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OIL FEEDERS.

Mnch information has been written concerning lnbrication, and many experiments havo been tried to ascertain the most efficacious manner of oiling journals in machinery. The snbject is generally discussed upon the appearance of some novel invention or ingenious lubricating device for which is claimed more than usnal advantages, more perhaps than intrinsic merit will warrant, when the invention is pnt into practical operation. Be this as it may the matter is an important one and continues to receive much attention from manufactnrers, engineers and machinists. The objects to be attained in oiling machinery are principally a good lubricating substance, and its application at regular intervals with fnll but economical distribution over the surfaces reqniring lubrication. We can remember the numerous countersnnk oil holes that were formerly drilled to receive the spout of the oil can, and to this day may occasionally be seen machinery with nothing but drilled holes in the caps as condnits for oil to the jonrnals. The indication given to the "oiler" or "greaser," when the proper quantnm of oil has been ponred in these holes, is generally an overflow, and the conseqnent result is immediate waste and expense; in course of time a mass of dirty, greasy machinery, repulsive to both sight and touch. Where oilcnps are not used, it is best to have a bead, or concave boss cast on the cap to retain any overflow—but even then holes left uncovered and unplngged become mere receptacles for dnst and dirt, and require constant probing to effect a passage for the oil. Brass oil and tallow cnps are now generally used where they are admissable, and although of great variety, reqnire no explanation, as they are known to all engineers and machinists. We now call the attention of our readers to an excellent Oil Feeder and Cnp, patented on Oct. 22, 1867, by J. B. WICKERSHAM, of Philadelphia, Pa. The oil cup is made of thick, clear glass, fastened into a metal socket, enabling the oil always to be seen. A central hollow stem is screwed into the bottom of the cnp and reaches nearly to the top. Into this hollow stem is introduced the Feeder, which consists of a covered siphon shaped wire, its action being based npon the natnral law of capillary attraction; the texture of the covering of the siphon wire regulates the drops of oil so that a drop of oil can be administered in every five seconds, or in one, fifteen, or thirty minutes, or at longer intervals if desired. The Feeders have one leg inserted in the tnbe, and the other in the oil cnp, the short leg of the siphon rests in the cup, and the long leg of the siphon reaches through the central tube so as to be below the end of the tnbe and not touch the jonrnal with the wick. Fig. 1, represents three of WICKERSHAM's patent oil feeders No. 1, No. 3, and No. 4. It will be observed that the covering of these feeders is cotton thread which is graduated in size and nature according to the amonnt of oil needed on the jonrnal. For example, No. 1 Feeder gives one drop in thirty minntes. No. 3, one drop in five minntes, and No. 4, one drop in a minnte. No. 8, ten drops per minnte. This last Feeder acts upon two laws viz; capillary attraction and the siphon principle combined, by which the oil flows more rapidly than when the fibrons material is in contact with the wire on all sides. This is effected by means of two wires acting as springs inside the webbing and forming a hollow tnbe which acts as a siphon. On each feeder is placed a tag with a number on it; when the feeder becomes worn ont the tag number designates its character and the same kind can be replaced from a box Fig. 3, that contains and preserves the feeders. Fig. 2, represents an oil feeder inserted in one of the glass cups, the latter being placed in the cover of the journal box and is termed a white metal stem oil cup. This description of oil feeder is applicable to every size of journal, from those of the diminutive sewing machine to one 36 inches in diameter; the oil feeder is also applicable to loose pullies, and with these has been found to work satisfactorily. It is claimed to be reliable, economical, effectual, cleanly and labor saving; it filters and saves seventy-five per cent. of oil. The well known firms WILLIAM SELLERS & Co., and NEAFIE & LEVY of Philadelphia, who have applied and thoroughly tested the efficiency of these oil feeders, certify to their reliability, economy and cleanliness, and state that journals on their premises which were once troublesome and required constant attention, now, by the regularity of oiling with the feeders, have stopped heating and give no further trouble. J. B. WICKERSHAM & SON, No. 143 South Front street, Philapelphia, are the general agents, from whom all further information may be obtained.

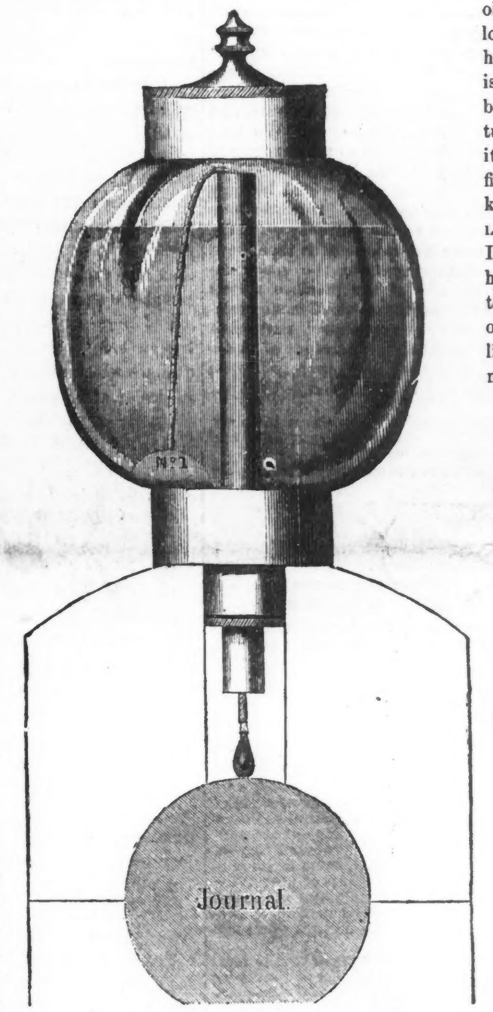

FIG. 2.

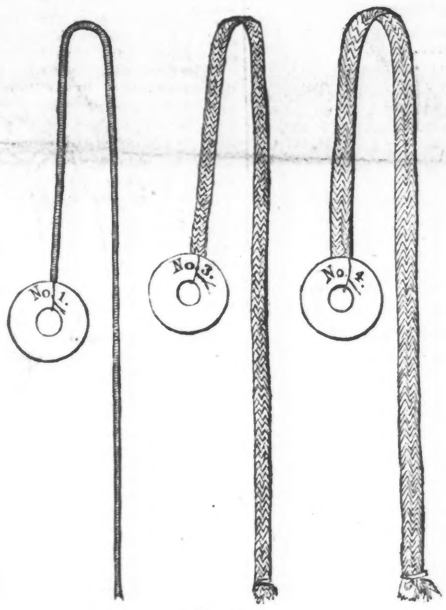

FIG. 1.

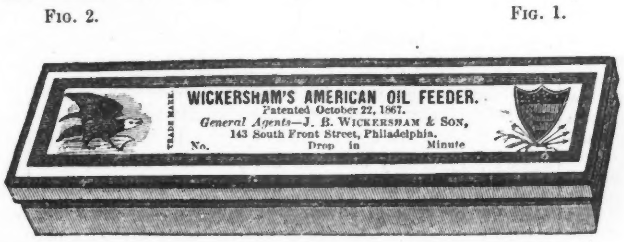

FIG. 3.

Heavy Blasting in Limestone.

A blast, estimated to have brought down 25,000 cnbic yards, or about 50,000 tons of limestone, was lately fired in Mr. Savin's quarry at Llanymynech. Preparations for the blast were made as long ago as September last. A level twelve yards in length was driven into the vertical face of the rock at a height of a few yards above the floor of the quarry. At the end of this level a cross level was driven right and left, and at each end a vertical shaft was sunk, besides a third at an intermediate point, these shafts reaching down to the level of the floor of the quarry. Chambers were formed at the bottom of the shafts, and 6,000 lbs., 4,000 lbs., and 3,000 lbs., respectively, of powder were placed in them, or nearly 6 tons in all. This large quantity of powder was not so great as has been nsed in single blasts at Holyhead, where as much as 11 tons have been fired. The blast was successfully fired by electricity, the wires being connected with a Grove's battery of 28 cells. The limestone brought down will be carried into Shropshire and South Staffordshire to be used as flux in the blast furnaces of those districts.—*London Engineering.*

New Volumetric Assay of Iron.

The two methods at present known, viz.: that by the bichromate of potash, known as Dr. Penny's process, and that by the permanganate of potash, which are both based upon the same principle of the oxidation of a ferrons solution and its conseqnent conversion into a ferric one—involve the necessity (to the travelling chemist) of carrying abont a large quantity of expensive and unstable standard solntions, or the trouble and inconvenience of dissolving fresh portions of the crystallized reagent, whenever required, npon the spot. A little circumstance which occurred at Cawnpore, in 1862, suggested to me another and apparently more simple method, which I beg to recommend to chemists and assayers, especially those travelling in out-of-the-way conntries. You are aware that rooms in India are floored with a substance called "chunam," which is a kind of hydrate of lime. In a room of this kind, without a carpet, I was amusing my children by showing them the beautiful deep red color which a drop of the solntion of sulphocyanide of potassium bestows up on one of peroxide of iron, and which I told them (in fnn) was "the blood of the theatres." A few drops of the red sulphocyanide of iron happening to fall npon the lime floor, I observed that they were immediately decolorized, and this natnrally led me to make an experiment similar to that upon which Parkes' volumetric assay of copper is based. I dissolved some sulphate of iron, "green vitriol," in distilled water, and added a few drops of nitric acid, to peroxidise the solution, to which a single drop of the sulphocyanide solution was then sufficient to impart a deep red color. This color I removed effectnally by the addition of about half the quantity of common lime water, leaving a perfectly clear solntion. I have not had time or opportunity since to carry ont the experiment to a practical resnlt by standardizing a solution of lime with one of sulphocyanide of pure iron (piano vire); but I hope shortly to do so, and, in the meantime, would feel much obliged by the opinion of better chemists than myself, if there is any difficulty or serions objection in the way of such a process? If not, there can be little doubt that it would form the most simple and economical method of assaying iron ores, as lime water is procurable in almost any part of the world, and the quantity of sulphocyanide of potassium reqnired is extremely small. I am, &c.,

W. A. ROSS, Captain, R. A.

WOOLWICH, 28th December, 1867.

—*Chem. News.*

Chinese White Copper.

Packfong, or Pakfong, or Teutenag, is an alloy, known by these names among the Chinese, and is composed of nickel and zinc, of each seven parts, and copper five parts. Another qnality, known by the same name, bnt more malleable, is composed of nickel, fifteen parts; copper, twenty-one parts, and zinc, twenty-eight parts. Both these alloys are sometimes called Chinese white copper, and are nearly the same as German silver. We give several formulæ for the latter:—Nickel and zinc, of each one part; of copper, two parts. This composess the finest quality. For rolling, nickel, twenty-five parts; zinc, twenty parts; copper, sixty parts. For castings, nickel and zinc, of each twenty parts; copper, sixty parts; lead, three parts. The original German silver is made from copper, forty parts; nickel, thirty-two parts; zinc, twenty-five parts; iron, three parts. All the above are used as substitutes for silver, to which they are in many cases preferable for durability.—*Jour. of App. Chem.*

The Drain of Silver to Asia.

The drain of silver to Asia forms the subject of some interesting considerations in Ross Browne's report, from which we are permitted to make the following extract:

It is admitted by eminent authors who have written about the present supply of the precious metals that it exceeds the demands of Christendom, and that the inevitable fall in value is retarded only by exceptional and temporary circumstances, the chief of which is the remarkable stream of silver pouring into Asia. The Hindoos, Chinese and Japanese are industrious and very populous nations, which have to import nearly all their gold and silver from abroad, and their capacity to absorb these metals increases as the value of the metals declines; and as their stock becomes greater their wages rise and they obtain the means to purchase more foreign goods, and after a time they will have as much coin proportionately to their productive power as the Christian nations, and then their imports of merchandise will nearly equal their exports, and the importation of the precious metals will not be one-tenth of the present figure. Asia was called 'the sink of silver' by Pliny, and it has deserved that name ever since, and will continue to deserve it for an uncertain period in the future. So long as we continue to consume so much tea, silk, sugar, rice, and other Asiatic products, and so long as they consume so few of our products, we must settle the difference by payment of the precious metals; and so long the precious metals will probably not decline much in value. But let the vessel of Asiatic trade, now half empty of silver, be once filled, as it will be in five, ten, or fifty years; and then we shall begin to feel the influence of the over supply of the precious metals, and their market value will fall rapidly. Christendom and Asia may be compared to two tubs standing side by side, and connected by a large open tube half way from the ground; and the supply of the precious metals to a stream of water falling into the tub, representing Christendom. Before the water reached the tube, or before the tube was well opened, the level rose very rapidly in the first tub; but now the stream pours so swiftly into the second, that the level can scarcely rise at all in the first. When the liquid gets up to the same level in both tubs, then it will rise with equal pace in both.

The quantity of silver annually exported from England and the Mediterranean to Asia has been as follows:

	England.	Mediterranean.	Total.
1851*	$ 8,362 500	....	$ 8,362,500
1852	12,116,210	....	13,116,210
1853	23,550,000	$ 4,240,000	27,790,000
1854	15,555,000	7,255,000	22,821,000
1855	32,075,000	7,620,000	39,695,000
1856	60,590,000	9,950,000	70,540,000
1857	86,477,170	10,180,291	96,657,461
1858	25,444,250	16,150,000	31,594,250
1859	33,298,120	7,340,280	40,638,400
1860	40,620,182	8,120,204	48,740,386
1861	36,399,175	7,980,000	44,379,175
1862	53,551,045	9,150,000	61,701,045
1863	38,236,191	29,281 000	67,517,191
1864	37,079,196	41,255,943	78,335,139
Total 14 years	$503,365,035	$147,522,718	$650,885,863

Michael Chevalier (on gold, page 65), says that in 1857 £20,145,921 were sent to Asia, or about $100,000,000.

The *Westminster Review* for January, 1864, says:

"In spite of our troubles in India, and a state of chronic warfare in China, the increase of our trade with the East during the last ten years has been enormous. This, too, may be looked upon as only the beginning of a commerce that must grow to proportions which cannot be estimated. The most important feature, too, of Eastern trade is the manner in which it absorbs the precious metals. This is a peculiarity so intimately bound up with the social condition of the East that it is likely to last as long as their ignorance and mutual mistrust. Until a system of credit can grow up among them like that which in Europe dispenses with the use of gold and silver for almost all things but retail transactions and the payment of labor, the East must ever remain a perfect sink for the precious metals. What amount of money would be sufficient to saturate the hoarding propensities of these hundreds of millions of men who believe in nothing but the little store they know of under some hearthstone or favorite hiding-place? There is no practical limit to the demand of the East for the precious metals, except the industry that they can develop in its acquisition, and that industry is susceptible of infinite development."

That passage is written in the supposition that a nation possessing an immense quantity of the precious metals in proportion to population could be a nation of hoarders. This idea, however, is entirely erroneous. There never was, nor is it probable that there ever will be, a wealthy nation of hoarders. With the exception of a few miserly individuals, hoarding is caused only by the lack of opportunities to invest profitably, the insecurity of titles to real estate, and the dangers of famine and war. Hoarding is far more frequent, relatively, in semi-barbarous than in civilized communities—more frequent in the country than in cities. As wealth increases, as education extends, as wars become rare, and as the titles to property become secure, the motives for hoarding cease. Hoarding is no doubt common now in Hindostan and China, but the main demand there for the precious metals is not for hoarding; it is for currency. We ship treasure to Asia because, on account of the greater scarcity of the precious metals, labor is cheaper, and because for that reason tea, cotton, rice, silk, and many other articles can be produced cheaper than here, and we find it more profitable to import than to produce at home. But the Hindoos and Chinese having far less trade and manufactures relatively than Europeans, do not need so much coin relatively, and the increase of the precious metals is ten-fold faster among them than the increase of business, so wages must rise, and their products must become dearer, and our gold and silver will have less relative value to them; and other of our productions will have more relative value. Then, our international trade will be more of exchange than now, and less of sale. Asia will always be a sink of the precious metals in so far as immense quantities must be lost, worn away, and used in the arts amidst such vast multitudes of people; and as the consumption is great and the yield nothing, there must be a steady stream pouring in; but this stream, after the level of industry has once been reached, will be much smaller relatively than now. The countries where labor is dearest must export treasure to those where it is cheaper; and the quantity of treasure that a nation will swallow up is proportioned to its industry and poverty.

Another late writer says:

"Regarding the amount of gold and silver afloat as currency in the various countries of the civilized world, there are very conflicting opinions; but, estimating the amount of gold and silver circulating in coin in Great Britain—the country in which, perhaps, the greatest economy of the precious metals consistent with the maintenance of the proper safeguards observed—at £80,000,000, and the population at 30,000,000; and estimating the currency of India in 1857 at an equal amount—an estimate, I venture to think high—and the population at 180,000,000, it requires but very little calculation to show that India is capable of yet absorbing silver to the amount of £400,000,000 in addition to this amount, for the purpose of currency alone. Nor must it be forgotten that India is able to support a population many millions more numerous than she at present possesses; nor, on the other hand, that England has many means of economizing the use of coin, which in consequence of her immense extent of area, will be denied to India, if not for ever, for many years to come. If, then, it be admitted that there is even a shadow of truth in these estimates, it may not be unreasonable to conclude that there is a possibility, distant it may be, yet still a possibility, if the requirements of India for currency purposes approaching the enormous sum of £500,000,000 in silver coin.†

"It is useless to attempt to say how much currency a nation may use. The amount depends greatly upon its relative value. In an age when a day's work is worth ten cents, only one-tenth as many dollars will be needed for currency, other things being equal, as in an age when a day's work is worth a dollar. Wages in India will not remain at their present low rate, and their rise will in itself make a demand for money. We may presume that an addition of $2,000,000,000 to the currency of Hindostan would raise wages there to the level of wages in Europe; and after that importation of silver would be only sufficient to compensate for the wear and tear. However long before that amount could be added to the currency of India, the Hindoos would demand more European goods than now, and these would pay, to a certain extent, for the goods exported from India, and the transfer of the precious metals would gradually decline. The larger the stock of money relatively, the higher the wages, and we may expect that when the sum of $4,000,000,000 is added to the currency of Asia, the wages there will be as high as they now are in Europe; but before that time the wages may have doubled in Europe.

* The figures from 1851 to 1862 inclusive in the above table are copied from Hunt's Merchant's Magazine for August, 1864, and those for 1863 and 1864 from newspaper reports.

† The drain of silver to the East, and the currency of India. By W. Nassau Lees. London, 1864.

Original Papers.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

ON A THEORY OF GOLD GENESIS.

Being the substance of a Memoir read to the AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, at the Buffalo meeting, August, 1866.

BY PROFESSOR HENRY WURTZ.

(Concluded from page 130.)

EDITOR AMERICAN JOURNAL OF MINING:

SIR—Many inquiries having reached me, both directly and indirectly, relating to points in my theory which I had intended to discuss at length in subsequent papers, and most of which were comprehended in my original communication to the Association at Buffalo; I deem it advisable to anticipate, in a measure, the complete, and consequently slow and gradual, publication of the substance of that communication, which I at first proposed to you, and to condense into as few words as practicable, some of its concluding chapters; attaining in this way the object of presenting to your readers, without further delay, the remaining *postulates* of my theory in an intelligible form. I shall then be enabled, in subsequent numbers of your valuable journal, to enlarge upon and illustrate these views, as time may permit.

I take the occasion to state that my studies have led me to form the plan of a general treatise upon the special subject of the modes of development of metalliferous minerals, from a chemical point of view. Upon the execution of this extensive and laborious plan, in detail, I am now engaged, and hope to be permitted in due time to put the results before the world in the form of a work entitled "Metallogenesis." H. W.

IV.—EPOCH OF SUBAERIAL OXIDATION AND EROSION.

The tide of time rolled on, and successive Eons were born of the Omnipotence and merged into the Eternity of the Ineffable Being. As the dynamic energies in the terrestrial substratum gradually died out, the pulsations or heavings of the continental breasts became doubtless slower and slower, until now the span of human history scarce furnishes a unit for their measure. The Earth was becoming fitted for our race; the sun shone full upon it, and differences of climate and variations of seasons began to prevail. Water-channels and river-systems began to form. The completed work of the ocean of waters was delivered up to the embrace of the ocean of air, whose functions are destruction and erosion. Since then the three great chemical solvents and disintegrators which ride upon the wings of the wind, Water, Frost and Oxygen, have held uninterrupted sway, over all those portions of our planet which had been so wonderfully and elaborately built up and furnished, for the dwelling-place of Man.

It is for us now to trace out and record the modes of action of these never-resting and insatiable destroyers, which have scored out the lake-beds and the river-valleys, and carved out the contours of the "everlasting hills." Into this immense inquiry, however, we can but now enter in the most superficial way, confining ourselves of course to the methods and products of the destructive agents in their chemical and mechanical operations upon the crystalline schists, with their contained auriferous sulphides; whose mode of formation we have hitherto been following step by step.

It will be seen that in my views of the transformations now in progress through atmospheric agencies upon and within the surface, which involve the gold; I adopt as a starting point, the same generalization, of which I have hitherto made such important use, of the peculiar relation of the precious metals to iron solutions and oxygen. Important differences, however, occur in the concomitant chemical conditions between the present epoch and those past. Of these the most important is of course the great diminution of the heat-intensity, except in limited localities; by reason of which it might seem that the chemical effects of atmospheric agents should be far slower and less important now than formerly.

With regard to this, however, it must be remembered that the present lower temperatures are necessarily more favorable to the absorption of atmospheric oxygen; and above all, that there has necessarily been a constant increase in the proportion of this element since Life began; there being, indeed, a probability, amounting in my mind to certainty, that gaseous oxygen, like solid carbon, owes its terrestrial existence solely to vital action upon metallic sulphates and silicates (chiefly ferric and manganic), and upon carbonic acid. This is a point, however, which merits a separate chapter hereafter.

Another important difference is, that the organic matters, with which I have shown the superficial portions of the mass, at each emergence, to have been loaded, are now entirely converted into the insoluble forms of calcite, graphite, etc.; and it might appear that reducing agents are also now wanting. This is not so, however, for my experiments have developed the following facts, having a most important influence upon the metamorphoses now going on in auriferous rocks:

Pyrrhotine and chalcopyrite rapidly and readily reduce cold ferric solutions, but *pyrites* with great slowness or not at all.

