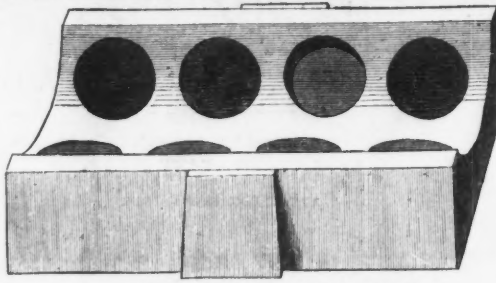
[TO BE CONTINUED.]

PATENT COMPOSITION FOR JOURNAL BOXES.

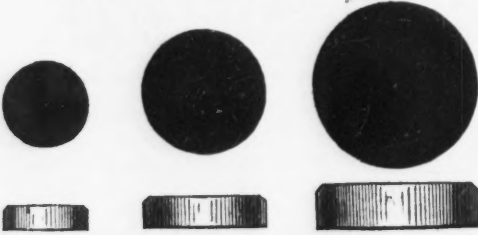
Engineers and machinists cannot fail to be interested in any device that greatly reduces the friction of journals, the frequent heating and consequent rapid wear of which have always been a source of anxiety and trouble. The marine engineer constantly experiences great annoyance, when at sea with "hot bearings," that nearly always exist in a greater or less degree with the machinery of steam propellers, where the hose is in constant requisition to deluge the machinery with salt water. The locomotive engineer has also frequent trouble with axle boxes and crank pin bearings, causing tedious delay on the road and demanding extreme caution on his part. But not to enumerate or even particularize cases of breakage, fire, and accident, we can confidently state, that all those interested in any way with engines or machinery, whether they are manufacturers or superintendents, know that machine bearings, require constant watchfulness and attention, and that hot journals are always to be dreaded as dangerous whenever or wherever they may occur. It sometimes happens that if boxes are screwed up to fit close, they heat; on the other hand if they are "slackened" the journals will "thump" and "pound" so as to disturb the nerves of both engineer and passengers. New boxes are more liable to heat than old, as the latter get worn down in course of time to an even, smooth, and well fitting surface. Remedy after remedy has been applied: all kinds of lubricators have been tried; tons of tallow, sulphur, black lead, and soft soap, have been consumed, to say nothing of the quantity of emery paper used in rubbing up machinery rusted from the free application of water in cooling down hot journals.

The annexed engraving represents a journal box, with com-

position inserted, as invented and manufactured by Messrs. DEVLAN, WYMAN & Co. The composition consists of a com-



PATENT COMPOSITION FOR JOURNAL BOXES.



COMPOSITION PIECES, FULL SIZE.

position of fibrous material with pure plumbago or black lead. The boxes are cast with recessed chambers for the reception of the composition, which can be stamped out to any desired shape. The illustration represents, the composition inserted in circular chambers; one chamber is shown without the composition. The composition is easily inserted, by a slight tap of a hammer, and cannot possibly come out so long as the box is upon the journal. The nature of plumbago is well known to engineers, and the combination of it with fibrous material when in pulp makes the distribution uniform; after the substance is hardened, it is ready to be cut to any shape. There is a certain degree of elasticity to this composition, which makes it very desirable for the purpose specified. It is warranted to wear three times as long as the best quality of brass or other metal boxes, and prevents the cutting of cylinders, heating of journals, &c., besides saving at least one-half the quantity of oil used on journals. Ninety days is the usual duration of locomotive boxes, but some boxes with this composition have

been in use for four years. The composition pieces can be inserted at any time when required, and the manner in which they are distributed on the box gives a large area of bearing surface while the composition itself gets completely saturated with oil and is the material that saves the wearing of the boxes, which in many cases require no finishing, boring, &c. Boxes with this composition are now being used on the locomotives and cars of the Erie, Reading, Pennsylvania, Central, Camden and Amboy, and New Jersey Central railroads, also on all the street railroads in Philadelphia, and in some cotton factories in Pennsylvania. Our own experience induces us to speak in the highest terms of this description of box, which is durable, convenient, always efficacious for troublesome journals, economical, simple, and easily fitted. We are persuaded that it is one of those mechanical improvements which has stood the severest testing from master mechanics and engineers, and these are the authorities we can refer to for the highest commendations of its excellent properties. All further information can be obtained from the manufacturers and sole proprietors DEVLAN, WYMAN & Co., No. 64 Broadway, N. Y.

ADVERTISEMENTS.

A limited number of advertisements will be admitted on this page at the rate of 40 cents per line. No extra charge for cuts. The AMERICAN JOURNAL OF MINING has a larger circulation than any other paper of the kind published in the United States. It goes into the principal cities and towns of every State and Territory in the American Union, as well as in Mexico, the South American States, the West India Islands and Europe.

WATERBURY CLOCK COMPANY,
M. BAILEY, Treasurer.
 DEALERS IN EVERY VARIETY OF
CLOCKS AND CLOCK MATERIALS,
 No. 4 Cortlandt Street,
 Manufacturing, Waterbury, Conn. may 16:21 NEW YORK.

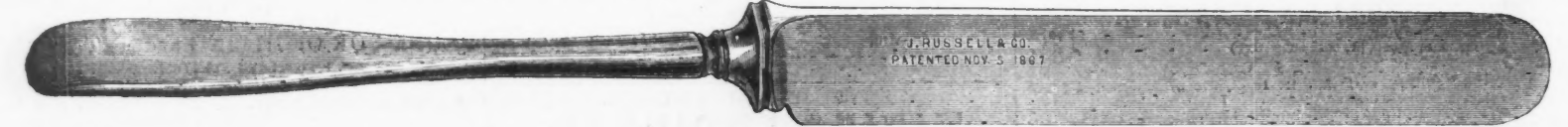
STURTEVANT'S
NOISELESS PRESSURE BLOWERS
 are made of all sizes, for all purposes where blast is required. They embrace two classes, the regular Pressure Blowers, for Rolling Mills, large and small Foundries, Forges and Blowpipes, and the second quality or cheap Blowers, for Steam Boilers, Ventilation, Coffee Roasting, &c.
 For Circulars with full particulars and price lists, address
B. F. STURTEVANT.
 PATENTEE AND SOLE MANUFACTURER,
 72 Sudbury street, Boston, Mass.

R. HOE & CO.,
 MANUFACTURERS OF WARRANTED
EXTRA CAST STEEL SAWS,
 OF EVERY DESCRIPTION.
Single and Double Cylinder, and Type Revolving PRINTING MACHINES.



Circular Saws with Movable or Inserted Teeth.
 The accompanying engraving represents a new and improved Circular Saw with inserted teeth, manufactured by us, and constructed on a plan in which is combined a mechanical arrangement embracing all the requirements of inserted teeth without an objectionable feature. These saws possess great advantages over all others. The teeth are grooved all around and comprise considerably more than half a circle; consequently when they are turned into the sockets they become as firmly fixed as if they were a part of the plate itself. These saws can be run at any speed desired, and there is no possibility of the teeth being thrown out of their sockets from any cause. There are no rivets required. In these and other respects they have an advantage over all other inserted tooth saws manufactured. Circulars and price lists will be sent on application.
R. HOE & CO.,
 31 Gold Street, New York.

THIS Knife is forged from one bar of Steel, handle and blade; is heavily plated with Silver; and is the cheapest Silver-Plated Knife offered for sale



Sold, wholesale and retail, by
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