In connection with this, I may cite the long-known fact that most pyrites (though there are exceptions, some varieties, from causes yet unexplained, resisting powerfully) readily yield to oxidation by atmospheric waters. At the lower temperatures now prevailing, however, it seems very probable that the primary metamorphoses now being effected by atmospheric agencies, are confined to those only in which *dissolved oxygen* takes part, water itself acting but as a solvent. I give here some of the simpler equations, expressing the changes which must be now going on in the rocks within the sphere of atmospheric influences; some of which have been given already (this Journal, Vol. V., p. 130):

(1). $3FeS + O^7 = FeO,SO^3 + Fe^2O^3 + S^2$

(2). $3FeS^2 + O^7 = FeO,SO^3 + Fe^2O^3 + S^5$

(3). $6FeS + O^{27} = 2(Fe^2O^3, 3SO^3) + Fe^2O^3$

(4). $4FeS^2 + O^{15} = Fe^2O^3, 3SO^3 + Fe^2O^3 + S^5$

(5). $2FeS + O^9 = Fe^2O^3, 2SO^3$

(6). $4FeS^2 + O^{30} = 2(Fe^2O^3, 3SO^3) + 2SO^3$

(7). $3FeS + O^3 = FeS^2 + Fe^2O^3 + S$

(8). $3FeS + O^6 = FeS^2 + Fe^2O^3, SO^3$

(9). $5FeS + O^{15} = FeS^2 + (2Fe^2O^3, 3SO^3)$.

The waters falling or running upon the surface, charged with their maximum of dissolved oxygen, soak into the fissures, until they encounter sulphides. Within the zone in which oxygen is in excess, such reactions as No's (3), (5) and (6) are most likely to prevail; though it is often found, as stated once before, that the sulphur partially resists oxidation, as in No's (1), (2), (4) and (7). In cases in which the reactions No's (1) and (2) prevail, auriferous hematite or limonite gozzans may be found, even at the surface. No's (3) and (4) will also form similar gozzans; which may, however, be entirely impoverished, and the gold transported to deeper zones. No's (5) and (6) may leave the outcrops entirely stripped of both gold and sulphides; while No's (8) and (9) might carry down all the gold and still leave the surface rocks charged with impoverished pyrites.

Below this zone, there will be another where the sulphides will be in excess over the oxygen; this being frequently at or near what is called the "water-level," though as this is constantly changing with the seasons, and with the continuous and variable erosions of the surface, such boundary is generally very ill-defined. In this zone of imperfect and variable oxidation, much *pyrites* is usually found, even in cases in which the prevailing sulphides, in depth, are pyrrhotine or chalcopyrite. Equations (7(, (8) and (9), explain this fact, and show also how even the pyrites in this zone may, in cases, be destitute of gold, even in an auriferous region.

In this same zone there must usually be, however, in places at least, a simultaneous action going on, of an opposite kind, a *reduction* of the ferric solutions percolating from the zone above, to ferrous conditions, by the reaction with pyrrhotine or chalcopyrite pointed out above, and a redeposition of any dissolved gold; which can here appear, therefore, wholly or partially, as palpable or "visible gold," sometimes in the crystalline form. Much of the ferric gold-solutions must nevertheless escape reduction in this zone, and pass down to a still deeper one, permanently *below* the water-level of the locality, where the circulation is usually slower and more diffused, and where the dissolved gold can hardly fail of being all reduced, sooner or later, either to the metallic state or to an auriferous sulphide.

I would give, as a brief comment on these views, that it is a common remark among the miners in Colorado and other districts, that they seldom "strike it rich," till the "metal," or the "iron" (Colorado terms for the sulphides) begins to show copper (generally either as chalcopyrite or erubescite).

It must not be forgotten that in the present brief summing up of [the subject, I must confine myself to the simplest case. Complications arise from a multitude of causes; from the presence of blende, galena, arsenical or other ores, for example; and also from important mechanical causes, as for instance, when the outcrops of beds descend steep slopes, and water that has soaked in at a higher elevation finds its way out again at lower outcrops. It must not be forgotten, also, that the exceedingly important element always enters of the continual sinking downward of the several zones, of the water-level, and the level of penetration of oxygen, by virtue of superficial erosion; and that in and near gulches or valleys of torrents, most important variations of the phenomena must proceed from this cause, which are worthy of the most careful study; and in which I distinctly trace the explanation of the coarseness of aggregation of gulch and placer gold, and the formation of large nuggets.

It will be remarked that in this chapter I have avoided also the consideration of the applications of these views and principles to the special cases of the more auriferous beds, lodes, or "veins," which usually occur in auriferous rocks. I will merely say now, that the very fact that these veins or beds contain originally a larger proportion of sulphides than their imbedding rocks renders them more attackable by the percolating solutions—more especially when they contain much fissured quartz, and "vugs;" and they, therefore, soon become channels for the introduction of atmospheric oxygen, and undergo the changes above described more rapidly and completely.

Did space allow, I could proceed at great length to show how my theory furnishes ample means for the explanation of numerous peculiar phenomena of gold lodes, which have been mostly regarded as obscure; such, for example, as are denominated by the miners "shoots" of rich ore, "pockets," "chimneys," "pay-streaks," "caps," etc., etc. I might also show that many conflicting theories, founded upon observations of high authorities, in different countries, may be greatly reconciled; as, for instance, the views of Murchison upon the impoverishment in depth of the Ural veins, and the late period of their impregnation, and so on.

All these, and many other pregnant topics of discussion, may, however, be safely enough left for the future; and I shall close this chapter by condensing its substance into the form of two more postulates:

EIGHTH POSTULATE.

During the more recent epochs; those of continuous atmospheric agencies; the iron sulphides are being converted, by infiltrating waters carrying atmospheric oxygen, into ferric sulphates; which dissolve wholly or partially, throughout a superficial zone, the impalpable gold of the sulphide crystals, and carry it down to a deeper zone.

NINTH POSTULATE.

In this deeper zone, where oxygen is no longer in excess, these auriferous ferric solutions may be reduced again, by ferrous sulphides, to ferrous forms; and the gold may thus be again deposited in the cavities and fissures, wholly or partially, in visible, coherent, compact, massive, or even crystalline forms.

V.—GENESIS OF FLUVIATILE AND LACUSTRINE GOLD.

My present limits will allow only, with regard to this concluding branch of the subject (upon which a whole chapter might be written), that I shall compress the views I adopt, into the space of a final postulate.

TENTH POSTULATE.

Finally—Placer gold, in the forms of grains and nuggets proceeds from the solution, corrosion and disintegration, of rocks which have passed through the conditions and operations specified—by water, oxygen and frost; and the subsequent removal and deposition of the ruins, by and in moving waters.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

ON THE VENTILATION OF COAL MINES—IX.

By J. W. Harden, C.E., Wilkesbarre, Penn.

Concluded from Page 227.

In concluding these, my letters, on the Ventilation of Mines, a few general remarks will not be out of place, even though at the risk of repetition.

Whatever are the motive powers employed, it is a *sine qua non* that the air courses be capacious and properly distributed over the pit. It may be that a large current is escaping at the upcast, but it is not from such fact apart from a knowledge of the arrangement below, that we are able to judge of the quality of the ventilation. Large air courses and a slow current are preferable to small courses and a rapid current.

The area of the main roads must not be reduced at a crossing, and the crossings should be made in the measure, either above or below, and, if necessary, built in with a brick arch. Neglected falls of the roof and sides of the air courses are a source of danger too often permitted.

In any scheme of ventilation there should be as few doors as possible; these should be, in all cases, double, and hung so as to close of themselves.

Bratticed shafts are objectionable, more particularly for deep mines. The number of shafts should depend on the area of coal to be worked. When there are two shafts, if one is sunk on either side of the area, the upcast being on the rise side, so much the better; but it frequently happens that the coal is out of the reach of practicable working depth, excepting at an enormous cost; the shafts may then both be sunk to the rise, but with such a space of undisturbed measures between them that there may be plenty of room for headways, and that an explosion may not be sufficient to dislocate the separation.

Although in England the law is absolute on this point, yet two shafts are certainly not enough for working some of the large collieries there. It has long been an opinion of the writer, almost amounting to a conviction, that, with a greater number of openings to the surface, the liability to such fearful calamities would be less. An abundant supply of pure air properly distributed, is the only effectual means of preventing explosions, and the consequent sacrifice of life.

The shafts of every deep pit should be lined with brick or stone in mortar, the surface over which the air has to pass should be smooth and even. The abrupt terminations of the timber linings in our shafts, are just so many abutments for the air to rush against and rebound.

Care should be taken that the stoppings of all drifts and cross-cuts be built air-tight and strong, and all places suspected to contain fire-damp, and not in actual working and extension, should be fenced off. Trials for fire-damp should not be made with the naked light. The Davy lamp will show the presence of gas quicker than the "Geordie"; a larger quantity of gas gets into it: yet in all the safety-lamps with which the writer is acquainted, an observant man will detect the gas on the flame at pretty nearly the same time.

Where safety-lamps are used, gunpowder should be prohibited. At least, it should not be used at the will of the miner. An experienced overman should be appointed to fire the shots; and he will not do so at all where the mine is doubtfully safe.

The miner should not be allowed to smoke, or take the top off his lamp. Men will do this, not always heedless of danger, but with an impression that there is none. The lamp should be securely locked. It is essentially necessary that all miners should be instructed in the use of the safety-lamp. They will then know when danger approaches; and it will be well to keep their knowledge within the limit of extreme danger. In approaching old workings, it is well to use the safety-lamp, and to keep a bore hole in advance, in the places being driven. Unless the pit is worked on double shift, a miner should not be allowed to enter his working place, until it has been examined by the overman appointed to that duty. Where the furnace is used for ventilation, the practice of backing it up at night and starting it again in the morning, is to be deprecated. It can only save coal and attendance—an item not worth consideration, compared with the health of the men and safety of the mine. The flue or drift carrying off the heated air from the furnace, or from any underground engine, should be daily examined.

To give, in detail, all the acts of precaution necessary to the safe working of collieries under the varied conditions in which we find them, is more than the limits of these letters will permit. Rules and regulations absolutely necessary, if adopted and carried out, will assist in preventing accident, will improve the intellectual and moral condition of the miners, and gradually lead to more care and attention on the part of the underlookers, and to less recklessness on the part of the men; but before looking fully to realize the benefits to be derived from rules, advance must be made in another quarter. The time has to come when, to prevent accident, secure to the miner a tolerable share of health, and at the same time keep expenses at a minimum, it will be necessary that superintendents and overlookers must be educated for their posts. Those upon whom the daily and hourly conduct of the mines necessarily falls, must be possessed of such an amount of scientific information, as would not fail to induce greater vigilance in carrying out necessary rules and precautions. Obvious enough to scientific men, such discipline is difficult or almost impossible to obtain in practice from men who, however willing to do their duty, do not fully understand or appreciate the reason and value of precautions. When such scientific, with the proper, practical information, becomes the standard of competency in the selection of men for the management of collieries, an important step towards lessening the number of accidents, and increasing the profits of employers, will have been taken. Indeed, without such training in those entrusted with the carrying on of this dangerous and yet constantly increasing branch of commercial enterprise, there is nothing to be relied on for the protection of either life or capital.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

NOTES ON SANTO DOMINGO.

By Robert Hauschkel, Mining Engineer, New York.

Concluded from page 226.

Southeast of the Laguna de Enriquillo occurs a mountain mass, which acquires especial importance from the circumstance that it consists almost throughout of beautiful, clear rock salt. Salt already begins to show itself, however, some fifty miles further east, where the zoophytic limestone is traversed by innumerable small veins of it, from a quarter-inch to two inches in thickness. Towards the west, these salt-veins (if I may call them so) gradually increase in size, while the limestone is more and more subordinated, until, at the Cerros de Sal, it has almost entirely disappeared. Moreover, the whole coast-region along the Bays of Ocoa and Neyba is blessed with numerous salt springs, which must either come directly out of the limestone, or break through the conglomerate further inland, or proceed from a bituminous sandstone still higher up, on the spurs of the southern coast range.

An American company obtained from the Dominican government authority to work the rock salt deposit which I have described, and intended to build a railroad, seven leagues long, from the village of Barahona, on the Bay of Neyba, to the Cerro de Sal. There were no great difficulties in the way of the enterprise; and it would have enabled the projectors to deliver salt at the coast for seven cents a bushel; but the plan was not carried out, principally, I believe, because it was feared that the United States would lay a high tariff upon imported salt.

Sulphur springs are also frequent in this part of the island; and one in particular, which is tributary to the small creek Sesesipi (flowing into the Bay of Ocoa) is so rich in sulphur as to coat with that substance the pebbles and plants with which it comes in contact.

Almost due west from Agua de Compostela, and at a distance of about four miles, occurs another important product, namely, petroleum. These oil-springs have long been known to the inhabitants, among whom the petroleum is highly reputed for medicinal purposes. It will be remembered that the petroleum of the United States, under the name of Seneca oil, was also used medicinally for many years, before it was successfully applied on a large scale as an illuminating or lubricating material. The oil of Santo Domingo is the heaviest yet discovered. In its crude condition it is an excellent lubricator for the courser parts, and, purified, it is equally applicable to the finer parts, of machinery; and, distilled, it furnishes a good "paint-oil."

The carboniferous formation, in which these oil-springs occur, is covered with loose conglomerate, varying in thickness from four to sixty feet. On the banks of the Rio Trabon, which flows by the springs, about a quarter-mile distant, a good opening exposed the following series of strata:

10 feet, loose conglomerate;
3 " sandstone (coarse grained);
1 " solid conglomerate;
5 " 6 inches sandstone (coarse-grained);
3 " gray slates;
2 " spherosiderite;
4 " sandstone (fine-grained); slates.

These lowest slates, when exposed to the air, easily disintegrate and crumble. They seem to form a very thick deposit; at all events, they are not passed through by a bore-hole ninety-five feet deep.

One of the petroleum springs yielded so much gas that the continual agitation was like boiling. The ground in the neighborhood of the springs is saturated with petroleum, and in many places asphaltum has been formed, frequently to a depth of several feet.

The carboniferous formation, which only occupies a small district on the Bay of Ocoa, appears in much greater development on the Peninsula of Samana. In this region petroleum also occurs; and what is probably of far greater importance, *coal*.

The significance of this fact will be apparent when it is considered, (1) that coal has not been, and probably will not be, discovered on any other of the Antilles; (2) that the coal beds of Venzuela have never been worked; (3) that commerce and industry in this quarter of the world are now dependent upon English coal; and (4) that the United States is negotiating with the Dominican government for the purchase of the Bay and Peninsula of Samana, with a view to the establishment at that point of a coaling station.

Safety Lamps.

Provisional protection has been granted to Mr. Samuel Higgs, junior, of Penzance, for certain "Improvements in Miners' Safety Lamps," which are described as follows:—For the purposes of this invention, the gauze of the ordinary Davy lamp is encased in a tube made partly of glass, and partly of gauze; this tube or casing forms of itself a separate safety-lamp, and encloses the whole of the Davy lamp. Instead of the ordinary wick, a flat plaited wick, dipped in a preparation of tallow, is substituted. By these means, 1st. There can be no chance of explosion, however strong the current of air; 2nd. The lamp cannot be tampered with, the inner lamp being locked with one description of fastener, and the casing with another; 3rd. By the use of the prepared flat wick, the pricker or trimmer is done away with; 4th. That part of the tube or case around the lamp being made of glass, a much better light is obtained. The invention thus consists in the encasing of any safety-lamp in a tube or case made of glass, or of both; the double locks and the plaited wick as obviating the necessity of a trimmer.—*London Colliery Guardian.*

Yearly Mercury Production of the Earth

This is estimated at 61,000 cwt., of which 20,000 come from Spain; California (New Almaden), 28,000; other California mines, 7,500; Peru, 3,000; and from Germany, Austria, and France, 2,500. Mexico, Peru, Chili, and Bolivia consume yearly 23,000 cwt. in the production of silver; China and Japan, for making cinnabar and producing silver, about 10,000. The remainder is consumed in Australia and California for gold and silver extraction, and in Europe and the United States for various industrial purposes. The supply is about equal to the demand.

Roasting of Pyrites.

Experiments lately carried on in the laboratory of Prof. Otto (*Collegium Carolinianum*, Brunswick), as to the production of sulphur from pyrites, have shown that by the process of extracting the sulphur by roasting in a current of air, by far the larger proportion is evolved in white vapors of anhydrous sulphuric acid, the smaller part only (5:3) as sulphurous acid gas.—*Dingler's Journal*, 1868.

Mining Summary.

GOLD AND SILVER.

Nevada.

[From our Special Correspondent.]

AUSTIN, March 28th, 1868.

SOUTHEASTERN NEVADA.

It is singular how little reliance can be placed in the statements of those who speak of their own mining claims. Men who are perfectly reliable in other matters, become uncertain authorities when they have to deal with quartz lodes in which they are personally interested. A streak of pay-rock, three inches wide, is usually magnified to two feet at least, and ore which will mill $60 per ton is sure to be represented as worth $150. Those who are given to such exaggerations may even be honest in their averments, and if so it would be interesting to ascertain what hypothesis and course of reasoning they had adopted with the result of their being thus self-deceived. It is probable that the natural desire to possess a really valuable mine, and have others believe implicitly in its inestimable worth, is usually the parent of inception, which, after being nurtured in the imagination, has the effect of making an ordinary claim appear as altogether superior to the estimate put upon it by a more sober judgment. Some respect is due to miners who are suffering from self-deception, even though they may have been to blame in adopting a false basis from which to draw conclusions. But for those cool, deliberate swindlers, who, with all the impressiveness of apparent sincerity, will descant on the merits of mining locations which, in their inner thoughts, are acknowledged to be utterly valueless, there ought to be no respect whatever shown. Such men are the bane and curse of a mining region. If the reputation of its mines has been established beyond all controversy, they are comparatively harmless; but in a new mining section, their shadow on its prosperity is like that of the deadly upas tree to those who slumber under its boughs.

THE REESE RIVER REGION,

or what is more correctly known as Southeastern Nevada, embracing, as it does, various mining districts from 50 to 150 miles distant from the nearest point of said river, has been maligned by the public and overlooked by capitalists, simply because the smooth, oily tongues of blacklegs and professional mining sharps have been busy in making money, without any scruples of conscience, out of one of the most wondrous discoveries of the age in the matter of silver mines. And really the parties most to blame for the success of these scoundrels in their nefarious schemes, were the capitalists and stock operators, themselves, who in the end were bitten by the biters. A merchant in New York or Boston will not purchase a ship's cargo without a properly-attested bill of lading being produced; if the seller is not thoroughly responsible, the cargo itself will not be taken on mere representations of interested parties, but must be subjected to a satisfactory examination. But the sellers of silver mines (quartz boulders, titleless locations, or rampant "wild cat") could go to the Atlantic States two or three years ago, with only a few abstracts from local record books, and a flourishing report on the wondrous value of the so-called mines by some self-styled professor or mining engineer, and on the strength of such potent documents, he could sell a property not worth $20 for $50,000, without any further inquiries being considered necessary. The buyers, in their unjustifiable ignorance, seemed to believe that all they required to do to secure for themselves huge and perpetually augmenting dividends, was to appoint as their resident general agent, the favorite son of the President of the company, or some particular friend of one of the trustees, for whom it was necessary to provide a respectable position. The appointee might perhaps be somewhat fast amongst his numerous city associates, or he might be a little too green to hold his own in a metropolitan business; but he would do splendidly in a new, rough country, where only illiterate, gawky frontiersmen from Pike and California were to be met with. To them their agent would be like a whale among the minnows, and if he did lack practical mining experience, he would at least be safe to handle the company's money. The dozens of miserable failures which have resulted from investments made in this country under such auspices as this, attest the folly of the practice. If economical management and thorough practical experience are wanted in any business, they are still more essentially requisite in the development of mining property and the building and successful running of a quartz mill. In the vicinity of Austin there have been large amounts of money expended on mining claims, which even from the first, experienced miners considered worthless. Extensive reduction-works, too, were erected at great expense, and when completed, were not only destitute of ore on which to be kept at work, but in some cases, were anything but well adapted for its profitable performance. It has been found by experience, too, that the residents of Nevada are not the uneducated, sheepish clowns they were formerly supposed to be. If the California gold miner, who has graduated in the Comstock speculating arena, and whose wits have latterly been exercised in carrying through to a final issue some Reese River wild cat scheme, is not a shrewd and unscrupulous operator, it is hard to say where such is to be found. To cope against men of this stamp, who are always to be met with in every new mining section, is no easy matter, and hence, one of the various reasons why unsuspecting officers of eastern mining companies, have failed in their local management. They had no knowledge of the business they were to control, and did not know enough of the ways and schemes of the western world to take care of their own or their companies' interests. But a more sensible practice is now becoming general. It is beginning to be conceded by the directors of eastern mining associations that men who have spent many years as miners and mill-men in the silver producing regions, are likely to make better managers than inexperienced city men, and where the proper rectitude of character exists, they are the right men to be employed. The prosperous condition the affairs of the Manhattan company are in now, as compared to what they were a little over a year ago, when mismanagement had entailed a heavy debt on the property, (now fortunately all paid off from bullion extracted in the interval) is the best possible commentary on this subject.

OUR FUTURE PROSPECTS.

Southeastern Nevada is destined to have a great history as a silver mining region. A stretch of country 200 miles in length, and almost of equal breadth, is known to contain valuable mines in almost every mountain range. There are upwards of thirty-five mining districts already organized, and as far as an opinion of the value of quartz lodes can be formed by the indications of their outcrop, each district contains several valuable mines, which will well repay the cost of development. The great bulk of the money invested in the country has been swallowed up in speculative operations, which have no permanent value. Scarcely more than a dozen of the investments which have been made will ever pay dividends to the stockholders—not because we have no mines capable of yielding high returns, but rather owing to the fact that very little judgment has been exercised in the selecting of the property to be operated upon. We have scores of mines, which in the hands of companies possessed of ample means to bring them to fruit, and determined to adhere to legitimate mining to the exclusion of everything like speculation, would soon become heavy dividend-paying properties. I will name only a few such mines, and though in a great measure unknown now, they will attract considerable attention ere two years have elapsed: The Gilligan lode of the Social and Steptoe company, at Egan Canyon, 150 miles east of Austin, has been opened to the depth of 400 feet, where it shows 4½ to 8 feet of milling ore which assays in the mill from $70 to $100 per ton. The Magnolia and American Eagle lodes in Morey district, though opened only 80 feet down, show 20 inches to 2 feet of ore, which various batches worked at Hot Creek, prove to be worth from $100 to $150 per ton. In Columbus district there is the justly celebrated Northern Belle lode, with a vein 15 to 25 feet wide, which has given a pulp assay in the mill of $60 to $100. The Montezuma district, 60 miles south of Silver Bend, though little spoken of, has its Highbridge lode, which bids fair to equal the celebrated mine at Belmont of the same name. By the returns to the assessor of Nye county for the last quarter of 1867, a batch of this ore was proved to yield $311 per ton in silver bullion, and this was taken out only 40 feet from the surface. In Cortez district the St. Louis and Garrison mines, though scarcely prospected, are yielding ore so high in grade that it pays handsomely to convey it to Austin by pack train, for reduction, though 70 miles distant. White Pine, with its Hidden Treasure; Hot Creek, with its New Cumberland, Silver Glance and Philadelphia; Reveille, with its Fisherman, Highbridge, Sweepstakes and Botivia, will in due time wheel into line as dividend-paying districts. These are only a few of the numerous valuable mines we have still undeveloped, most of them being in the hands of men, who are too poor to do more than a little surface work. All they require to become dividend-paying mines, is a judicious expenditure of capital in exposing their mineral treasures.

TWIN RIVER.

The Murphy mine of the Twin River company, four-fifths of which were bought in 1865 for $50,000 in coin, is one of the best investments ever made in this part of the State. It has proved to be a true fissure vein, with large quantities of high grade mineral at command; the sworn returns to the assessor of Nye County for the last quarter of 1867 showing that the actual yield from 1,691 tons of ore, was $131 per ton in bullion. For a year or two the mine was poorly managed, and larger sums of money were expended on mill buildings and offices than could be considered necessary. The assayed value of 5,000 tons of ore worked since the mill went into operation, has been from $150 to $200 per ton. The tailings from such high grade ore contained, at the lowest estimate, from $16 to $20 in silver, which could easily be extracted by re-amalgamation, yet they were wastefully run into the Ophir Canyon creek. Our New York company do business in a grand style, and think nothing of rushing a hundred thousand dollars down a steep rocky stream. It is but a month or two ago that two miners here purchased 2,000 tons of tailings lying at the Midas mill, and having fitted up the amalgamating pans, are now about to work them over. By numerous assays they have been proved to contain from $20 to $25 per ton, and those of the Murphy mine ought not to have been anything inferior. With ordinary management the Twin River company ought to pay good dividends, but those owning the principal portion of the stock seem to act as if they thought they had no right to give any account of their doings. Why the stock is not far above par in the New York market it is hard to determine, unless it is owing to a want of confidence in the directory of the company.

MANHATTAN COMPANY.

Till a few days ago when a shaft gave way in the mill of this company, they have been turning out a large amount of bullion. From their returns to the assessor of Inland Revenue, I find that their pile of bullion for January last was $85,982, and for February $97,072, that for the year 1867 being $553,000. The property is economically, and, on the whole, judiciously managed. If the agent has any particular fault it is that he figures a little too closely, and perhaps does not see quite as far ahead as some men would. A case occurred a few weeks ago illustrative of this point. A lawsuit between the Manhattan and Timoke companies had been started, and a compromise was agreed upon; a certain dividing line was fixed, and, on the proposal of the agent of the Manhattan company, the line was run parallel with the course, from top to bottom of the Timoke incline. This being at once agreed to, a judgment was rendered in the District Court in accordance therewith. Not till all the papers were properly executed, was it discovered that this line, not being at right angles to the course of the lode, would, as depth was attained, keep encroaching on the Manhattan ground. The lawyers were set to work in hot haste to evade the effects of the blunder, but it was too late, and the settlement stands good, much to the satisfaction of the legal gentlemen from Boston, who attended to the interests of the Timoke company. On the western end of the North Star lode of the Manhattan company, the boundary line with the Buel North Star company was also blunderingly fixed.

THE KEYSTONE MILL

resumed work a few days ago, and, as the California mill has shut down, it has all the work to do it is capable of performing. It is rumored that Gen. Page is about to sink a deep shaft in connection with the Keystone, somewhere in the ravine above the Diana mine. The story is that the Washington Irving and Eaglet lodes were deeded to him some months ago in order that he might effect a sale in New York. On his return without having sold the property, he was asked to re-convey it to the original owners. This, however, it is said he declined to do, and because the deeds are absolute, he considers his title is legally good without any payment being made. It is for these ledges he is about to open a shaft, and of course he is likely to strike good ore in other lodes his works will penetrate. If the facts are as represented by the parties whose rights have thus been taken from them, Page ought to be ashamed.

THE COMBINATION MILL

at Silver Bend has been running a month, during which period, as proved by the shipments through Paxton & Company's bank, it has turned out $53,075.27. This is poor work compared to what we were led to expect before the mill went into operation. The mill, it appears, is a poor excuse for a first-class establishment. Last year, when the machinery was about to be purchased, the agent, though wholly inexperienced in such matters, selected from his own judgment at the Miner's Foundry in San Francisco, the kind of mill he desired to have. Seeing that they had greenhorn to deal with, the Managers palmed off upon him all sorts of old castings that they had around the works, and to keep the matter quiet as long as possible, they stipulated that they should send a man to supervise the building of the mill. The result is that, though the reduction works have a splendid exterior, they cannot be ranked as more than third-class. Owing to leaks in the amalgamating pans, and wastes from other causes, over three tons of quicksilver of the value of $5,000 have been lost; the twenty stamps intended for wet crushing have been set aside, ten of them being now employed in dry work. As the batteries discharge but on one side, twenty stamps can only crush eleven tons per twenty-four hours; whereas any of our best mills will put through 1,600 to 1,800 pounds to the stamp in the same time. The bullion is very low, ranging from 350 up to 600 fine, only one or two bars going higher than the latter figures. This is partly owing to there being considerable base metal in the ore, which is probably also to some extent the cause of the great loss of quicksilver. There is no doubt at all about the value of the company's mines, and by judiciously remedying existing defects in the mill, the yield of bullion during the next two or three months ought to be very large.

A PROFESSIONAL VISIT.

Professor Vincent, of London, has been here with Colonel Buel, to examine certain mining properties at Silver Bend. I understand he expresses himself as highly pleased with our mineral resources, and only regrets he cannot spend longer time in giving them a fuller examination. He leaves by overland stage this evening in company with the Colonel, who is very confident of a sale being made to an English company, if the Professor gives a favorable account of the mining property he has examined. Including, as it does, parts of the Highbridge, Transylvania, and Eldorado lodes at Belmont, it is scarcely possible to see how any other than a flattering report can be given. If these are not first-class silver mines, it will be a difficult matter to say where such are to be found. Professor Vincent made quite an interesting discovery yesterday while paying a visit to General Wild and his lady. Some time ago, in passing through Virginia City, Mrs. Wild obtained from a miner at work on the croppings of one of the Comstock mines, a piece of ore in which he informed her there was some *chloride of gold*. On Professor Vincent being shown this specimen, he, after a careful examination, intimated that it did contain some native chloride of gold, and further, one of the crystals on its surface was a genuine diamond of the third water, which, owing to its perfect form, might be set without any cutting being necessary. As a matter of course Mrs. Wild has now a very high opinion of the piece of quartz presented to her by the Comstock miner, who seemed to have known a little more of mineralogy than he probably was suspected of knowing.

PERSONAL.

In sending you a series of letters descriptive of southeastern Nevada, I wish it to be distinctly understood that, though my criticisms of the operations of mining companies may sometimes be somewhat pointed, they will never knowingly be unjust or undeserved. If I do inadvertently fail to do justice, it will give me pleasure to correct any mistake I may fall into. My object will be to treat of our immense resources, and show, as far as possible, how they can best be developed. I have no favor to ask from any man, nor have I any fear of boldly uttering the truth as it appears to me. Nothing will appear in your paper from my pen without the signature, E. J. DARE.

(From our Special Correspondent.)

Montana.

THE DIFFICULTIES OF MINING IN MONTANA.

VIRGINIA CITY, N. T., March 21, 1868.

In my last I stated some facts as to the errors of mining as they are found to exist here, and now propose to point out some of the difficulties that are encountered, and under which the mining interest is now laboring in this Territory. The first has been the manner of the location of our leads. Under the Act of February 4, 1864 (while we were under the Statutes of Idaho), the lode had to be pre-empted in claims not exceeding two hundred feet along the lead or ledge, giving to the discoverer two claims, one by pre-emption, the other by virtue of his discovery; thus enabling the discoverer to hold four hundred feet. The remainder must be held in severalty by others in the name of resident pre-emptors in fractions of 200 feet each; and this statutory provision is reduced by the local custom in many cases to 100 feet upon the ledge. As a result, the vein was so cut up into fractions, or held by varied interests, that no concert of action for development could possibly be obtained, and capital, ever timid, could not be induced to develope a mine in which the interest of this very capital was perhaps only one-tenth or one-twentieth of the whole ledge. The resident holder is poor and unable to develope, and too often satisfies himself with the reflection that he will hold on. Capital will soon tell him what he possesses, and if it proves to be of value he can sell for a good round price; and if the ledge should prove worthless he has not lost anything, for not a cent has be expended. It is true that the Idaho Act required that within six months from recording, work should be done on each claim amounting to one hundred dollars. This was easily performed, for the owner himself was the judge of the value of the labor expended. We have heard that it has been estimated that four days labor was a full and complete discharge of the $100. But worse yet, Congress, on the 26th May, 1864, created a new Territory, and gave us power to regulate the mining interests, "as to us might seem good." In the exercise of this right we did, on the 20th of December, 1864, say: That all quartz leads, lodes, or ledges should be held in claims of not more than two hundred feet each by resident pre emptors, without the labor qualification of Idaho. This caused our people to own claims of 200 feet scattered over the Territory. It was impossible to develope often from the distance that the owner found himself, and he too concluded, Micawber-like, "to wait for something to turn up." How to overcome this difficulty was the question, for it soon became apparent that capital would not develope unless a greater interest could be obtained than was provided by law, and that the mine could not be worked advantageously owning only two hundred feet. The remedy was at last applied. The discoverer placed the names of personal friends upon the stake, and completed his pre-emption upon the record, and by deed back to him in an hour's time was the owner of the lead or ledge of 2200 feet. Now that this difficulty has been overcome, capitalists can purchase and obtain a perfect title to the lead for a fair consideration. The second difficulty to be met with was the high price of labor and the enormous cost of living. The price of labor was to a degree a necessity from the cost of provisions, but not wholly so. For three years past the miner has been exploring the mountains for placer mines, and has each year reported discoveries of $8, 10, 20, 30, 40, and as high as $100 diggings per day to the hand. The news is borne from camp to camp, and what we here term it, a stampede is the result, and labor becomes scarce, and if the work of development is to go on, it must be at prices per day that are not warranted by any leads yet discovered that we are aware of. This has delayed development, and in very many cases has delayed and prevented results that might have been obtained upon capital that had already been invested. This difficulty is being overcome by the reduction of freight, increase of commercial facilities, the production of staples at home, and the permanency of population with the increase of labor afforded by each year's emigration, so that now labor can be obtained for about $5 per day, and in fact, in some cases is obtained for less, and ere long we shall be able to develope the mines of the Territory at cheaper rates and with less capital than heretofore. Another difficulty to be overcome is the anxiety and restlessness of capital that is invested for mining purposes, and why the expectations of immediate profits are not realized. It may seem strange that after a company has been formed and a cash capital of 100,000 dollars paid up, so long a time must elapse ere returns are made. The shareholders become disheartened, the future is dark and the present seems a blank. Agents have done what they could in most cases, have overcome difficulties that seemed almost insurmountable, and when success seemed in reach, supplies have been stopped, and all work suspended. If mining is to be successful it must be by continued energy, judicious management, and above all an exercise of sound judgment in the employment and disbursement of the capital expended. The sooner the idea is abandoned of large dividends and enormous per cents and the belief in the safety and permanency of mining investments established with fair profits, the better it will be for both capital and labor.

We may hereafter, in the columns of the JOURNAL, give examples and striking illustrations of the truth of the effect of this *over anxiety for returns*, upon mining in Montana. This anxiety has caused thousands to be expended for machinery, now to be seen in every part of this Territory *idle*; either because it is not suitable, or else for the want of paying ore. Experience will soon overcome this difficulty, and it is now already manifest that capital is becoming more patient and is more ready to await development. When this shall have been obtained capital will be satisfied, and the fortunate owner thereof will receive a satisfactory percentage upon investments made, for we shall soon demonstrate that the ores of Montana will pay. We shall mention only one other difficulty that should and must be overcome if success is to crown our mining enterprises. And it is that we must have practical metallurgists for the treatment of ores. We are not of the class to decry science, or debase the man who has devoted his life in the pursuit of knowledge to a visionary or theorist, but when we speak of practical metallurgists we mean those who understand thoroughly the best mode of treatment of the ores that are submitted, and who are willing to give up a long cherished theory for practical good when required. Each year will add to our knowledge of the successful treatment of the varied ores of this Territory, and we shall soon (if we have them not now) have men who will be able to save the precious metals in quantities that will satisfy. These and other difficulties that could be enumerated have and are to be overcome, ere we can expect that mining will be successfully prosecuted in this country. The steady increase of our production of the precious metals, notwithstanding the decline in yield from placers, prove that we have the American spirit of "never failing in that we resolve to do."

WM. Y. LOVELL.

Dakota.

The Commercial Record is the name of a handsome new weekly paper hailing from Cheyenne, and mainly devoted to the mining, commercial, and railroading interests of Dakota and the adjacent territories. Under the caption "new gold mines," it gives the following interesting account of what the miners are doing in its neighborhood: "For some time past the Arapahoe Indians have been in the habit of trading gold to the post sutler and others at Fort Phil Kearney. Many of them had their little buckskin pouches containing from $100 to $400 worth of the precious metal. The gold is of the description known as coarse scale gold, and some of it was mixed with small nuggets. During the winter of 1866—'67, one of the Arapahoes promised to guide a party of miners, who were at Phil Kearney, to the spot where he and his comrades obtained the ore. He, however, backed out before all the preparations were completed, as the other Indians frightened him by their threats. The men, however, had set their minds on making this expedition, and accordingly remained in the neighborhood of the post during the summer, and waited to see what another winter would bring forth. During the present winter the Indians traded their dust as usual, and after much trouble the same Arapahoe again promised to act as their guide to the spot. The miners assured him a full outfit and a full share in whatever they might make at the mines, and during the last days of February a party of six miners, armed to the teeth, and well supplied with pack animals and provisions, left Phil Kearney with their guide. From what the Indian said, the locality they were going to is situated from eighty to ninety miles north of Phil Kearney, and in what is known as the Wolf mountains. It is south of the main Yellowstone river. A report from this party is anxiously awaited by their friends at the post. Nearly one hundred miners have been in the neighborhood for some time past waiting for an opportunity to explore the tributaries of the Yellowstone. Becoming, however, disgusted at the continued hostility of the Indians and the prospects of the Forts being abandoned, nearly all of them have since left for Sweetwater or Wind river. Some veins of quartz showing free gold to the naked eye, have been found in the vicinity of Phil Kearney. The Fort is at present garrisoned by 690 soldiers, and contains provision sufficient to last 1,000 men for nearly three years. It is situated on Piney creek, which empties into Clear Fork, a tributary of Powder river. The latter stream is distant forty miles. The post is about 235 miles north of Laramie and 330 miles from Cheyenne. It was here that the Indians concentrated to the number of 1,800 or 2,000 men, early in 1867, and surrounded a party of soldiers who were out cutting wood a short distance from the Fort. They killed all of them, and afterward mutilated their bodies in a shocking manner. There is no doubt that good paying gold mines can be found on many of the streams rising in the Big Horn mountains and flowing north; but whether they are sufficiently rich and extensive to allure miners in numbers great enough to repel the Indians is a question that is not yet determined. If authentic news ever comes in of a good and permanent field being found, enough miners will pour in there from Sweetwater and Montana to give a good account of the Sioux, and relieve the government of much annoyance......Commenting on the trade of Cheyenne, the same paper remarks: "The number of merchants and capitalists who have congregated at Cheyenne is already equal that of any city this side of the Missouri, and every day adds to the number of those who settle permanently in the new mercantile centre of the west. Week after week the lines of houses increase in length, and large warehouses and stores usurp the place of the unpretending rough board buildings that served the exigency of the hour .....First in importance is the trade with what is known as the Sweetwater mining region. It can be safely set down that not less than 20,000 persons will inhabit that country during the summer, and who will undoubtedly draw four-fifths of their supplies from our wholesale houses. This trade has already commenced, and from this time will grow rapidly in importance. The reports from this country will be looked forward to with the utmost eagerness as having a direct bearing on the business of the city. For ourselves, we are confident that its mineral wealth has not been over-estimated, and that the perseverance and energy of the miner and pioneer brought to bear on it will soon demonstrate practically its value."......For the benefit of those persons who are eager to set out for the Sweetwater mines, we give the prices current there for articles of food, wear, tools, etc., as published in the *Sweetwater Mines* of the 14th ult.: Flour per 100 pounds, $30; bacon, pork, and ham per pound, $1; beef, scarce, per pound, 25c.; sugar per pound, $1; coffee per pound, 75c.; tea per pound, $4; beans per pound, 30c.; potatoes per pound, 25c.; syrup per gallon, $7; soap per pound, 75c.; candles per pound, 75c.; nails per pound, $1; tobacco per pound, $4; whiskey per gallon, $20, and scarce; picks, with handles, $9; shovels, each, $7; steel per pound, $2; blasting-powder per pound, $2; boots, long legs, per pair, $20; blankets per pair, $20. There should be no doubt about the mines that are required to sustain these prices.

Idaho.

Advices to March 28 are that the Ida Elmore and Golden Chariot company's Owyhee district is strongly fortified. In the mines several collisions had occurred under ground, which had resulted in the killing of J. C. Holgate of the Golden Chariot and Frank Meyer, of the Ida Elmore. A number of others have been wounded. It is expected the fighting will soon commence above ground. The parties number 50 well armed men on each side......The Owyhee *Avalanche* of March 21 says: A large number of well-armed men are in both mines, well fortified and closely watching each other. Occasional shots are exchanged, and on Thursday night, we are informed, as many as one hundred and fifty shots were fired. Although, so far as we have heard, no one has been seriously injured, so well are the stopes and passages barricaded. Work is going on briskly in both mines, and a crisis is expected soon. It appears that the Ida Elmore company are now running a drift on the ledge, below the works of the Golden Chariot company, who are sinking down to intercept them, which is expected to take place at any time, when bloody work will be likely to ensue. The community are watching the affair with breathless interest, dreading, every day, that some fearful tragedy will occur....We visited the Potosi this week. Found every body busy and highly elated with the richness of the mine. In the main tunnel, eighty feet from the mouth, a shaft is down fifty-four feet from the bottom of which a drift has been run north sixty feet. In this drift is where the recent rich strike was made. The ledge varies in width from fourteen inches to two feet. Stoping is going on between the upper and lower drifts, and ore of immense richness is being taken out, richer than was ever before found in the mine. On the dump we noticed about twenty tons of quartz, that if properly worked, should turn out quite a snug little fortune in itself. The ore contains considerable gold, but is chiefly remarkable for its richness in silver, in the form of black sulphurets. In some of it, also, can be seen pure native silver, and in some instances beautifully crystalized. Judging from the manner in which the mine has improved from the surface downwards, it is evident that by sinking on the ledge in the lower drift it would be found to increase in width and richness. No mine in Owyhee possesses better or more convenient facilities for working. Situated, as it were, almost in town, quartz can be hauled therefrom the year round. Starting on a level with the creek in Long gulch, a tunnel can be run in, on the ledge, which would effectually drain the mine, and give unmitigated scope for working .....A correspondent of the Montana *Post* writes from Salmon City, Feb. 20, as follows: The North Fork mines bid fair to be the banner camp in this section. The bars opened last fall are very extensive and paid good wages. The miners who are there do not claim a second Alder gulch, but good paying mines; extensive enough to work twenty-five hundred men. Some good bars were discovered by Capt. Smith & Co., and successfully worked, below the mouth of North Fork on main Salmon. The miners in the vicinity of Leesburg are more sanguine than ever of the richness of certain portions of their camps. Beers & Co. have run up their bed rock flume about 700 feet; they are in the bed rock now and about 30 feet from the surface. The company has spent $15,000 on their works. They are very sanguine and full of golden dreams. Ben Heath & Co. have worked all winter, running part of the time night and day. Dr. Price and many others have been working extensively on their grounds during the winter. The Leesburg mines will be lively in the spring. Already companies are trying to engage hands for next summer, but meet with poor success. Nearly every one in the mines has ground of his own to work. Nearly all of those who had not good paying ground and many that had, went off in the excitement that raged here and in the mines last fall about Cheyenne, Green River and Sweetwater. We should have at least one thousand more men to work the Leesburg mines next summer. Lemhi valley wants more farmers. Last year the grasshoppers came early and took nearly everything eatable. The valley is one of the most fertile in the west. Grain and vegetables of all kinds mature well. The destructions of crops by grasshoppers last year caused many men to abandon good farms, fearing the grasshoppers would revisit the valley this summer.

Arizona.

From the Prescott *Miner* of the 7th ult., we condense the following items of mining news: Joseph Young left Prescott on Monday last for Philadelphia, with the hope of getting aid to work his "Chance" silver lode......J. B. Slack intends, as soon as the weather moderates, to commence work upon the Gross, in anticipation of the running of the Bully Bueno mill, which it is expected will be set to work in May or June......John A. Rush has gone to the Ticonderoga mill, which he will start up, on rock from the Dividend lode .....Wertenbarg & Smith are crushing rich rock at their little mill, and getting big pay......Since our last account of operations at the Sterling mine and mill, 15 tons of rock have been crushed and manipulated, eleven tons of which were taken as it came out of the lode, without being assorted, and four tons of refuse rock. The yield was about $40 to the ton. The mill is now running, and if everything works well, a big result may be looked for.....Excellent rock is now being drifted out of the Chase lode .....The news from the Placer mines is good. Nearly all the miners are making good wages.

New Mexico.

The Santa Fe *Gazette*, March 28, says: "Mr. Bullard, a California Miner, returned by last night's coach from Socorro. He had been to the Magdalena mountains, in that county, examining the John D. Perry and Magdalena lodes of the Rio Grande mining company and parts adjacent, and says that the lay of the country, timber, rocks and surroundings are very similar to those of the celebrated Washoe Silver region. He is especially impressed with the prospect of the John D. Perry Lode, and thinks that in richness of silver it will rival, if not excel, Washoe."

Canada.

The Belleville correspondent of the *Monetary Times* writes as follows concerning the Empire Mine: "When the mill was set agoing at Eldorado, the then owners of the mine sent a ton of ore to Messrs. Daniels & Co. for reduction, and got the gratifying return of $21 per ton in gold. Encouraged by this they sent fourteen tons to the same establishment, but to their dismay, found the return this time was only at the rate of $2 per ton. What was to be done? Such a return would damage irretrievably both the mine and the mill! A consultation was held and it was agreed that the proprietors of the mine should procure a sufficient quantity of gold to make up about $20 to the ton, and that D. S. T. & Co. should stamp the same and enter that amount in their returns. The secret was kept for some time, and the mine was sold to certain parties in Belleville; but some misunderstanding having occurred among the parties concerned, the piece of petty rascality which had been perpetrated came to light, amid their mutual recriminations. Just at this time too, came the letters from Dr. Hunt, completely confirming the previous assay, and showing that, under proper management, the mine was likely to turn out an exceedingly rich and profitable concern; so that the perpetrators had the satisfaction of reflecting, that their imposture was as needless as it was criminal."...... Under date Belleville, March 30th, the same correspondent writes that the a new amalgamating apparatus for the Richardson Mine has been completed, and is now in course of erection." Mr. Barries's machinery has also been forwarded to its destination in the township of Denbigh, where the indications of the precious metals are said to be very good. The boiler for the Anglo Saxon company's mill has also arrived at Eldorado, and their machinery will soon be in motion. The Belleville Richardson Company have been making some preliminary explorations on their share of the "twenty acres;" and Mr. Anstee has commenced to sink shafts on the portion allotted to Messrs. Lombard and Hardin. Two tons of rock from the Rose Mine are certified by the Secretary of the Eldorado works to have yielded 18 dwts. 27 grs. gold, i. e., $9.50 per ton. Eighteen tons of rock from the Moira Mine, 19th lot, in the 5th concession of Madoc, were operated upon last week at the mill lately owned by Messrs. Turley & Gilbert, and produced 13 oz. 13 dwt. 14 grs., retorted from strained amalgam, to which is to be added 15 dwt. 9 grs. obtained by retorting the mercury, by which it was held in solution, so that the whole will be 14 oz. 8 dwt. 23 grs. which will lose somewhat in refining, but which is worth about $260, or $15 per ton nearly. Increased activity is evident in every branch of the mining business, either in actual work or in preparation. A considerable influx of strangers is now taking place, and should the present appearance of an early spring fulfil its promise, we may expect a busy season throughout the region.

New Zealand.

A correspondent writes from Wellington: Sir George Grey, our late Governor, has discovered rich gold-bearing quartz on the Island of Kawau, and has sent specimens to Auckland. His Excellency is still at the island, and the proposed time for his departure for England is unknown. The new gold fields at Caledonian Terrace are doing very well. A new lead has been opened. The population of the place is rapidly increasing, and now reaches 400 or 500. The district, indeed, promises such a large yield that the town of Westport is improving so greatly that within no distant time it will probably be *the* port of the western coast. Some excellent coal fields at the Bay of Islands are also being successfully worked, and large quantities of coal have already been shipped to this and other New Zealand ports.

COAL, IRON, OIL, ETC.

Pennsylvania.

Mr. Michael Kenney, the owner of a property on Little Mountain, about one mile east of Orwigsburg, informs us, says the *Pottsville Standard* of the 11th inst., that he has discovered, and is now opening a vein of hematite iron ore, which is pronounced by those who have examined it, to be of good quality and rich in iron. The vein has only been opened to a depth of some ten feet, and shows a thickness of four and a half feet, with the top and bottom slates as regularly and clearly defined as in the coal veins. On the adjoining property, owned by Mr. Patrick Herbert, veins ranging from five to twenty feet have been discovered .....The Scranton *Journal* of the same date says the strikers still hold out to the number of four hundred and that the prospects of an early settlement of the existing differences are very slim .....An explosion of fire-damp occurred at Taylor's shaft, located at Taylor's mill, three miles below Scranton, and owned by the Steuben coal company, which resulted in severely injuring several persons who injudiciously entered the mine with an open lamp .....The Pittsburg *Commercial*, April 10, says: The coal-miners lately employed in the various mines along the Monongahela and Youghiogheny rivers, who have been on a strike for the past three months, have agreed with the pit-owners to accept three and one-half cents per bushel for digging, and yesterday went to work, and all the works on the Monongahela valley will be in operation before the end of the week. The season for full mining operations is, however, near at a close—but some six weeks more remaining, when low water will materially interfere with loading barges, and end shipments to lower ports, with the exception, perhaps, of a small run out in June. In this strike the coal-miners lose much and the pit-owners but little, while each coal-miner could have had his $3.50 per day, or some $90 per month, or nearly $300 for the three months of the strike, he received not a cent. The pit owners have large capital invested in boats, and in the mines and their appurtenances, but the scarcity of coal in lower ports has raised prices to such a height that, for all that can be mined and sent out between now and the June rise, they will be paid nearly, if not fully, as well as if the works had been in operation during the three months past. The pit-owners have an immense number of empty barges on hand, and will no doubt avail themselves of employing all the diggers their mines will accommodate, so as to be ready for the first rise. The resumption of mining operations will, within a short time, set afloat a large amount of money now idle, and will besides relieve the distressing wants of hundreds of families which have been impoverished by this unfruitful strike....It is stated that the Glendon Iron company have secured leases on a number of tracts of land in Williams township, and will at once develop it. From the preparations which are being made by the different iron companies in the Lehigh valley, it would seem as if the iron trade was looming up briskly......The Catasauqua manufacturing company have leased the East Penn rolling mill, at Bethlehem, Pa., and will put it in operation without delay. This will give employment to a large number of men, who have been idle a large part of the past winter......The Northampton iron company's new furnaces at South Bethlehem, Pa., will be put in blast in a few weeks......The Thomas iron company has increased its capital to $1,000,000......The two furnaces of the Westerman iron company, at Sharon, Pa., turned out during the four weeks commencing January 12, and closing February 8, 1,681 tons and 900 pounds of pig iron, being an average yield per day of a little over thirty tons each .....The new furnace erected at Alburtis, Pa., by the Thomas iron company, was put in blast week before last, and also the Hellertown iron works new furnace.

Michigan.

We have no news from the Lake Superior furnaces save what we glean from the Negaunee *News* of the 12th inst., which has the following items: In the past two weeks the Pioneer furnace made 254 tons of iron, with 101 bushels of coal per ton. The repairs on No. 2 stack nearly completed.....The hoisting machinery of the Lake Superior mine is being put up as fast as possible, and will be ready for use in a short time......The new pump for pumping the main shaft is completed and in working order......The Jackson has been shipping ore from the main tunnel for a week or two past .....The New England mine has about 8,000 tons of ore in the stock piles, ready for shipment. Operations here are now confined entirely to the new openings of hematite discovered last fall, and which seems to be inexhaustible. But a small force has been worked here since December, principally on account of the great cost of hauling the ore to the railway, a distance of about a mile. About 100 tons per day is now taken out of the two new openings. In the spring a railway track is to be constructed from its present terminus through the ravine to the deposite of hematite, and as soon as this is completed the ore will be raised from the cuts and dumped into the cars, doing away entirely with the wear and tear of horse-flesh.

Alabama.

The Elyton *Herald* says that the coal deposits through Jefferson, Walker, Fayetta, Tuscaloosa, and St. Clair counties are inexhaustible and unsurpassed in extent. "We have now on our table," it continues, "a specimen from the noted coal-bed of Calvary Williams, lying twenty miles west of Elyton, immediately on the Warrior river, which approximates nearer to the celebrated English Channel coal than any we have heretofore examined, on account of its purity and freedom from shale, iron, or sulphur. The great fluency with which it burns when ignited is unusual, and its cleanliness is attested by the fact that a lump of it may be carried in a white handkerchief without in the least soiling it."

Wisconsin.

The "Deep clay diggings" of the Shullsburg lead mining region comprise the east half of Section nine and west half section of Section ten, being on the west side and contiguous to the village of Shullsburg. These mines were first discovered in 1828, says the *Advertiser* published at that place. During the years 1828 and '29 new discoveries were made and a large amount of lead ores wa raised. The "Black Hawk War" caused a suspension of operations for several years, and after its close the low price of lead not justifying the working of these mines, nothing further was done until the summer of 1844. In the years 1846 and '47, there were over five hundred men working on the one mile square that constituted the deep clay diggings. The Mexican war drew off many of the wild and restless spirits that were mining here; and when the California fever broke out, it became nearly deserted, and there has been but little work done here since. All the ore raised here was above water, being only float or surface mineral, as it is called. Surveys on this ground show that there could be over one hundred feet of water drained off by opening an adit into it; and that the work could be executed with comparatively small cost. There have been over forty million pounds of lead ore raised on this piece of ground; and if the same principle holds good here, that has proved true in other parts of the lead mines, that the largest deposits of ore are beneath the water level, there is untold wealth in this piece of ground. When the land came into market, the most of the deep clay diggings was purchased by Hon. A. A. Townsend, by whom it is now owned.

California.

From a San Francisco paper of the 10th ult. we learn that the new lead smelting works of Messrs. Selby & Co., in that city, are nearly completed, and will probably be in operation in three weeks. The buildings are finished, the furnaces and the tall chimney, eighty feet in height, are erected, and now workmen are engaged in putting the machinery required into proper position. On the wharf there lies packed up a large number of sacks of galena, from Mexico. This ore, which is found in large masses at the place where it is procured, is very pure, with the exception that it is rich in silver. The amount of silver contained in this ore, it is said, is sufficient to pay for the expense of transportation to San Francisco from the mine.

MARKET REVIEW.

FRIDAY EVENING, April 17, 1868.

Gold and Silver Stocks.—The market is very weak, and prices rule considerably lower. Manhattan Silver is now offered at $165; Combination Silver at $55, and Twin River at $70, a falling off in each of $5 since our last report. Colorado stocks are likewise affected by the apathy of the market. Consolidated Gregory has declined to $2 60, and Smith & Parmelee to $2 05; Sensenderfer, however, is still held at $7. Owyhee Mining remains firm at last week's quotations. Prices are thus given at the board:

	Bid.	Asked.		Bid.	Asked.
Alameda Silver	70	1 00	Keystone Silver	— —	— —
American Flag	— 45	62	La Crosse Gold	— 45	46
Atlantic and Pacific	— —	1 00	Liberty Gold	— —	3
Bates & Baxter Gold	— —	— 40	Manhattan Silver	— —	165 00
Benton Gold	— 20	— 35	Midas Silver	— 30	70
Black Hawk G	4 00	6 00	Montana Gold	— 35	— 60
Bobtail Gold	1 15	1 50	New York	— 50	59
Bullion Consolidated	— 10	— 75	New York & Eld'o	— —	1 75
Columbian G. & S.	— —	— 6	Nye Gold	— —	3
Combination Silver	— —	55 00	Owyhee Mining	17 00	— —
Consolidated Gregory	2 60	2 70	Ophir Gold	— —	— —
Corydon Gold	— 27	— 32	People's G. & S. of Cal	— 5	20
Engebill Mining	— —	3 00	Quartz Hill	— 83	— 85
Gold Hill	— —	1 00	Reynolds Gold	— —	— 4
Gunnell Gold	— 80	1 00	Rocky Mountain Gold	— 12	— 15
Gunnell Union	— —	45	Smith & Parmelee Gold	2 05	2 10
H'n G & S. bs	— —	83	Sensenderfer	— —	7 00
Harmon G. & S. bs	— —	3 00	Symonds Fork Gold	— —	1 00
Holman	— 4	19	Texas Gold	— 6	— 12
Hope Gold	— 5	20	Twin Riv Sil.	— —	70 00
Kipp & Buell Gold	— 5	20	Vanderburg G	— —	— 75

Copper Stocks are quoted as follows:

	Bid.	Asked.		Bid.	Asked.
Caledonia C	— —	10 00	Hilton	— —	1 00
Canada	— —	— 50	Knowlton	— —	2 00
Davidson	30	35	Ogima	3 00	5 00
Gardiner Hill	— —	1 00	Rockland	....	4 00

Petroleum Stocks.—Buchanan Farm now sells at 40. Quotations range:

	Bid.	Ask'd.		Bid.	Ask'd.
Bennehoff Run	1 00	1 75	N. Y. and Allegheny	....	2 75
Brevoort	....	35	Pit Hole Creek	.. .	75
Buchanan Farm	38	40	Rathbone Oil Tract Co.	....	....
Central	40	55	Rynd Farm	6	12
Clinton Oil	75	1 10	United Pet. Farms	....	12
Manhattan	....	5	United States	1 45	1 80
National	1 00	3 00	Union	2 50	....

Miscellaneous Stocks.—Cumberland Coal, pref. is quoted, to-day, at 29@29¾; Central, 40c.; Wells, Fargo & Co., 27; American, 57c; Adams, 59½; United States, 59; Merchants' Union, 31; Quicksilver, 26½; Pacific Mail, 89⅝; Atlantic Mail, 26; Western Union Telegraph, 35⅞; New York Central, 111¼; Erie, 66¾; Erie, pref., 70; Hudson River, 124¾; Reading, 86⅞.

Government Stocks are steady and holders are quite firm. Quotations range:

U. S. 6s, 1881, coupon	112 @112¼
U. S. 5-20s, 1862, reg	103⅞@104
U. S. 5-20s, 1862, coupon	110¾@111
U. S. 5-20s, 1864, coupon	109 @109½
U. S. 5-20s, 1865, coupon	109¼@109⅜
U. S. 5-20s, July, 1865, coupon	107½@107¾
U. S. 5-20s, July, 1867, coupon	107¾@107⅞
U. S. 10-40s, coupon	101¾@101⅞
U. S. 7-30s, June, large	106 @106⅛
U. S. 7-30s, July, large	106 @106⅛

Foreign Exchange is firm. Leading drawers this morning put their rate for 60 days' sterling to 110⅛, which, however, is above actual transactions fully ⅛ per cent. We quote:

London, (prime bankers') 60 days'	109⅞@110⅛
London, (prime bankers') sight	110¼@110⅜
London, prime commercial	— —
Paris, (bankers') long	5.13¾@ 5.12½
Paris, (bankers') short	5.10⅝@5.10
Antwerp	5.16¼@5.15
Swiss	5.16¼@5.15
Hamburg (bankers')	36⅛@36¼
Amsterdam (bankers')	41⅛@41¼
Frankfort (bankers')	41 @41⅛
Bremen (bankers')	79⅝@79¾
Berlin (bankers')	71⅞@72

Gold is firm. The price opened at 138⅛ and rose to 138⅝. Gold is loaned at 12 per cent.

American silver sells slowly at 6¼@7¼c. below the price of gold. Mexican dollars are quoted at 103@103½ in gold.

The money market exhibits an extreme stringency. Among private bankers the rate is generally 7 per cent, in gold, and on stock transactions differences of ⅛a¼ per cent. per day have been quite common. The banks are poor, and pending the uncertainty as to the course of the stock market, are naturally cautious respecting collaterals.

The discount market continues heavy, and rates high, prime paper being current at 8@10 per cent.

The following will show the exports of specie from the port of New York for the week ending April 11, 1868:

April 7—Steamer Cimbria, Hamburg—	
Foreign silver	$ 1,000
American gold	5,000
April 8—Steamer China, Liverpool—	
Gold bars	190,112
April 9—Steamer Eagle, Havana—	
Spanish gold	531,970
French gold	62,500
Specie	5,550
Spanish doubloons	51,664
April 9—Steamer Hansa, Paris—	
Mexican Silver	21,000
For London—Mexican silver	21,821
For Liverpool—Mexican silver	915
April 9—Schooner J. Warren, St. Johns, P. R.—	
American silver	325
Total for the week	891,807
Previously reported	16,005,451
Total since January 1, 1868	$16,897,258
Same time in 1867	7,080,022

The steamer Oregonian sailed from San Francisco for Panama, with $303,000 in treasure, on the 26th ult.

Messrs. Platt & Newton's San Francisco Circular, of March 16, remarks:

"Our money market exhibits a slightly improved activity. The demand from the country is somewhat greater, but not enough so, to create any marked effect. Deposits are steadily increasing in all our monetary receptacles, and rates remain unchanged, being 1 per cent. per month for call loans, and 10@12 per cent. per annum, for long periods. Gold bars are scarce at 910@915. Silver bars are selling from par to ½ per cent. premium. Currency bills at Atlantic cities are obtainable at 37@38 per cent. premium on gold. Sight drafts, payable in coin, ¾ per cent. premium. Telegraphic transfers, 1½ per cent. premium. Sterling exchange, 48¾d.; commercial do., 49¼@49½d. Mexican dollars, 4½@5 per cent. premium.

"The shipments of treasure from March 1 to date, have been as follows:

March 5, per Nevada, to New York	$374,000 00	
To England	100,009 00	
		474,009 67
March 7, per Great Republic, to Hong Kong	$286,059 47	
To Shanghae	6,000 00	292,159 47
March 10, per Constitution, to New York	$124,153 17	
To England	190,112 00	
To France	32,744 90	
To Panama	15,000 00	
		362,008 07
March 14, per Nellie Abbott to Hong Kong		93,847 25
Total since March 1, 1868		$1,222,024 46
Previously this year		6,268,392 93
Total since January 1, 1868		$7,490,417 39
Corresponding period of 1867		8,105,316 38
Decrease this year		$614,898 99

The following is a statement of the public debt of the United States on the 1st of April, 1868, compared with the preceding statement;

DEBT BEARING COIN INTEREST.	March 1, 1868.	April 1, 1868.
Five per cent. bonds	$212,784,400 00	214,464,450 00
Six per cent. bonds, 1867, 1868	9,378,191 80	8,903,641 80
Six per cent. bonds of 1881	283,076,600 00	283,676,150 00
Six per cent. 5-20 bonds	1,407,321,800 00	1,424,405,600 20
Navy pension fund	13,000,000 00	13,000,000 00
Total	$1,926,150,991 80	$1,944,440,841 80

DEBT BEARING CURRENCY INTEREST.	March 1.	April 1.
Six per cent. bonds	$22,470,000 00	$23,583,000 00
3-year compound interest notes	46,244,780 00	46,010,530 00
3-year seven-thirties	202,951,100 00	185,884,100 00
3 per cent. certificates	25,585,000 00	26,290,000 00
Total	$297,250,880,00	$281,766,630 00

MATURED DEBT NOT PRESENTED FOR PAYMENT.	March 1.	April 1.
3-year 7-30 notes, due Aug. 15, 1867	$1,519,600 00	$1,303,550 00
Compound interest notes, matured June 10, July 15, Aug. 15, and Dec. 15, 1867	6,163,000 00	5,393,000 00
Bonds (Texas Indemnity)	256,000 00	256,000 00
Treasury notes, (Acts July 17, 1861, and prior thereto)	159,661 64	158,611 64
Bonds, April 15, 1842	6,000 00	6,000 00
Treasury notes, March 3, 1863	616,192 00	616,192 00
Temporary Loan	1,890,700 00	1,284,006 00
Certificate of Indebtedness	19,000 00	19,000 00
Total	$10,630,153 64	$9,036,383 64

DEBT BEARING NO INTEREST.	March 1.	April 1.
United States Notes	$353,157,747 00	$356,144,727 00
Fractional Currency	32,307,047 51	32,588,689 94
Gold Certificates	26,699,360 00	17,742,060 00
Total	414,165,054 51	$406,475,476 94
Total debt	$2,648,207,079 95	$2,641,719,332 38

AMOUNT IN THE TREASURY.	March 1.	April 1.
Coin on hand	$106,623,374 75	$99,279,617 68
Currency on hand	21,754,082 36	23,930,027 34
Total cash in Treasury	$128,377,457 11	$122,509,645 02
Net debt	$2,519,829,622 89	$2,519,209,567 36

The foregoing is a correct statement of the public debt, as appears from the books and Treasurer's returns in the department on the 1st of April, 1868.

HUGH McCULLOGH, Secretary of the Treasury.

By comparing the above with the public debt statement issued on the 1st of March, it is shown that the amount of debt less cash in the Treasury has decreased during the month $619,935 48. The amount of coin in Treasury decreased $7,343,757. The amount of currency shows an increase of $1,745,945. The debt-bearing coin interest has increased $18,279,850. The debt-bearing currency interest decreased $15,484,250. Matured debt not presented for payment has decreased $1,593,770. The debt bearing no interest shows a decrease of $7,689,578, and the total debt has decreased $6,487,747.

Copper has been in good demand and the sales of the week amount to 1,200,000 lbs., at 22⅝@22¾c. for Baltimore, 23c. for Portage Lake, and 23@23¼ for Detroit; 5 to 600,000 lbs. Detroit has been taken for export to France. In spite of the large sales there is no improvement in prices, and to-day's quotations are the same as above. The English market was firm at £73 10s.@£74 for Chili pig.

Tin.—The market is quiet without large transactions. Straits is quoted 24c.; Banca 27½c.; English, 29½c., all gold.

Spelter.—6½c. gold for Silesian, with sales of 50 to 75 tons in lots.

Lead.—Ordinary foreign is quoted 6⅜@6½c. gold; 100 tons best English sold at $6 70@6 75.

Pig Iron is dull. Scotch has been sold at $41 for 250 tons Gartsherrie. Glengarnock is quoted at $40. American No. 1 is held at $39.

Zinc.—The stocks of Mosselmann and Lehigh, especially the latter, are very light, and Lehigh is firm at 11¾c. currency, which is an improvement. Oxide of zinc is not subject to much fluctuation.

X Extra, in 5 ton lots, is	7½c. currency.
XX " "	8½c. "
XXX " "	8¾c. "

The French Zinc white is 9c. gold.

Antimony.—Quiet, at 16c. currency.

Bismuth.—Held at $4 gold, best quality.

Nickle.—$1 25@2 00, gold.

Quicksilver.—85c. to 90c per lb.

Petroleum.—Is quiet and firm at 12c. for Crude, and 25¾c. for Refined, in bond.

Receipts for the week ending April 14	pkgs.	17,221
Exports for the week	galls.	460,451
Do. from Jan. 1st	do.	11,182,441
Do. same time last year	do.	7,726,665

The following is the quantity exported from other ports, Jan. 1 to April 11:

	1868.	1867.
From Boston, galls.	594,793	513,966
Philadelphia	6,313,173	4,127,125
Baltimore	373,991	417,578
Portland	6,900	....
Total	7,288,757	5,058,660
Total export from the United States	18,629,082	12,256,733
Same time 1866		13,856,899
Same time 1865		3,061,882

THE IRON TRADE.

The market for both American and Scotch pig, is a shade weaker; but prices continue steady with a moderate business. Among the sales we notice 250 tons of Gartsherrie at $41; 100 do. Coltness, $42, both ex-ship; and 100 do. American (Thomas), for immediate delivery, $38; Eglinton is held at $39, ex-ship. For English Rails, large orders have gone forward of late for future delivery, say 20,000 tons, to be laid down here at a cost of about $51@52, gold. We notice besides, 250 tons No 1, Wrought Scrap, part extra, at $49 50, from yard—$48@49 is a fair quotation; 600 packs Russia Sheet, 11⅞.. gold; and 250 do., on terms not transpired. Bar, from store, is dull.

Steel—Business continues moderate at prices within our range.

BOSTON, April 15, 1868.

The market continues quiet for pig iron, but prices remain the same. The sales of Scotch, Gartsherrie, and other brands, No. 1, have been at $42@45; and American, No. 1, at $40@45 per ton. In Bar iron the sales have been at full prices in lots as wanted. Russia Sheet iron is firm at 12c. gold.

Boston Imports of Pig Iron from January 1 to April 11, 1868.

	1868.	1867.
From Great Britain, tons	1,573	11,127
Coastwise Ports	3,264	2,456

Lehigh Valley Iron Trade.

The following table shows the amount of Pig Iron transported over the Lehigh Valley Railroad for the week ending April 11, 1868, and for the season to that date.

From	Tons.	Total
Carbon Iron Co	70	3,145
Lehigh Valley Iron Co	190	3,210
Thomas Iron Co	570	8,685
Lehigh Crane Iron Co	600	6,150
Allentown Iron Co	350	2,875
Robert Iron Co	195	3,095
Glendon Iron Co	630	7,310
Other shippers	190	2,992
Total	2,795	37,462

Market Prices.

NEW YORK, April 17, 1868.

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

Anthracite, No. 1, best	$39 00@40 00		Swed'h I'n, ord'y sizes	150 00
" " 2x, fdry	37 00	38 00	Swedish Iron.	
" Grey Forge	32 00	35 00	1½x¾ to ⅝ and ⅞ to 2 in sq	155 00
Scotch Pig, from yard	41 00	42 00	1¼x⅜ to ⅝x⅞ "	160 00
Charcoal, coal blast	50 00	60 00	6 to 12x⅜ to 5-8	165 50
Old Wrought sc'p, fm yd.	47 50	— —	Common Iron	
" " " fm. vsl.	46 00	— —	¾ to 2 in. round and sq.	....
English rails, gold	52 00	53 00	Refined Iron.	
American " at works.	78 00	80 00	¾ to 2 in. r'd and sq.	95 00
American Bar Iron.			1 to 6 in. wide x ⅜ to 1 th.	90 00
Common, cash per ton	80 00	85 00	3¼ and 3½, round and sq.	105 00
Refined, " "	85 00	87 50	Rods—5-8 and 11-16, round & sq., per ton	100 00
Old Railroad Iron	46 00@....		½ and 9-16 round & square.	105 50

RETAIL PRICES.

Hoops, ⅝ per ton	$190 00	7-16, round and square	115 00
" ¾ "	160 00	⅜, " "	120 00
" ⅞ "	150 00	5-16, " "	125 00
" 1 "	140 00	¼, " "	130 00
" 1⅛ "	137 50	3-16, " "	160 00
" 1¼ to 2 per ton	137 50	Horse Shoe Iron	125 00
Scroll Iron—⅝x14..per ton	180 00	Band—1 to 6 in. x 3-16 to No. 12	130 00
" 12 "	170 00	Ovals and half Rounds.	
" 10 "	160 00	⅜ to 1⅛	120 00
" 3-16 "	150 00	⅜ & 11-16,	125 00
" ⅛ "	140 00	½ & 9-16	130 00
" ¾x14 "	160 00	Nail Rods, per lb.	
" 12 "	160 00	"	9@10
" 10 "	150 00	Norway Shapes	8¾c
" 3-16 "	140 00	Spring Steel	—@ 9¾
" ⅛ "	135 00	Tire " ⅞ to ¼x¾ & 5-16	10¼c
" ⅞x14 "	150 00	Toe Cork Steel	10¼c
" 12 "	150 00	Sleigh Shoe Steel	10¼c
" 10 "	140 00	Plow Steel—6 to 14x¼ to ⅜	10c
" 3-16 "	135 00		
" ⅛ "	132 50		

STEEL.

English, cast (2d and 1st quality) per lb	18	@23
English Spring (2d and 1st quality)	10	@12½
English Blister (2d and 1st quality)	11½	20
English Machinery	13½	16
English German (2d and 1st quality)	14	16
American Blister, "Black Diamond,"	11½	17
American, Cast, Tool " "	21	22
American, Spring " "	10	13
American, Machinery " "	—	14
American German " "	10	13

PHILADELPHIA, April 15, 1868.

The market for pig-iron is not active. Bars are firm.

Anthracite Pig, No. 1	$38 00@	$39 00
" " No. 2	35 00	36 00
Gray Forge	33 00	34 00
Charcoal Wheel	48 00	50 00
" Blooms	90 00	95 00
Scotch Pig (by the cargo)	41 00	43 00
Railroad Bars (American)	78 00	80 00
Refined Bar	85 00	90 00
Common Bar	75 00	80 00
Band Iron, 1½ to 6	110 00	120 00
" 12 to 3-16	....	....
Hoop Iron, 1 and upwards	135 00	....
" " ⅞	140 00	....
" " ¾	150 00	....
" " ⅝	175 00	....
" " ½	200 00	....
Nails and Spikes	5 25	....
" 4d	5 75	....
" 3d	6 75	....
" 3d, fine	8 25	....
Boiler Rivets	7½ pr. lb	
Railroad Spikes	5@6c. "	

PITTSBURG, April 11, 1868.

PIG IRON AND BLOOMS.

The market for raw irons, says the *Commercial*, has been quite inactive throughout the week. Several causes conspired to effect this result, not the least of which was the extreme stringency of the money market, inducing increased caution on the part of the consumers. Although our report is but partial (for reasons similar to those assigned last week) the aggregate of sales was less perhaps than during any previous week for a month past.

Stocks, however, do not seem to accumulate. Good makes of standard forge irons are firmly held, but inferior grades are less firm, and to effect sales of magnitude, concessions would be required on rates current a fortnight since.

We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

400 tons Open Grey, deliverable at furnace	$36 00—4 mos.
200 tons do at furnace	35 00—4 mos.
100 tons medium, to arrive	35 00—30 days.
200 tons open Grey, from yard	38 00—6 mos.
100 tons medium, deliverable at furnace	35 50—4 mos.
300 tons inferior, deliverable at furnace	30 00—cash.
150 tons do do do	30 00—cash.
200 tons do do do	30 00—cash.
25 tons do do do	37 75—4 mos.

CHARCOAL.

50 tons extra No. 1, Forge	$48 00—4 mos.
100 tons extra No. 1, Foundry, H R.	48 00—4 mos.
100 tons No. 1, Foundry	45 00—time.
50 tons No. 1, Foundry	45 00—time.
20 tons No. 1, Foundry	64 00—time.
50 tons hot blast Hanging Rock	46 00—4 mos.

ANTHRACITE.

100 tons Open Grey, Grey Forge	$38 00—5 mos.
45 tons Open Grey, Grey Forge	38 00—4 mos.
5 tons No. 1, Foundry	44 00—4 mos.
50 tons mottled	35 00—4 mos.
50 tons red short	37 00—4 mos.

BLOOMS.

100 tons Juniata No. 1, blooms	90 00—4 mos
30 tons Juniata No. 1. do	88 00—90 days.
30 tons Carlisle, second quality	79 00—6 mos
30 tons charcoal	90 00—4 mos.

IRONTON, Ohio, April 9, 1868.

Prices, says the *Register*, are firm, with indications of an enlivened trade. Inquiries are on the increase, but they have been attended with unimportant transactions. Holders are sanguine that they will be able to dispose of nearly all the stock on hand this season.

We quote this week:

Mill, hot blast	$38 00@40 00
Foundry, hot blast	40 00@42 00
Cold blast	55 00@60 00

The shipments for the week were 380 tons; receipts, 450 tons.

BAR IRON still remains very dull, with slim prospects of an increased business. Some little is doing, but for nearly all classes of manufactured iron the demand is almost fatally quiet. Rates, 3¾@4½.

NAILS continue in active demand at $5 for 10d.

BOSTON, April 15, 1868

Swedish—common ass'd	$150@155	Scotch Pig, No. 1	
English—com	85 90	Gartsherrie	$43@45
do refined	95 100	No. 1, other brands	42 45
do sheet, per lb	6½@10c.	American, No. 1	40 45
Russia, sheet	16@17c		

LONDON, March 27, 1868.

Bars, Welsh in Lond.	£6 2 6@	.. ....	Do. railway, Wales.	£5 5 0@£5 10 0
Ditto to arrive	6 2 6	.. ....	Do. Swd. in London	10 0 0 10 5 0
Nail rods	6 15 0	7	To arrive	10 0 0 10 5 0
" Stafford in Lond.	7 7 6	8 10 0	Pig, No. 1, in Clyde.	2 13 0 2 18 0
Bars	7 5 0	8 10 0	Do. f.o.b, Tyne, Tees.	2 9 6 .. ....
Hoop	8 5 0	9 10 0	Do. Nos 3, 4, f.o.b. do	2 6 6 2 7 0
Sheets, single	9 0 0	10 0 0	Railway chairs	5 10 0 5 15 0
Pig, No. 1, in Wales.	3 15 0	4 5 0	" spikes	11 00 0 12 0 0
Refined metal, ditto.	4 0 0	5 0 0	Indian Charcoal Pigs	
Bars, common, ditto.	5 7 6	5 10 0	in London, pr. ton,	7 0 0 7 10 0
Do. merch. Tyne or Tees	6 10 0	....		

STEEL.

Swed., kegs (rolled)	.14 5 0	Swed., in faggots	.16 0
" (hammered	.14 15 0 15 00 0	English, spring	.17 0 0 23 .. 0

Iron.—The preliminary meeting of the ironmasters of South Staffordshire and East Worcestershire was held at Birmingham, on Thursday, when it was resolved after a lengthened debate, that the price of bar-iron be reduced to £7 per ton, and that the puddlers' wages be reduced 1s. per ton, and other wages in proportion. The proposition met with a very determined opposition, but, being carried, the dissentients agreed to conform to it. The workmen will receive notice on Saturday. In Welsh, operations at the works are carried on slowly, the mills and furnaces, as has been the case for many months past, being on from one-half to two-thirds time. The opening of the Russian season will, it is believed, stimulate the gradual return of confidence. Home engagements are slightly increasing, and there are indications of a further improvement. It cannot be said that quotations have experienced any actual advance, but prices are stiffening, as compared to what they were three months ago. Another blast furnace is about to be blown in at Ebbw Vale, which will afford employment to a number of additional hands. In Swedish iron there is more animation, and several shipments are now arriving from Sweden. In Scotch pig-iron the market has been steady during the week; and the price has slightly improved to 52s. 10½d. cash.—*Mining Journal.*

San Francisco, Cal., March 18, 1868.

There is a fair inquiry for Pig Iron, with sales in lots of about 500 tons Scotch, chiefly from second hands, in lots, at $40 cash; $41, 30 days, and $42 upon 60 and 90 days. Holders are now asking $42 50.

Scotch and English Pig, tons	42 00	@— —
American White Pig	42 50	45 00
Refined Bar, bad assortment, per lb	— —	— 2
Refined Bar, good assortment, per lb	— —	— 3
Boiler, 1 to 4	— —	— 3½
Plate No. 5 to 0	— —	— 3¼
Sheet, 10 to 13	— —	— 3¾
Sheet, 14 to 20	— —	— 4
Sheet, 24 to 27	— —	— 4

THE COAL TRADE.

New York, April 17, 1868.

No new feature characterized the trade during the past week. Trade has been unaccountably dull for this season of the year. There is no doubt but that coal has touched its lowest point and that dealers who are holding off buying will find themselves mistaken. We learn that most of the miners in the various regions are on a "strike." This fact alone, if it continues any length of time, may enhance the price. We have no news of the Lehigh Canal tolls yet, and think they will not be issued this month. Freights are a little off this week; prices are firm.

The amount of coal exported from the port of New York for the week ending April 14 was:

Exports for the week	tons.	993
" from January 1st	do	13,688
" same time last year	do	15,513
Decrease		1,825

Boston, April 15, 1868.

English Cannel is quiet and prices are nominally $20 per ton. In Pictou the sales have been at $7 50@7 75 per ton; and Sidney is nominally $8@8 25 per ton. Cumberland has been selling at $8 50, and delivered at Georgetown, the price is $4 35, and at Baltimore, at $4 75 per ton. Cargo sales of Anthracite have been made at $6@6 50, and the retail price is $7 50@$8 per ton.

Philadelphia, April 14, 1868.

The market continues dull. We quote Locust Mountain lump and steamboat at $3 50, do. broken, $3 50@3 65; do, egg, $3 90@4 10; stove. $4 00 @4 25; Red Ash, Egg and Stove, $4.10@4 50; Lehigh lump, steamboat and broken, $5 00; do. prepared, $5 00; do. chestnut, $4 25.

The following table exhibits the quantity of Coal passed over the following routes of transportation for the week ending April 11, 1868:

	1867.		1868.		Inc. or Dec.	
	Week.	Year.	Week.	Year.	Week.	Year.
Phil. & Reading R. R.	62,176	729,917	54,936	783,345	d 7,240	i 54,318
Schuylkill Canal	25,819	68,148	32,333	60,149	i 6,514	d 2,001
Lehigh Valley R. R.	34,661	430,691	37,555	675,025	i 2,894	i 244,334
Lehigh Canal	9,658	9,658	5,175	5,175	d 4,482	d 4,482
Scranton North	6,997	98,998	6,423	102,632	d 574	i 3,634
" South	28,190	341,310	24,564	281,994	d 3,626	d 59,316
Del. & Hudson Canal.	43,320	108 605	35,645	35,645	d 7,675	d 72,960
Penn'a Coal Canal	687	687	229	229	d 453	d 453
Shamokin	11,823	109,855	2,602	90 515	d 9,221	d 19,340
Trevorton	497	4,894	363	4,633	i 134	d 261
Short Mountain	65	3,600	1,729	6,381	d 1,664	i 2,781
Lykens Valley C. Co.	1,127	11,387	84	21,882	i 1,043	i 10,495
Broad Top	6 813	57,339	5,410	53,178	d 1,403	d 4,161
W'mstown Col'y, E.	2,280	16,383	4 561	36,674	i 2,280	i 20,291
Total	2,340,013	1,991,472	211.609	2,1 7,457	......	......
	......	......	234.013	1,191 472	......	......
Increase	......	......	d 77,596	165,985	......	......

Schuylkill Coal Trade.

BY RAILROAD AND CANAL, FOR WEEK ENDING APRIL 9, 1868.

	Railroad	Canal.
St. Clair	33,333	......
Port Carbon	6,626	......
Pottsville	864	......
Schuylkill Haven	17,589	....
Auburn	576	......
Port Clinton	4,570	......
Total for week	63,558	23,908
Previously this year	788,345	60,149
Total	846,903	84,057
Same time last year	791,393	93,967
Increase	55,510	d 9,910

Cumberland Coal Trade.

By B. & O. Railroad.—The shipments over the Baltimore and Ohio Railroad, for the week ending April 11, were as follows:

From Cumberland & Pa. R. R., via Cumberland:

Consolidation Company	3,065 08
Borden do.	1,027 04
New Hope do.	......
Midland do.	22 01

From George's Creek via Piedmont.

George's Creek C. & I. Company	1,754 17
Central "	3.493 04
Atlantic "	1,337 18
Piedmont "	1,300 11
American	2,303 01
Swanton "	117 00
Potomac "	1,495 11
George's Creek Mining	46 16
Hampshire	1,953 09
Franklin "	170 17
Savage Mountain "	34 03
Total	18,122 00

From Eckhart Railroad.

C. C. & I Co	1,462 07
Total	19,584 07

By C. & O Canal.—There were despatched from the port of Cumberland, during the last week—the first week of the season—121 boats, laden with 13,503 19 tons of coal, forwarded by the following companies:

American	4.756 18
Borden	1,217 07
Central	3,924 08
C. C. & I	1,088 08
Consolidation	339 12
H. & B.	1,184 08
New Hope	990 18
Total	13,503 19

Shippers.	Railroad. Week. Tons.	Railroad. Total. Tons.	Canal. Week. Tons.	Canal. Total. Tons.	Grand Total.
FROM MAUCH CHUNK.					
Summit Mines	....	....	3,017	3,017	3,017
Total	....	....			
WYOMING REGION.			....	....	....
Franklin Coal Co	....	....	....	....	....
Audenried	....	50	....	....	....
Lehigh & Susqueh'na	....	....	....	....	....
Germania Coal Co.	51	4,638	604	604	13.286
Wilkes Barre C. & I.	....	12,782	128	128	7,113
Warrior Run	1,035	8,201	....	....	....
Parish & Thomas	809	23,148	....	....	....
New Jersey	559	6,985	....	....	....
Union Coal Co.	116	2.432	....	....	....
Wyoming C. & T. Co.	....	3,227	....	....	....
Newport Coal Co.	....	....	....	....	....
Morris & Essex Mut'l	133	1,058	....	....	....
Consumers	....	....	....	....	....
Everhart Coal Co.	....	....	....	....	....
Plymouth Coal Co	....	152	....	....	....
Hillman & Son	315	3,913	....	....	....
Bowkley, Price & Co.	....	149	—	....	....
Mineral Springs	117	5,582	....	....	....
Valley Coal Co.	....	....	....	....	....
Enterprise C'y, J.H.S	798	9,713	....	....	....
G. B. Linderman & Co	....	....	....	....	....
Washington Coal Co.	....	....	....	....	....
West Pittston	....	....	....	....	....
Barclay	....	....	....	....	....
Shawnee	108	2,486	....	....	....
Consumers Coal Co.	131	1,788	....	....	....
Harvey & Bro	92	1,177	....	....	....
Wyoming Valley	197	1,119	....	....	....
Henry Colliery	32	384	....	....	....
New England	88	88	....	....	....
Del. & Hudson C. Co.	11	11	....	....	....
Other Shippers	....	9	858	858	867
Total	4,638	89,100			....
FROM B. M. REGION.					
New York & Lehigh.	2,265	12,533	....	....	....
Honey Brook Coal Co.	847	41,120	91	91	41,211
Ger Pa. Coal Co	1,328	14,775	....	....	....
Spring Mountain	2.008	31,522	...	....	....
Coleraine	1,263	20 380	....	....	....
B. Meadow (D. W.)	....	....	....	....	....
John Connery	....	....	....	....	....
Lehigh Zinc Co	....	....	....	....	....
Spring Brook	....	....	....	....	....
Other Shippers	16	120	....	....	....
Total	7,727	120,450	....	....	....
HAZLETON REGION.					
Central Coal Co.	....	....	....	....	....
Ashburton Coal Co.	....	433	....	....	....
Mt. Pleasant	243	6,315	....	....	....
Hazleton (A. P. & Co)	3 070	75.415	193	193	75,608
East Sugar Loaf	2,125	44,071	....	....	....
Mount Hall	....	219	....	....	....
Latimer (A. P. & Co)	1,144	11,254	....	....	....
Stout Coal Co.	913	9,111	....	....	....
Harleigh Coal Co.	791	18,097	....	....	....
Ebervale Coal Co.	1,242	24,585	....	....	....
Jeddo (G. B. M. & Co)	1,805	42,785	....	....	....
Woodside (J. C. Co.	394	4 998	....	....	....
Highland	861	22,177	188	188	22,365
Cross Creek	341	8 095	....	....	....
Council Ridge	1,662	30 727	94	94	30,821
Buck Mountain	1,637	20,975	....	....	....
Other Shippers	....	....	....	....	....
Total	16,234	319,263	....	....	....
U. LEHIGH REGION.					
U. Lehigh Coal Co.	17	21,733	....	....	....
Other Shippers	....	....	....	....	....
Total	17	21,733	....	....	....
MAHANOY REGION.					
Trenton Coal Co.	....	....	....	....	....
Mount Etna Coal Co.	53	729	....	....	....
Mahanoy Colliery		9,704	....	....	....
Coplay Colliery	875	2,896	....	....	....
Glendon Colliery	382	9,977	....	....	....
Primrose Colliery	...	550	....	....	....
E. S Silliman	1,191	33,650	....	....	....
McNeal Co.	2 992	17,138	....	....	....
Knickerbocker	1,445	18,861	....	....	....
Thomas Coal Co	750	8,400	....	....	....
Williams & Herring	233	3,144	....	....	....
New Boston Coal Co.	297	12,346	....	....	....
Shamokin Coal Co.	....	....	....	....	....
Caledonia M. & M.	708	7,061	....	....	....
Coal f'm Cataw'sa RR	....	....	....	....	....
Other Shippers	....	15	....	....	....
Total	8,938	124,477	....	....	....
Total Mauch Chunk	....	....	3,017	3,017	3,017
Total Mahanoy	8,938	124,477	....	....	124,477
Total Hazleton	16,234	319,263	476	476	319,789
Total Upper Lehigh	17	21.733	....	....	21,733
Total Beaver Meadow	7.727	120,450	91	91	120,451
Total Wyoming	4,638	89,100	1,591	1,591	90,691
Grand Total	37,255	675,025	5,175	5,175	680,200
Same time last year.	34,661	430,691	9,658	9,658	440,348
Increase	2,894	244,334	....	....	....
Decrease	....	....	4,482	4,432	239,852

Prices of Coal by the Cargo.

[Corrected weekly.]

At New York, April 17, 1868

Schuylkill R. A., choice	$6 00@$	....	Lehigh Broken	4 87½	....
" Ordinary	5 75	....	" Egg	48 7½	....
" W. A., Lump	5 00	....	" Stove	5 12½	....
" Steamboat	5 00	....	" Chestnut	4 37½	...
" Broken	5 00	....	Wilkesbarre Lump	5 00	....
" Egg	5 50	....	" B'ken & Egg.	5 50	....
" Stove	5 50	....	" Stove	6 00	....
" Chestnut	4 50	....	" Chestnut	4 75	....
Lehigh W.A. Lump Old Co	5 00	...			

SPECIAL COALS.—Dealers' Quotations.

Diam'd Vein R. A., Sch'kill	6 00	....	Broad Mountain	....	....
Locust Dale W. A., "	5 50	....	Buck Ridge W. A., Sh'kin.	....	....
Honey Brook " Lehigh.	5 50	....	H. Heils, E. F'klin, Lorb.	5 50	....
Harleigh " "	5 50	....	New England Red Ash	5 25	....
Spring M'n " "	5 50	....	Wyoming	5 50	....
Sugar Creek " "	5 50	....	Locust Mount'n (Reppiler)	5 50	....
Ashburton " "	5 50	....	Duncan Red Ash "	6 00	....
Fulton White Ash	....	....			
Stout	....	....			
Old Co.'s " "	5 50	....			
Mt Pleasant	5 00	....			

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

At Philadelphia, April 17, 1868.

Lehigh Lump and St'mb't.	5 00@	....	Schuylkill Chestnut	2.50@2 60	
" Broken and Egg.	5 00	....	Locust Mount Lump and Steamboat	3 50	....
" Stove	5 50	....	" Broken	3 50	3 65
" Chestnut	4 25	..	" Egg	3 90	4 10
Schuylkill R. A. Prepared	4 25	4 50	" Stove	4 00	4 25
" Chestnut	2 45	2 50	Lorberry Coal	4 50	....
" W. A. Lump and Steamboat	3 00 4 00	3 25	Shamokin	....	....
" Broken	3 35	3 50	Franklin. (Lykens Valley)	5 00	....
" Egg and Stove	4 10	4 50	Broad Top	4 60	....

Scranton Coal at Elizabethport, April 17, 1868.

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

Lump	$4 00@	....	Egg	4 50	...
Steamer	4 00	....	Stove	5 25	....
Grate	4 25	....	Chestnut	4 00	....

Prices for Pittston Coal at Newburgh, April 17, 1868.

(Corrected weekly by Penna. Coal Co.)

Lump, per ton of 2240 lbs.	$4 10@	....	Egg " " "	4 20	....
Steamer, " " "	4 10	....	Stove " " "	4 55	....
Grate " " "	4 20	....	Chestnut " " "	4 00	....

70 cents additional to New York.

Lackawanna at Rondout, April 17, 1868.

Lump	$4 10@	....	Egg	$4 10@	....
Steamer	4 10@	....	Stove	4 30	....
Grate	4 10@	....	Chestnut	3 90	....

70 cents additional to New York.

Lehigh Coal at Elizabethport, April 17, 1868.

Lump	5 00@	...	Chestnut	4 25	....
Steamboat and Broken	4 75	....	Stove	5 00	....
Egg	4 75	....			

Wilkesbarre Coal at Hoboken, April 17, 1868.

(Corrected by Wilkesbarre Coal & Iron Co.)

Lump	$4 25	....	Egg	4 50	....
Steamer	4 35	....	Stove	4 80	....
Broken	4 35	....	Chestnut	4 15	....

Ten cents additional on shipments from Jersey City.

At Baltimore, April 17 1868.

Wilkesbarre & Pittston W. A. by car	$5 25@5 50	From wharf or yard, 50c. to 75c per ton additional	
Lykens Valley R. A. by car	....@ 5 80	Retail, del'd, per 2,240 lbs	7 00@7 75
Sunbury & Shamokin R. or W A. by car	5 25 5 75	George's C'k and Cumberland f. o. b. at Locust P't for shipping	....@4 75

At Havre de Grace, Md.

Wilkesbarre or Pittston, W. A., on board	$....@5 50	Sunbury or Shamokin, R. or W. A., on board	....@5 50
Trevorton R. A., on board	5 50	Lykens V'y, R. A. on b'd.	....@5 75

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

George's Creek and Cumberland f. o. b. .... $....@ 4 35

Prices of Gas Coals.

April 3, 1868.

Provincial.	Coarse. Gold.	Slack. Gold.	American	Coarse. Currency.	Slack. Currency.
Block House	$2 00	$ 75	Westmoreland Co.	$8 25	$8 00
Gowrie	1 75	75	Despard	8 25	8 00
Lingan	1 75	75	Cameron	8 25	8 00
Sydney	2 13¾	71¼	Penn	8 50	8 00
Pictou	2 18¾	1 18¾	Newburgh Orrel Gas	8 50	8 00
Little Glace Bay	1 75	1 00	Delivered in New York.		
International Co.'s	1 75	....			

Prices of Foreign Coals.

Duty $1.25 per ton.

Corrected weekly by Parmelee Bros., 32 Pine Street, N. Y.

Liverpool Gas Caking	$10 00	Liverpool House Cannel	— —@20 00
" " Cannel	13 00	" " Orrel	16 00@18 00

Per ton 2240 lbs., Ex. ship.

PRICES FROM YARD:

Liverpool Orrel, screened.....$18@20 | Liverpool Cannel, scr'd.. 22 00@— — per ton 2000 lbs. delivered.

Coal Freights.

(Corrected Weekly.)

Rates of Freight from Newburgh

River.

On "Pittston" Coal, by boats and barges of the Pennsylvania Coal Company, per ton of 2,240 lbs.

River.		Eastern.	
Troy and West Troy	$ 55	Stamford	$1 25
Albany and Greenbush	50	Norwalk	1 25
Coeymans	45	Bridgeport	1 25
Coxsackie and Stuyvesant	40	New Haven	1 25
Hudson & Catskill	35	New London	1 40
Saugerties and Barrytown	35	Norwich	1 50
Rhinebeck and Rondout	30	Mystic	1 45
Po'keepsie and New Paltz Land.	25	Stonington	1 45
Fishkill Landing	20	Sag Harbor	1 45
Cold Spring and West Point	30	Bristol	1 55
Peekskill	40	Newport	1 55
Haverstraw	45	Fall River	1 55
Sing Sing and Nyack	50	Providence	1 60
Tarrytown and Piermont	50	Dighton	1 60
Yonkers	55	Warren	1 60
		Pawtucket	1 75
		New Bedford	1 80
		Boston	2 10
		East Cambridge	1 10
		Salem	1 90
		Newburyport	2 00
		Portsmouth	1 95
		Portland	1 75

The Coal must be discharged with all reasonable dispatch, at the expense of the consignee, who shall also pay wharfage on the boat. Boatmen will tend guy while unloading.

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

St. Johns	$1 75@	— —	New York	1 30	1 50
Portland	2 40@	2 75	Dighton	2 00	— —
Boston	2 25	3 00	Danversport	2 75	— —
Salem	2 50	2 75	Lynn	2 50	2 75
New Bedford	2 00	— —	Fall River	2 00	— —
East Cambridge	2 75	— —	Marblehead	2 00	2 50
Providence	2 00	— —	Bridgeport	2 00	— —
Pawtucket	2 40	— —	Hartford	2 50	— —
Newport	2 00	— —	Norwich	2 00	— —
New Haven	1 90	2 00	Mystic Bridge	2 00	2 25
Charleston	3 50	— —	Barrington	2 00	2 25
Saco	3 00	— ..	Belfast	3 00	— —
Bangor	3 50	— —	Greenpoint	2 20	2 25
Portsmouth	2 60	— —	Hastings	1 55	— —
Beverly	2 40	2 50	Hackensack	1 75	— —
Amesbury	2 90	— —			

From Elizabethport and Port Johnston.

Albany	$1 00@	— —	New London	1 15	— —
Boston	1 75	— —	Newport	1 40	— —
Bridgeport	1 00	— —	New York	60	— —
Fall River	1 50	— —	Norwalk	1 25	— —
Hartford	1 40	— —	Norwich	1 25	— —
Hudson	1 00	— —	Pawtucket and towing	1 60	— —
Lynn	— —	— —	Portland	1 75	— —
Middletown	1 25	— —	Portsmouth	1 75	— —
New Bedford	1 50	— —	Providence	1 50	— —
Newburyport	2 00	— —	Salem	1 75	— —
New Haven	1 00	— —	Taunton	2 00	— —

Rates of Transportation to Tide Water.

[BY RAILROAD.]

To Port Richmond.—(Philadelphia.)

Philadelphia and Reading R. R. from Schuylkill Haven $2 00

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

	Drawback.	Freight.	Nett.
Lump	$1 25	$2 00	$ 75
Steamboat	1 15	2 00	85
Broken	1 00	2 00	1 00
Egg	65	2 00	1 35
Stove	50	2 00	1 50
Chestnut	75	2 00	1 25

From Port Carbon, 8 cents per ton more.

To Elizabethport.

L. V. Railroad from Mauch Chunk to Easton	$ 69
C. R. R., N. J., Easton to Elizabethport	1 06
	1 75
Shipping Expenses at Elizabethport	25
Total	2 00

To Port Johnson.

L. V. R R.	$ 69
C. R. R. of N. J.	1 12
Shipping Expenses	25
Total	2 06

To Hoboken

L. V. R.R.	69
Morris & Essex R.R.	1 12
Shipping Expenses	25
Total	2 06

[BY CANAL.]

To Port Richmond.

From Schuylkill Haven to Port Richmond	$1 00
Freights and tolls by Raritan Canal	1 90
	2 90
Drawback	30
Total	2 60

To New York.

From Mauch Chunk to New Brunswick, by Lehigh, Del. Div. and Del. & Raritan Canal	$ ..
Freights through	1 25
Towage	22
	..

To New York via Morris Canal.

Lehigh Canal	$ ..
Morris "	..
Towage	10
Freight	1 45
Total	.

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

Lehigh tolls (net)	$ ..
Morris "	..
Freight	1 40
Re shipping	30
Total	..

Provincial Freights.

	Currency.
Sydney to N. Y.	....
Lingan	....
Cow Bay	....
Big Glace Bay	....
Little "	3 00

Foreign Freights.

New Castle and Ports on Tyne	£14@16 keel.
Liverpool	12s. 6d.@15s. ton

SAN FRANCISCO STOCK MARKET.

A Telegram from San Francisco, dated April 17, to Messrs. Lees & Waller, Bankers, 33 Pine street, this city, quotes stocks as follows:

Stocks.	Bid per F't.		Stocks.	Bid per F't.	
Gould & Curry	700	@ —	Belcher	390	@ ..
Savage (per share)	163	@ 159	Imperial (per share).	237	@ 215
Chollar Potosi	290	@ 272½	Alpha	75	@ ..
Ophir	200	@ ..	Kentuck (per share)	467	@ 450
Hale & Norcross	No sales.		Cal. Steam Nav'n Co.	..	@ ..
Crown Point	2,200	@2,150	Cal. State Telegraph Co	..	@ ..
Yellow Jacket	1,500	@1,475	Greenbacks	..	@ ..

Slate Trade Circular.

New York, April 16, 1868.

The slate trade is beginning to show some signs of life, but the prospects are that the business will be dull until late in the season. The Stock of good qualities on hand is small, but enough to supply the present demand. There is no demand for poorer qualities yet, though the quarries are fully stocked with them. Work in the quarries is being slowly resumed. The prices will start at about the same figures as they were in the fall.

Weekly London Copper Trade Circular.

Messrs. Vivian, Younger and Bond, March 27, write:—A fair amount of business has been done in Chili bars in Liverpool, about 450 tons having been sold. The transactions comprise 100 tons spot, at £72; 200 tons close at hand at the same price, and 250 tons spot at £72 10s., a small portion of which last was with one month's prompt. A small cargo of regulus, 160 tons, was parted with at 14s. 9d. per unit. The market for West Coast produce closed firm at our quotations, with nothing pressing. In Havre the feeling is somewhat quieter, and a certain quantity of bars might be had on slightly easier terms. At the sale of ores at Swansea the average price obtained was 15s. 1d. per unit, the standard having advanced £5 over that of the previous month. At the sale in Cornwall, the standard receded £2 from that of the previous week. In fine foreign a good business has been done, about 150 tons Wallaroo cake having fetched £80 10s. cash. Burra Burra has been done to a small extent at £82. The demand for English descriptions is quiet.

AMERICAN Journal of Mining.

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ROSSITER W. RAYMOND, Editor.

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DEALERS AGENTS.

THE AMERICAN NEWS COMPANY, 121 Nassau street, N. Y
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☞ 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.

☞ The American Journal of Mining has a larger circulation than any other paper of the kind in the United States.

NEW YORK, SATURDAY, APRIL 18.

CONTENTS OF THIS NUMBER,

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.

THE PROBABLE EXHAUSTION OF ENGLISH COAL MINES.

Prof. W. Stanley Jevons, of Owen's College, Manchester, recently lectured on this subject at the Royal Institution, London. We quote the condensed report of the *Mining Journal.*

"In his introductory remarks he referred to the recent enormous increase in the quantities raised from the mines of Great Britain—64,600,000 tons in 1854, and 101,630,000 in 1856. He stated that about half the carrying power of British railways is occupied in conveying coal, and that it would require a fleet of five times the amount of tonnage of the whole of the vessels which now enter English ports in a year to bear the whole of that coal, it being the greatest trade ever carried on. Every pound of it is intrinsically of extreme value, since the heat it yields is capable of conversion into mechanical power, light, and electricity—in short, into any form of force. As almost all our manufactures are carried on by the aid of coal, directly or indirectly, there is every reason to suppose that its employment will become more and more general. It is thus the mainspring in our prosperity. Even the economical use of coal tends to extend rather than restrict its use, for the cheaper the performance of an engine is, the more profit is derived from it, and the more engines are employed; and this Mr. Jevons proved from the history of the steam-engine. He expressed the opinion that the notion that electricity would eventully supersede coal is fallacious, because coal is the cheap source from which electricity itself is derived, and new machines are now being invented by which electricity will be more economically obtained by its help; and, should any new and unknown source of power be some day discovered, we have no reason to suppose that Britain will possess supplies of it so richly as she possesses coal Mr. Jevons said that the limited extent of the British coal mines will prevent us from much longer extending the production of coal as rapidly as in late years; and other countries will soon develope their more abundant mines, and in time will enjoy a larger supply of coal than we do. He desired that it should be especially understood that he had never supposed the English mines could be literally exhausted. What he had asserted was that coal would become dearer here and cheaper abroad; and that, instead of producing more than half the total supply of coal in the world, we should, after 50 or 100 years were passed, produce only a small fraction of it. This was what he meant by the exhaustion of our coal mines."

Prof. Jevons draws a distinction between the literal exhaustion of the English mines, and their economical exhaustion. This may be well enough for philosophers, but it carries cold comfort for statesmen and owners of consols. To say, "we have plenty of coal left, but it will cost us more to get it than it is worth," is like saying, "I have a magnificent estate, but it is mortgaged for twice its value, and if I would sell it, I should be obliged to add a bonus to induce a buyer to accept it."

We agree with the Professor that the discovery of new sources of motive power, more economical than coal, is a very unlikely thing. The developments of science indicate the improbability of any such discovery. We now know that electricity, chemical force, gravity, etc.—all the so-called physical forces, are correlatives of heat; and heat is that force which may be most conveniently transformed into motion. We may use electricity as a motive power; but we are only using another form, as it were, of heat; and, so far as we can judge, a much less convenient form. In other words, if all the work now performed by coal were performed by electricity, we should still consume as much coal, and probably more.

The world's treasure of coal exceeds the store of any other source of power with which we are acquainted. The sun, indeed, communicates to us daily an immense amount of force, which we consume in processes of organic life, radiating the remainder back into space. Will sunlight become a motor? But what is coal but sunlight, accumulated at compound interest! We draw checks on our coal-banks, for wealth that was deposited ages before our race was born.

Suppose, then, that in fifty or a hundred years, England's great supply of power becomes so exhausted that, "instead of producing more than half the total supply of coal in the world, she should produce only a small fraction of it." The result would be gradual, but inevitable and final, ruin of her commercial supremacy. We do not know why mankind at large, or even the English people in particular, should grieve at such a result. It is not only the diminution of the coal that portends this change. Several important social and political signs point in the same direction.

In the first place the incroachments of Russia in Asia, and the schemes of France in Egypt and Arabia, tend to deprive the British Empire of its vast Indian provinces, or, at all events, to take from England the only thing for which she values those provinces, the Indian trade. On the other hand, the Pacific railroad and the steamship line from San Francisco to China put New York like a toll-gate between England and that quarter of the world. English houses will be obliged to establish their branches and agencies here; American houses will multiply and wax strong: coal or no coal, the world's commercial center of gravity is changing its place.

The social condition of England herself is no less significant. Every year shows the soil of that country distributed among fewer proprietors. Large tracts of land are returning to the uncultivated condition, to serve as parks and preserves for gentlemen; the rich are constantly growing richer, and the poor, poorer. Hundreds of thousands are annually leaving the shores of their native land to seek in the New World that permanent foot-hold which they cannot maintain at home.

Wise proprietors of mines or factories know very well that to secure willing, faithful, and permanent labor, they must give their workmen homesteads. "A cottage and a piece of ground" goes a long way. But society in England is organized on the opposite plan, and when that day has come, the portentous shadow of which already darkens the noon of national prosperity; when the diminished resources of England can no longer maintain, in spite of geographical disadvantages, her commanding commerce and manufactures, there will be nothing to prevent the workingmen from leaving that soil which they do not own. The operation of all these causes may be delayed by measures of wise statesmanship; but we do not see how the result can be considered otherwise than inevitable.

In the words of a youthful stump orator, "Sir, we are told that 'westward the star of the empire takes its way;' and history confirms the assertion of the poet. But that star, whose rays now begin to illumine this great American continent, can go no further west than this; for geography informs us that the other side of the Pacific Ocean is where the East begins! That star, sir, *that star,* I say, will soon have reached the climax of its glory, and will blaze resplendent in our zenith, nevermore to waver or to set; while round and round it, in brilliant constellations, will revolve the lesser lights of the other nations of the world!"

Patriotic and astronomical prophecy can no futher go!

THE GEOLOGICAL SURVEY OF CALIFORNIA.

The telegraph has recently brought us news of a calamity that will be regretted by all interested in the progress of science and the prosperity of our Pacific States. The Legislature of California, with a short-sighted economy that appears to us perfectly incomprehensible, has abolished the Geological Survey of that State, at a point in its career when it was just about giving to the world the most important of its results. A small but laborious corps has been for upwards of seven years, under the leadership of a man whose position is deservedly at the head of his profession in the United States, contending against all the disadvantages and hardships incident to frontier travel, in a country where settlements are scattered, roads few, among rough mountains, exposed for weeks at a time to the snow and rain.

Inspired by the energy and indomitable pluck of their chief, they have persevered, in the belief that they would be amply rewarded by the eventual publication of the results of their labors in a manner alike creditable to themselves and to the State that had inaugurated so noble an undertaking. There was not a man in the commission, from its chief to his most subordinate assistant, but could at any time have commanded a much larger salary outside the Survey than in it. Their continuance in the work was therefore a direct pecuniary sacrifice; and the action of the Legislature in not providing for the publication of the reports must be looked on as little short of an indirect breach of faith on the part of the State.

On no one does this blow fall more severely than on Prof. Whitney himself. To his individual zeal and pertinacity is due the continuance of the work up to the present time. He has fought for it through evil as well as good report. At a time, in its earlier history, when nearly the whole press of California was clamoring against him, he persevered, advancing his own private funds to keep his parties in the field. The State, meanwhile, was sometimes in his debt to the amount of more than half of an annual appropriation. During the "oil fever" he made for himself a noble record, and accomplished more than any one man towards saving the reputation of California, by opposing the preposterous speculative schemes of that period, instead of making friends, like the unjust steward, against a day of trouble. His uniformly upright and consistent course won for him the support of one after another of the papers, until during the last year there was not a single journal of any prominence in San Francisco, Sacramento, or any of the smaller cities, that did not speak in terms of commendation of the Survey.

But there is another and more comprehensive point of view from which this matter must be considered. During the continuance of the work, successive legislatures appropriated upwards of $126,000, and with this sum an immense amount of valuable information was obtained. The whole general geological structure of the State had been worked out, its natural productions, animal and vegetable, had been collected and studied, its minerals and fossils investigated, and a series of maps nearly finished that would have surpassed in excellence and accuracy anything of the kind ever produced in the United States. These maps alone were worth more than the total amount of the appropriations. But one of them has been published; and so great was the demand for it, that the whole of the first edition was sold in San Francisco within a week of its appearance. The State, after having incurred the great expense of collecting this vast and varied information, now voluntarily foregoes the material advantage (to put it on the level of legislative understanding, let us plainly say, the money) to be derived from its publication—a piece of suicidal policy which we cannot understand.

Had the plan of the Survey been carried out as ordered by the legislature that inaugurated it—"an accurate and complete geological survey of this State, with proper maps and diagrams thereof, together with a full and scientific description of its rocks, fossils, soils and minerals, and of its botanical and geological productions"—the reports and maps would have comprised a library of scientific and economic information, equalling in value the deservedly admired reports of the New York commission. Besides the persons directly connected with the work in California, many of the most eminent scientific men of the country had been engaged for several years as co-laborers in their specialties. Two complete volumes have already been published, one on general geology and one on the fossils; besides which, parts of three other volumes and the one map, above mentioned, have appeared. Professor Whitney's plan, as embodied in his letter to the Governor, was to publish in all from eleven to fifteen volumes; of which, besides those already issued, we are credibly informed, several were either ready for the press or in an advanced stage of completion.

The telegraph tells us that the legislature has made an appropriation af $15,000 to pay deficiencies, and to carry on the office work to the end of the current fiscal year, or to wind up the affairs of the Survey. We sincerely trust that some additional provision has been made for the publication of the reports now ready. The information to be obtained from a meagre telegraphic message is, at best, unsatisfactory; and we can only hope for the best, while we fear for the worst. Professor Whitney, we understand, expects to sail for the East this month, and will doubtless very soon assume his new duties at Cambridge, where a professorship has been waiting for him for several years.

PRO AND CON.

There seems to be a lively difference of opinion concerning the new discoveries of gold-bearing quartz in the Sweetwater region, Utah. The Helena, Montana, *Herald* undertakes to expose the delusion that these discoveries are of great value, and goes so far as to say that "there is no such place as South Pass City, and no such mines as the Sweetwater mines, save in the imagination." At the same time, it asserts, that "of course there are taverns, saloons, gaming houses, and other public institutions there, ever ready to take the poor pilgrim and prospector in, and go through him for his bottom dollar."

The Fort Bridger, Utah, *Sweetwater Mines,* replies with vigor and directness, to the effect that the *Herald* is a "vehicle of falsehood and all uncharitableness," "a detestable sheet;" that its editor is an "ink-slinger," and ought to "put his head in soak, before he again exposes his ignorance of a country, of whose resources he is no more competent to judge than a jackass-rabbit;" and that "South Pass City contains over one hundred substantial buildings, and as many more in course of erection, yet there is not, neither has there been, up to the present time, a single tavern, saloon, gaming-house, or other public institution in the country." "The fact of the Sweetwater mines," says their vivacious namesake, "being rich and extensive, is established beyond the shadow of a doubt, and the puny efforts of a thousand such slanderous sheets as the *Herald* can no more retard their progress and development than can the Niagara be dammed with straw."

The dispute turns, after all, on the meaning of words. What is a "city," and what is a "mine?" Doubtless the Montanese definition of the former term includes the saloons and gaming-houses; but as to the latter, the notions of all "Pacific coasters," and possibly also of the gentile inhabitants of Utah, are extremely vague. The prevailing impression appears to be that a mine is a stake set in the ground. The "ink-slinger" who charges that the Sweetwater mines exist only in imagination, should remember that nine-tenths of the mines in the country have the same indefinite locality. The Western use of language is prophetic, though sometimes the profits are deceptive! At all events, this is apparently a case where the pot should not call the kettle black.

We confess that the picture of the virtue and sobriety of the Sweetwater district given by our Fort Bridger cotemporary is "pretty strong painting;" and, if correct, it is calculated to raise a suspicion or two as to the remunerative character of the Sweetwater industry thus far. In spite of much faith in human nature, we are constrained to believe that only extreme poverty could force one of our western mining communities to go without its "public institutions." The saloon generally makes its appearance as soon as the gold; and if there are no sharpers after the "pilgrim's bottom dollar," the reason is apt to be, that the pilgrim has already parted with that interesting coin.

The *Deseret News*, of Salt Lake, discourses upon the same text in a different tone:

"We hear of gold mines being discovered on the Sweetwater and other places, and understand that some young men and others seriously think of going to dig for gold as soon as the roads will admit of their traveling. If they do, we can assure them that disappointment and sorrow will be the results of such attempts on their part. They will have the faith of this entire people to contend against, for in every household in our land, if the people are alive to their duties, fervent prayers ascend every day to God that the gold and the silver in our neighborhood may be covered up, so that none may be successful in finding them. Gold may be found in abundance at the Sweetwater. Of this we have no wish to express an opinion at present. But no matter how plentiful it may be, it is no place for a man professing to be a Latter Day Saint."

This sort of preaching will have the effect of stimulating the eagerness of the gentiles, and perhaps of increasing the restlessness of the faithful. We should not be surprised to see an irruption of the Saints into the mining business. At all events, the wealth of that agricultural community of patriarchs would be greatly increased by the development of the mineral resources of the country, and the consequent establishment of new markets for all products of industry. If the Church continues to protest and forbid, it will be Mammon vs. Mormon.

QUESTIONS AND ANSWERS.

The secretary of a copper mining company in New Mexico wishes us to favor him with a description of a copper furnace on a cheap plan, with the capacity to smelt, say, two tons at each smelting. He also desires to know the amount and quality of stone, brick and clay required for its erection, and what other articles are necessary to put everything in working order. As data for our judgment, he gives the facts that the company's shaft is 150 feet deep; that there are on the dump 100 tons of very fine ore, averaging 48 per cent. of copper, and that the "main bottom vein" is growing better and richer every day. An early answer will greatly oblige, as the company desires to begin smelting as soon as possible.

We are flattered by the childlike confidence with which these gentlemen submit to us a question of so much difficulty, without giving us any particulars to hamper our decision, and propose to act at once upon the advice we may give them. Yet, on second thought, the compliment appears to be but a dubious one. Only entire ignorance of the problems involved, and the labor required for their solution, could permit any one to believe that an inquiry like the above would be of assistance to him in the prosecution of the work. The metallurgy of copper is one of the most intricate branches of the art. There are innumerable varieties of method; and the choice among them must depend upon local circumstances. First of all, it is absolutely necessary to know what is the nature of the ore. Our New Mexican friends do not say whether it is an oxidized or a sulphuretted ore; whether it contains lead, silver, gold, antimony or arsenic; whether it has a siliceous or a calcareous gangue. They only inform us that it averages 48 per cent. in the "top vein," and that the "main bottom vein" is constantly growing "better and richer." How is this change taking place: by the gradually increasing predominance of ore over gangue, or by the disappearance of one variety of ore and the appearance of another? It would be wise to wait until the permanent character of the ore is ascertained, before deciding how to treat it.

Again, is it desired to make fine copper, or black copper, or copper matt? What is the market value of these products, and what are the costs of mining, sorting and freight? It is necessary to know these things, before deciding how much money can properly be expended in metallurgical operations. What building materials are available in the neighborhood? What mineral fluxes? What is the cost of labor? Are there any skilled laborers—masons, blacksmiths, &c., not to speak of smelters—to be obtained?

When all these points, and others equally important, are fully elucidated, it is the work of an experienced metallurgist to combine them into a plan, to make the drawings and specifications for furnaces, and to decide upon the details of the process. If our friends desire this done, we can assist them in finding the proper person to advise them; but we warn them that any advice given at a distance, and without personal knowledge of all the circumstances, must of necessity be somewhat uncertain.

Morever, when the plans are all fixed and elaborated, it is the most difficult work of all to build and run the works. The better the process and apparatus—i. e., the more nicely fitted to the particular case—the more certainly will they fail in incompetent hands. There is just one way, and only one, to carry on a manufacturing business; and that is, to secure a man who has been trained to superintend it. It is true that, in the course of time, people will learn something from experience; but it has taken the world several thousand years to learn by experience what is known about metallurgy; and this New Mexican company cannot afford to wait so long as that.

Finally, it may be asked, cannot ores be treated, in cases like the one under consideration, by rude and imperfect processes, so as to secure a profit to the proprietors, even though with considerable waste? We will not undertake to deny that this is sometimes the case; but we do not wish to encourage such reckless squandering of the mineral resources of the country; and we are glad to know that in most cases it brings its own punishment. Some loss is unavoidable in all the operations of mining; but loss through mere ignorance and greed of immediate profit is inexcusable.

We sympathize with our New Mexican correspondents. If we were in person on the spot, we might help them. At this distance, we must decline to judge for them; and our best advice to them is to light the lantern of Diogenes and go prospecting for a man.

THE LURMANN IMPROVEMENT IN BLAST FURNACES.

The description of the improvement in iron blast furnaces, invented by Herr Fritz Lurmann, and represented in this country, by Mr. George Asmus, which we gave our readers a few months ago, has been copied into some of the most prominent foreign scientific journals, and made the subject of considerable comment. Although this is a German invention, the American Journal of Mining was the first periodical in the world to give it public discussion and appreciation. Our readers will remember that we have frequently alluded to it since our first article on the subject, and have not hesitated to express our opinion, that it is one of the few radical improvements in metallurgy which the last twenty years have witnessed.

American ironmasters are too intelligent not to perceive the advantages offered by a closed front and continuous automatic slag-discharge; and it was not long after we called attention to these points before the Lehigh Crane Iron Works, at Catasaqua, Penn., made trial of the new invention.

We have before us a letter from Mr. David Thomas, the veteran ironmaster, President of the works which bear his name, and well known to the iron men of this country as foremost in this department of industry. Higher authority upon such a subject could not be required nor obtained. Mr. Thomas alludes to the Lurmann-Asmus patent as follows:

"We have Mr. Asmus' plan on No. 2 and No. 4 here (Catasaqua) and also at Lock Ridge. The new furnace there is doing admirably well from the start. If I had a hundred furnaces, I would apply Mr. Asmus' plan to every one of them. Crane Co.'s No. 2 is making fifteen per cent. *more* iron and *better* iron than last year on the old plan; and the labor is not more than two-thirds of the old way."

We do not wonder that Mr. Fritz, of Bethlehem, superintendent of the new Northampton furnace, has adopted this extraordinary improvement at the very outset. In a word the result of the experiments of the last three months is regarded by all parties as a complete triumph. One of the most difficult problems of the metallurgy of iron is solved; and it cannot be long before the tymp and dam and forehearth, with their manifold inconveniences and wastes, will be things of the past.

In a short time we shall be enabled to lay before our readers the details of actual working of this new method. The American Journal of Mining, which was the first to introduce it to the public, will continue to watch and report the progress of its success.

The Cryolite Flux.

Dingler's *Polytechnic Journal*, No. 1685, just received, contains a curious error for which we suppose an American correspondent is primarily responsible. In a brief notice of the so-called Stevens flux, which consists, as our readers are aware, of fluoride of aluminium and calcium, the residuum of the soda-fabrication at Natrona, Pa., this authority gives potassium as one of the metals of the double salt, in the place of aluminium. A moment's consideration will show that this is a mistake. The formula of Cryolite is, according to Berzelius, $3NaF+Al_2F_3$, with 53.6 parts of fluorine, 13 of aluminium, and 33.3 of sodium. There is no potassium in it, nor does the process of soda manufacture introduce any.

The Stevens flux, by the way, seems to be going a-begging. What is the matter? Does not the Lisbon Gold Company require a new supply?

NEW PUBLICATIONS.

First and Second Annual Report *of Progress by the State Geologist and the Assistant and Chemist of the Geological Survey of the State of Iowa; together with the Substance of Popular Letters Contributed to the Newspapers of the State During the Years* 1866 *and* 1867, *in Accordance with Law; also, Extracts Originally Contributed to Scientific Journals as a Part of the Work of the Survey.* Des Moines. 1868.

These reports are highly creditable to Dr. Chas. A. White, the State Geologist, Mr. O. H. St. John, his assistant, and Prof. Gustavus Hinrichs, the Chemist of the Survey. We shall take a future opportunity, after a more careful perusal, to discuss their contents more critically and in detail. A large part of Prof. Hinrichs' report, comprising his researches into the constitution of Iowa coals, has already been presented by the American Journal of Mining, through the courtesy of the author, in advance of its official publication.

Report *of the Directors to the Stockholders of the Pewabic Mining Company, for the Year ending Dec.* 31, 1867.

Eighth Report *of the Directors to the Stockholders of the Franklin Mining Company, for the Year ending Dec.* 31, 1867.

Report *of the Central Mining Company for the Year* 1867.

These three Reports, from three of the most respectable and successful mining companies at Lake Superior, present a picture of the present condition of mining enterprise in that district, to which we shall make hereafter more particular allusion.

An Address *on the Propriety of continuing the State Geological Survey of California, Delivered before the Legislature at Sacramento: to which are appended: Two Letters to the Governor Relative to the Progress of the Geological Survey; also the Report of the Commissioners to manage the Yosemite Valley and the Mariposa Big Tree Grove, for the years* 1867 *and* 1868. By J. D. Whitney, *State Geologist.* San Francisco, 1868.

We have expressed in another column our views upon the principal topic treated in this pamphlet; and we will only add, at the present, that Prof. Whitney's address and letters are admirable arguments in behalf of his survey. We regret that they fell upon such poor soil.

We learn with pleasure that "Lyndon's" Margaret, which has attracted much interest as a serial in the *Examiner*, is to be published in book form by Scribner.

Scientific Meetings.

POLYTECHNIC BRANCH OF THE AMERICAN INSTITUTE.

NOVA SCOTIA IRON—ELECTRO-MAGNETIC LOCOMOTIVE ENGINES—DR. VAN DER WEYDE ON MAGNETISM—NEW OIL FEEDERS.

There was a large attendance on Thursday evening last, April 16th, at the meeting of the above Association; the proceedings were of an exceedingly interesting character.

Dr. Feuchtwanger presented specimens of iron ore of unusual richness from a recently discovered bed near Truro, Nova Scotia. He said that the ore contains from 60 to 65 per cent. of pure iron. Plenty of wood and good coal, from which can be made charcoal or coke, are found in the same neighborhood with the iron ore. Pig iron, he stated, can be made from it for seven dollars, gold, per ton, whereas other pig iron costs twenty dollars per ton.

Mr. F. G. Fowler explained the construction of his electro-magnetic engine, from a neatly delineated chalk sketch of a locomotive. He spoke of the introduction of an electrical railroad at Rutledge & Davidson's Business College in Springfield, Illinois. The practical department of this institution is furnished with commercial centres, represented by cities, located in different countries. An electrical railroad connects the cities, which contain post and telegraph offices, miniature business establishments, &c. A small locomotive and train, moved by electro-magnetism, runs round a circuit of 300 feet, and bears messages, goods, &c., from one point to another.

This device has been in successful operation for one year. It takes three days to exhaust the battery, and the expense of running the whole apparatus is but fifty cents per week. The locomotive itself weighs eighteen pounds and the train twelve pounds. A speed of six feet per second can be obtained, and a load of eighty pounds is drawn at a moderate rate of speed. Prof. Van Der Weyde then took the stand and gave a most interesting and instructive lecture on magnetism, elucidating his remarks with numerous apparatuses. The style of this lecture met our ideas exactly of what a scientific lecture should be, viz., delivery without written notes, plain and comprehensive explanation combined with practical illustrations and working apparatus. We trust to hear many such lectures. From the crowded state of the lecture-room on Thursday evening, we were convinced that there is a growing interest in all scientific subjects. After the lecture Mr. T. P. Pemberton exhibited Nickersham's new oil-feeders for the journals of machinery. The white metal used in the cups was considered an excellent feature, for the reason that the white metal will not oxidize, while brass or copper render the oil of a greenish color, and frequently of a gummy consistence that does not properly lubricate. A full description of these oil-feeders is given on our first page.

Manufacturing and Mechanical Notes.

No. XV.

Bridges.

Public attention being now frequently called to the construction of large bridges, such as those proposed to be erected between New York and Brooklyn, Boston and East Boston, &c., a few figures and facts respecting bridges in different localities may prove to be interesting to our readers.

It is a curious circumstance that the most successful contriver of an iron bridge, and that of the very boldest design, was no other than the celebrated Thomas Paine. He studied mathematics and mechanics, and became acquainted with Goldsmith and Franklin; the latter persuaded him to go to America. He settled down at Philadelphia to mechanical and philosophical studies, and speculations on electricity, minerals, and the uses of iron. In 1788, when a bridge over the Schuylkill was proposed to be constructed without any river piers, as the stream was apt to be choked with ice in the spring freshets, Paine boldly offered to build an iron bridge, with a single arch of 400 feet span. When he again visited America, in 1803, he presented a memoir to Congress, on the construction of iron bridges, with several models. It does not appear he succeeded in erecting his bridge. "If," said Mr. Stephenson, when speaking of the Sunderland bridge over the Wear, in which Paine's ideas of construction were followed out, "we are to consider Paine as its author, his daring in engineering certainly does full justice to the fervor of his political career; for, successful as has the result undoubtedly proved, want of experience and consequent ignorance of the risk, could alone have induced so bold an experiment; and we are rather led to wonder at, than to admire a structure which, as regards its proportions, and the small quantity of material employed in its construction, will probably remain unrivalled."

The suspension bridge over the Ohio river at Cincinnati, erected from plans by Mr. J. A. Roebling, has a span of 1,057 feet, the largest existing span of a suspension bridge. It crosses the river, with a clear headway of 100 feet above low water; the greatest variation between the summer low-level and that of the spring freshets, being sixty feet. The massive towers of masonry rise 200 feet above low water. The supporting members of the bridge are two cables of parallel wires of No. 9 gauge—each cable being 12¼ inches in diameter, and containing 5,250 wires; the breaking strength of the wire being over sixty tons per square inch of net section. Nearly half of the weight of the roadway and load, is carried by diagonal wires, running straight from the tops of the towers to successive points along the floor, so that the main cables, stiffened by this arrangement, really carry about half of the total weight of the roadway and load. Length, 2,000 feet; cost, $2,000,000.

The Niagara Suspension-bridge is of 883 feet span, and 230 feet above the river.

The Buffalo and New York city road crosses the Genesee river at Portage, on timber piers, 237 feet high, the length being about 1,000 feet.

The Pacific railroad bridge across the Osage river, is 1,110 feet long.

The Starucca Viaduct, about two miles from the Susquehannah depot of the New York and Erie railroad, has eighteen arches of Pennsylvania blue-stone, and about 1,100 feet long, and 112 feet high.

The Philadelphia, Wilmington, and Baltimore railroad-bridge, across the Susquehanna river, is 3,250 feet long: has thirteen spans of 200 feet, eight of 65 feet, a double draw, and cost nearly three-quarters of a million.

At Stonestown Bridge, Penn., the Broad Top Railroad is laid for some 2,000 feet over tressel work, from 75 to 100 feet high, over which hundreds of tons of coal pass daily. This is among the most stupendous tressel work to be found on any road in the country.

The suspension bridge over the Ohio, at Wheeling, has a span of over 1,000 feet.

There is a bridge over the Danube, built by Trajan, which consists of twenty stone piers, sixty Roman feet broad, and is 150 feet above the bed of the river; the width between each pier being 170 feet, making the total length 3,700 feet.

In England, the bridge at Burton-upon-Trent is very massive; it is of square blocks of free-stone, and is 1,845 feet long.

The Waterloo bridge, London, is 1,240 feet long, and has nine arches.

The Westminster bridge is 1,220 feet long, and has fifteen arches.

Telford built a bridge over the Menai Straits, in 1826, which had a span of 580 feet, and was 102 feet above tide water. He also built the Conway bridge, which has a span of 327 feet.

The Hammersmith bridge, over the Thames river, has a span of 422 feet.

In 1779, the first cast-iron bridge was built at Colebrook Dale; its span is 100 feet, with a rise of forty feet.

The Southwark arch-bridge, over the river Thames, was built by Rennie, about 1815, and is amongst the largest iron bridges; it consists of three arches, 241 feet span, and a rise of twenty-four feet.

Amongst tubular iron bridges, those erected by Stephenson are among the most extraordinary structures of modern times. The Britannia bridge, across the Menai Strait, built for the Chester and Holyhead railroad, consists of four spans, two of 230 feet each and two of 468 feet each. It is 100 feet above high water. The Conway bridge, also erected by Stephenson, has a single span of 414 feet, and is but eighteen feet above the level of high water.

The Victoria bridge, across the St. Laurence is about two miles in length, and rests on twenty-four massive stone piers. The weight of each span is 645 tons. There are three millions two hundred thousand cubic feet of masonry. There are 24 iron tubes each 242 feet span, and the center one 330 feet under which steamers pass on their trips down the St. Laurence; the tubes are 60 feet above the summer water level. Total weight of iron work 8,000 tons. The size of tube, is 22 feet high by 16 broad.

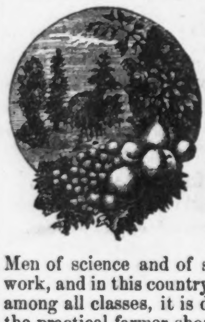
The Washington Aqueduct Bridge over Rock Creek, at the western end of Pennsylvania avenue, has a cast iron arch of twenty feet rise and two hundred feet clear span between the abutments. The arch consists of two ribs, each of which is composed of seventeen cast iron pipes of 48 inches internal diameter, and 12 feet 3 inches in length. This bridge is a splendid specimen of American Engineering, characterized by excellence of mechanical structure, and beauty of design. The designer was Capt. M. C. Meigs.

The Kieff Suspension Bridge—among the greatest of all suspension bridges in extent—over the Dnieper river in Prussia—Charles Vignoles, engineer—was begun September 9th, 1848, and finished October 10th, 1853. Its extreme length is 2,562 feet. Each of the principal spans is 440 feet; each of the two side openings are 225 feet. There are also drawbridges at each end. The clear water way is 2,140 feet. The platform of the bridge is 30 feet above the summer level. The river rises 20 feet. The height of piers from foundations, is 222 feet. The versed sine of chain (not wire cable, but a chain of bars) is 30 feet. Each of the four chains is 2,280 feet long; their weight and that of the piers being 1,578 tons. The minimum sectional area of the four chains is 429 square inches. The total weight of the iron in the bridge, is 3,500 tons. Of masonry and concrete, 1,500,000 cubic feet were used in the construction. The total cost of the bridge was $2,160,000.

There are some very fine suspension bridges at St. John's, and at Grand Falls, in New Brunswick; and, among many others, we may also particularize the fine suspension bridge between Pittsburgh and Allegheny City.

Special Notices.

Agriculture and Horticulture.



The progress of agriculture and horticulture in this State, during the past few years, has been in the highest degree encouraging. The improvement is evident in the superior method of cultivating the farm, which is observed in every county in the State. In every section fruits recommended by our Horticultural and Agricultural associations, are superseding the worthless fruits formerly cultivated, and the portion of the farm devoted to fruit culture is now becoming highly remunerating, during favorable seasons. Men of science and of study, have aided the farmer in his work, and in this country where education is so widely diffused among all classes, it is desirable that the man of science and the practical farmer should be brought together.

Our agricultural newspapers and magazines reach numbers who peruse them with the deepest interest, and the great benefits flowing from their extended circulation, are not confined to the improvements in agriculture; they inspire a taste for reading, enlarge the sphere of observation, and educate in literature and science a large class who are inaccessible to other influences.

Horticulturists, farmers, florists and others, have long felt the want of a general head-quarters at New York, where they could see, without waste of time or expense, samples of the various implements, seeds, fertilizers, periodicals, and everything of new and special interest pertaining to their various departments of industry, of the articles in competition for sale, and leave their orders to be directed to principals. Yielding to this pressing demand, our neighbor Mr. L. L. Whitlock, the son of Prof. Whitlock, now deceased, has entered upon a novel and useful enterprise. Leaving his rather obscure rooms at No. 37 Park Row, he has leased the first, second, and third floors over the main *Agriculturist* Office, No. 245 Broadway. Each floor is 114½ by 25 feet, with extension upon Murray street of 25 by 12½ feet. Here is ample provision for a continual exhibition of samples and of all implements pertaining to soil culture. The locality is a desirable one and we opine that many gatherings of a social kind will take place here; useful information will be given and received; interchange of ideas and the detailed results of experiment will prove beneficial to all concerned. There will also be pleasant reading rooms furnished with the best of papers, magazines and books bearing upon Agricultural, Mechanical and general subjects, free to all persons interested in inventions and industrial pursuits. Specimens of useful articles, seeds fruits and vegetables, etc., will be kept on constant exhibition at the option of the exhibitor, for a small remuneration.

We think very highly of our neighbor's enterprise, as it combines business, information and rational recreation; the rooms will afford excellent and desirable accommodation for farmers, inventors and others visiting the city, and will serve to these, and all having farms and extensive grounds, as a most desirable and instructive place of resort.

Cocks and Clocks.

Much admiration is attracted by the splendid vane or weathercock and the still more magnificent clock, with which Messrs. Browne & Spaulding have recently provided the Custom house in this city. The vane is an arrow, 160 feet above the floor of the great hall, with which another arrow, fifty feet below, and within the dome, is connected. The lower arrow, which is gilt, and 38 feet long, serves as an index to the movements of the upper one, which is of iron, and poised on five spherical balls of polished steel.

As for the clock, there never was such a clock. It surmounts a gorgeous Corinthian column, and is itself, with its four dials, surmounted by the gellorious American eagle. The manufacturers certainly "spread themselves" on this work; and the eagle spreads himself as if he knew it.

What Browne and Spaulding got for these beautiful and substantial pieces of workmanship, we don't know; but they could almost have afforded to do both jobs gratis; for they could not have a more convincing advertisement of their ability and taste. The clock is exactly regulated by the Dudley observatory, and will tick the praises of the makers, as the arrow will indicate their high aims and golden success, until "winds shall cease to blow, and time shall be no more."

Patent Claims.

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

76,196.—Processes and Apparatus for the Manufacture of Iron and Steel.—Jacob Jameson, Philadelphia, Pa.

I claim, 1. The reducing-furnace B, in combination with the chambers D and chimney-flue F, constructed and arranged for operation, substantially as described, and for the purposes set forth.

2. The chamber G, boiler H, and pipes h h', in combination with the reducing-furnace B and chambers D, constructed and arranged for operation, substantially as described, for the manufacture or production of cast iron direct from the ore.

3. Reducing the size and changing the form of the reducing-furnace by blocks M, arranging the chamber G for the production of large quantities of carbon, and introducing the carbon into the blast, and so into the reducing-furnace B, substantially as described, for the purpose of producing steel direct from the ore, as set forth.

4. The process of treating ore, for the purpose of making cast iron or steel, in the manner and by the means substantially as herein described.

76,219.—Method of Creating Draught in Chimneys by Means of Steam.—William H. Martin, Brooklyn, N. Y.

I claim, in combination with a smoke-stack or chimney, the blast-head n, constructed substantially as described, so as to deliver the steam in said stack in a circular volume or volumes, substantially as set forth.

76,223—Treating Cinder for Fixing-Furnace.—Hugh McDonald, Allegheny, Pa.

I claim subjecting melted cinder, slag, dross, or recrement of iron, and of furnaces used in the manufacture of iron and steel, to an active current of air, substantially as herein described, and for the purpose set forth.

76,240, antedated March 25, 1868.—Hoisting-Apparatus.—Charles R. Otis, Yonkers, N. Y.

I claim, 1. So combining the drum B with the steam-valve and friction-brake, that when released from the tension of the suspending-rope, it shall automatically cut off the steam from the engine and tighten the brake against the wheel substantially as herein set forth.

2. The studs f f* and spring g, in combination with the band-wheel a and drum B, whereby the drum is moved in advance of the band-wheel when released from the tension of the suspending-rope, substantially as herein set forth.

3. The cam-faced annular slide a*, furnished with an arm, d, connected with the drum B, in combination with the cam-faced enlargement b of the shaft A, and the sliding rod c, whereby the turning of the aforesaid slide is caused to operate the valve in the supply-pipe A*, substantially as herein set forth.

4. The rod m* and lever m, so combined with the valve in the supply-pipe A*, and the loaded lever D of the friction-brake, that the said brake shall be held away from the friction-wheel b when the valve is opened, substantially as herein set forth.

76,242.—Rock-Drill.—Joseph Peevy, Orono, Me.

I claim, 1. The adjustable and notched collars n', in combination with the drill-shank m and the bifurcated and notched shaft k, as and for the purpose set forth.

2. The spring-arm k, in combination with the walking-beam A and the drill-rod, as and for the purpose set forth.

76,256.—Process for Steelifying Iron.—Thomas Sheehan, Dunkirk, N. Y.

I claim, 1. The combination of the ingredients composing the charcoal-compound, substantially as and for the purpose set forth.

2. The combination of the charcoal-compound with the broken limestone, substantially as and for the purpose described.

3. The employment of a perforated plate, when used as and for the purpose specified.

76,279.—Portable Rock-Drilling Machine.—William Weiler, Washington, N. J.

I claim, 1. The drill-rod L, operated by a sliding weight, H, and raised and partially turned between each of the blows of the weight by the anti-friction rollers *f* and dogs *g* of the endless bands *d* and *d'*, through the medium of the levers and devices herein described, or their equivalents, all substantially as and for the purpose specified.

2. The drill-rod L, secured to the frame of the machine by plates *k* and *l* in such a manner as to be readily detached from the same, as described.

3. The sliding weight H, and its spring-catch 1, elevated by the plates *e* of the endless bands *d* and *d'*, and released by the pin *j'* of the adjustable plate *k*, in the manner and for the purpose specified.

76,280.—Steam-Boiler Furnace.—James D. Whelpley and Jacob J. Storer, Boston, Mass.

I claim, 1. The inclined jambs *m* and fire-brick arch I, arranged within the fire-box, to secure an axial focus of radiation within the fire-box, substantially as described.

2. The arrangement of inclined jambs in the fire-box, and concave radiating-flue beneath the boiler, to utilize the heat of radiation more perfectly, substantially as described.

3. The arrangement of the surrounding masonry flues to the setting surrounding the boiler, with concave interior surfaces towards the boiler, so curved that the axis of their radiation may fall within the water-space of the boiler as a linear focus, as and for the purpose described.

4. In the employment of pulverized fuel for heating purposes, the arrangement of a blast of carbon and air above the fire, introducing the air-floated coal among radiating surfaces, together with a blast of less power below the grate-bars, to maintain the combustion of the lump-coal, and prevent fusing the grate-bars, as and for the purpose described.

On-dit about Minerals, &c.

☞ The New Jersey State Geologist reports that there are 205,476 acres of salt marshes in that State. Twenty thousand of these acres have been reclaimed at an average cost of from five to twenty dollars per acre, and are now the most productive lands in the State, producing per acre from $100 to $300 annually.

☞ The Devoe & Pratt Manufacturing Company have a factory at Hunter's Point, N. Y., which turns out 20,000 five-gallon petroleum cans per day. The process of manufacture is carried on by twenty different machines. The company can fill with oil and box, for shipment, 10,000 cans, or 100,000 gallons, per day.

☞ A quarry of fine building stone has been discovered on Bulger creek, 26 miles west of Des Moines, Iowa, on the line of the Chicago, Rock Island and Pacific road. It is said to be equal to the best stone yet developed in the State, and of inexhaustible quantity. This is cheering news for the Des Moinese.

☞ Cinnabar of a beautiful vermillion color is found in an unusual form in Idaho, being abundantly spread throughout a gangue so massive, compact and homogeneous, that specimens may be cut and polished like marble.

☞ The works of the Vershire copper mine, at Vershire, Orange county, Vt., have been considerably enlarged this year. They now employ 150 hands, and ship for smelting about 5,000 tons of ore per year.

☞ A company are now engaged in manufacturing white oxide of zinc, in Jefferson county, Tenn. They have already spent $300,000 in the enterprise, and are now turning out about 30 bbls. per day.

☞ A petroleum well is said to have been discovered within the town limits of Van Wert, Ohio.

☞ Efforts are to be made to establish a line of mail steamers between New Orleans and Vera Cruz.

☞ A telegraphic cable is proposed between Cuba, Jamaica, and Aspinwall.

☞ Glass works are projected at Nepeuskin, Winnebago county, Wis.

☞ A very rich silver mine has been discovered at Huasco, Chili.

All Sorts.

☞ Those who go round with the contribution box, in California churches, are said to plead and argue the case at the pews as they go along. In one instance, the following ensued:

Parson L. extended the basket to Bill, and he slowly shook his head. "Come, William, give us something," said the parson. "Can't do it," replied Bill. "Why not, is not the cause a good one?" "Yes, good enough, but I am not able to give anything." "Poh! I know better; you must give a better reason than that." "Well, I owe too much money; I must be just before I am generous, you know." "But, William, you owe God a larger debt than you owe to any one else." "That's true, parson; but then he ain't pushing me like the rest of my creditors." The argument was conclusive.

☞ Our trade with the Spanish and Portuguese States in America, Mexico, Cuba, Brazil, etc., amounted to $121,191,396, in 1860; in 1866, it was $112,263,263, or 7⅛ per cent less. Great Britain's trade with the same States, in 1860, was about $145,000,000; in 1866, $225,000,000. This comparison is not flattering to our merchants, and, we trust another decade may witness a reversal of our own and Great Britain's positions in this matter of South and Central American trade. It is a striking fact that Brazil can import flour from Spain cheaper than we can furnish it; yet not many years ago the Southern States, at least, were sending no small quantities of flour to Spain herself.

☞ The gold, silver, and bronze medals, which were awarded the United States exhibitors in the Paris Universal Exposition, have arrived from Havre. There are several hundred of these medals, each of which is set in a glass frame; and it required seventeen large cases to box them. They were consigned to the United States agent, J. C. Derby, and will be forwarded by him to this city. They will be placed on public exhibition at the Capitol for a short time, and afterwards distributed to their owners.

☞ A London musical paper says that by the adaptation of Baker's system of electricity to organs, it is possible for a performer in England to play on an instrument situated in America. To have the great organ in the Boston Music Hall, or that in Mr. Beecher's church, played by the agency of the Atlantic cable would now-a-days be regarded as no more wonderful than the laying of the cable itself. This was considered an impossibility only a few years ago.

☞ The *Nor-Wester*, of February 29, says the people at the Portage, in the Red River country, having become disgusted with the present rule of the Hudson's Bay Company, have formed themselves into a Republic, to be known hereafter by the name of New Caledonia. Thomas Spence is the President of the new Republic.

☞ Steam towing is hereafter to be tried upon the New York canals. A canal company has been formed in Syracuse to build a steam tug and apply it to a new plan for towing on the Erie Canal. The tug is to tow canal boats in trains. It is claimed that the new method will reduce by one-half the cost of freighting and the length of time between Buffalo and New York.

☞ Trains on the Union Pacific Railroad are again running regularly. The first through train arrived from Cheyenne on the 30th. The road had been blockaded by snow near Cheyenne for several days. Denver and Cheyenne papers report the storm as the severest experienced in many years by the mountaineers. There was about three feet of snow at Denver.

☞ The Rocky Mountain trade promises to be very large this season. Sixty boats are already advertised to leave St. Louis, and a line of steamers will run from Sioux City during the season.

☞ A young man who was about jumping from a railroad train while in motion, was deterred by a reporter, who asked him his name, age, business and residence, for an obituary item.

☞ The machinery and buildings of the National Chemical Works, near Elizabeth, were destroyed recently by fire, involving a loss of over $60,000, upon which there was no insurance.

☞ Part of the Abyssinian currency, we are told, consists of "salt bricks, in shape very like a scythe-stone, about eight inches long and an inch and a half broad in the broadest part."

☞ It is estimated that the discovery of gold in Madoc, Canada, has already led to the expenditure, in one way or another, of probably half a million dollars.

☞ Dr. Crossley, of Lowell, Massachusetts, is manufacturing coffins of slate, instead of wood. They may be sealed air-tight.

☞ The average weight of a freight car on the Hudson River Railroad is 17,000 pounds.

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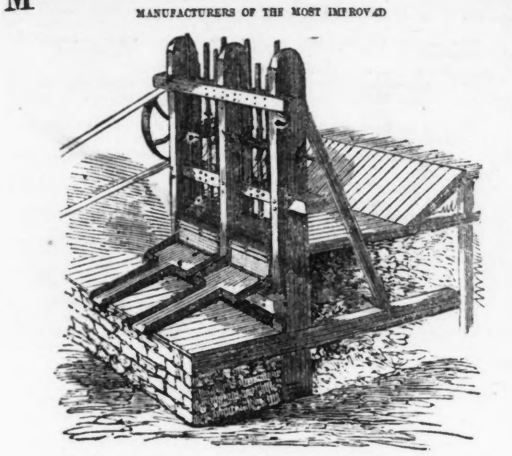

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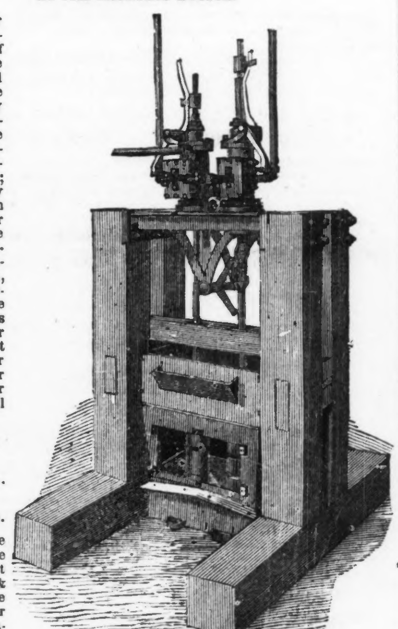

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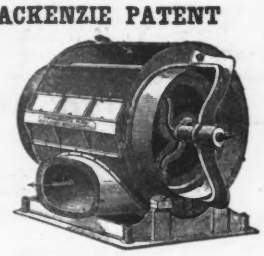

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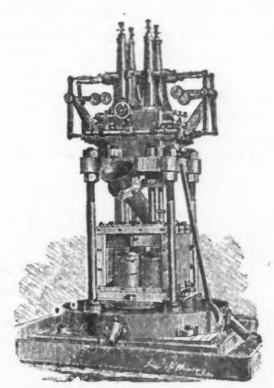

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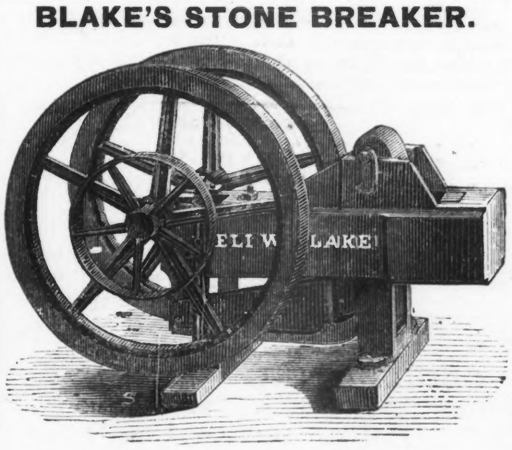

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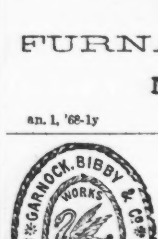

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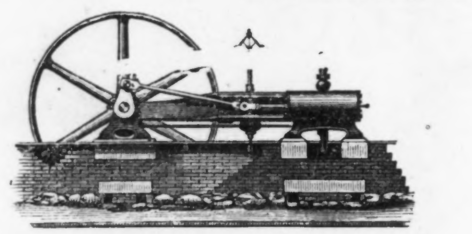

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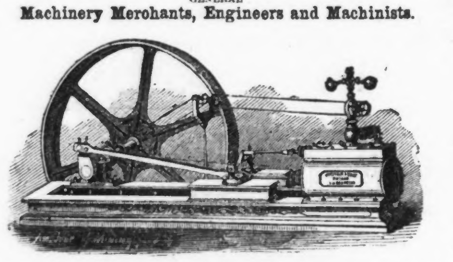

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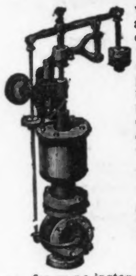

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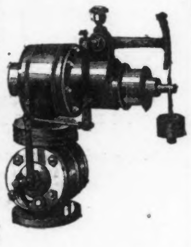

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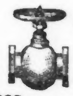

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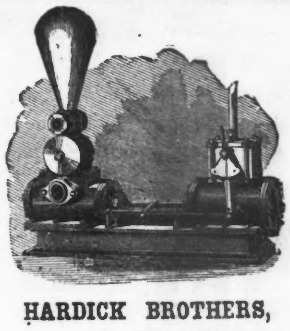

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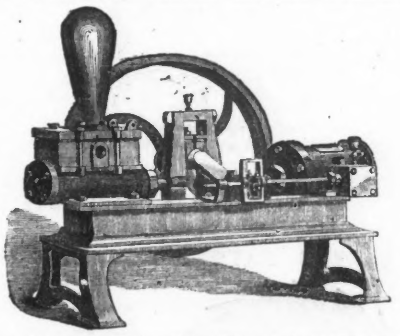

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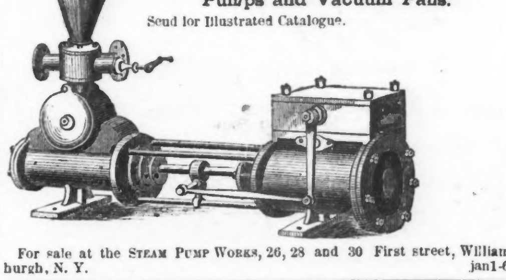

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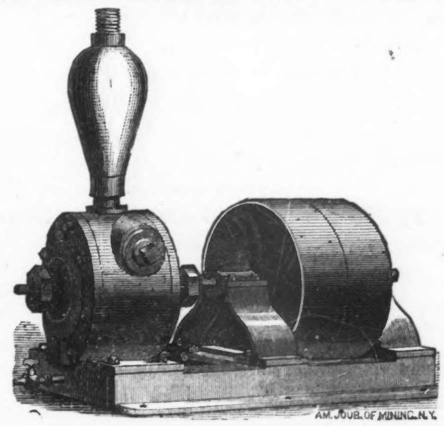

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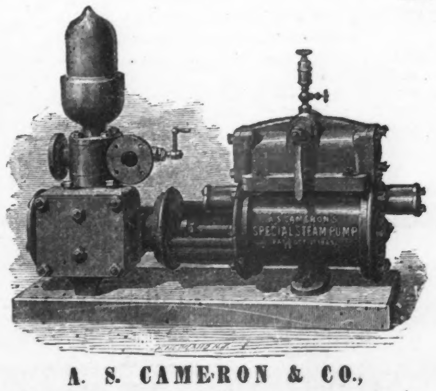

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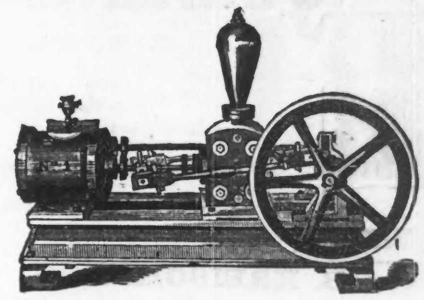

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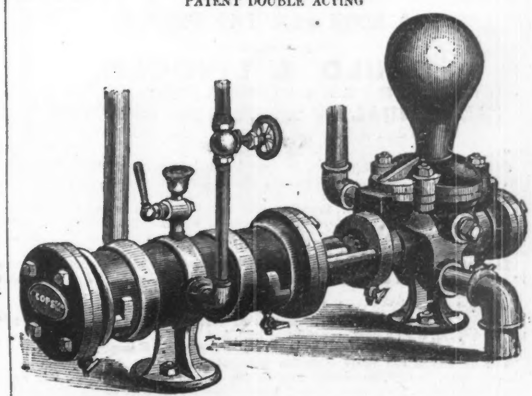

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To that portion of the people, therefore, who believe in a stable government, good men, good laws, and equal and exact justice, we shall continue to appeal for that measure of public favor which is due to the principles we avow.

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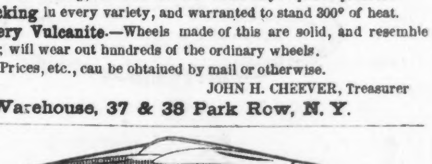

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Our illustration, Fig. 1, represents an ingenious tool for cutting pipe, invented by Mr. Henry Getty, and patented Aug. 6th. 1867. This implement is a great improvement on some of the pipe-cutters now in use.

The head block, A, is forged of wrought iron, and is slotted for the reception of the knife, B, which is V-shaped, and thus makes a drawing cut, no matter how it is turned, and while making a splendid cutting tool, it also serves the double purpose of a rest for the pipe while being cut, and a protection to

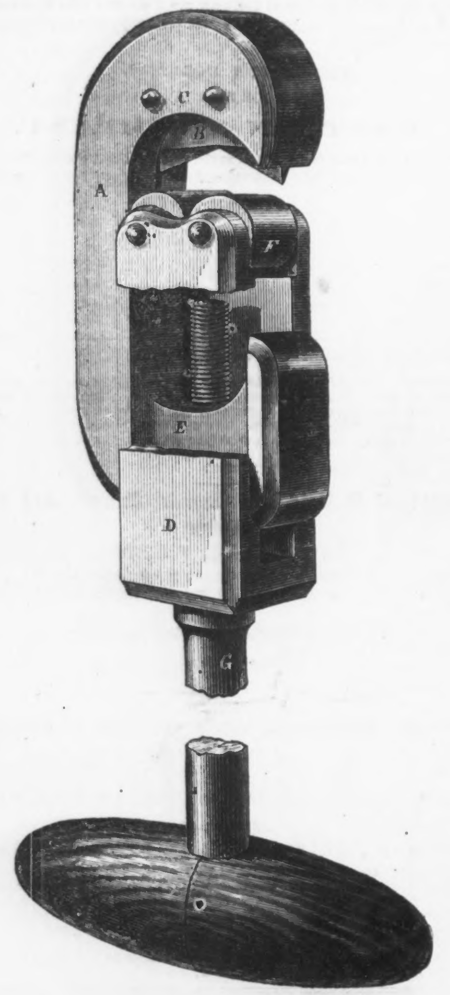

FIG. 1.

the head block. The pins, C, which are tapering, pass through the head block and knife, and thus, though holding the latter perfectly firm, allow it to be easily removed. The slide, D, is of malleable iron, and travels in a broad groove, E, formed on the sides of the head block. It carries the two steel anti-friction and pressing rollers, F, which allow the cutter to work

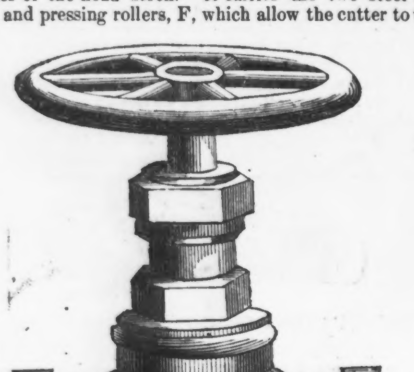

FIG. 2.

smoothly and easily, and also rolls down the burr edge thrown up by action of the knife, and presses the pipe to be cut up against the knife. The handle, G, has a boss formed on it for the purpose of pushing the slide, which carries the anti-friction rollers forward. One end of it is screwed, and works in a thread formed in the head block. The other end has a wooden handle for the purpose of working the implement.

The advantages of this cutter are as follows :—The knives are simple, durable, easily replaced, and they are interchangeable ; the rollers roll down the burr edge, and make the cutter work easily ; the slide is always held perfectly steady, no matter how small the pipe being cut, by means of the grooves in the head block, and also by the handle-rod ; the head block and slide cannot wear out, as the former is protected by the knife and the latter by the rollers. There are two sizes ; one cuts from one inch down, the other from two inches to three quarters of an inch.

This is but one of the many useful tools furnished by the well-known firm of McNab & aHrlin, who are manufacturers and dealers in wrought iron pipe, brass and iron fittings for steam, water and gas. The great demand for globe valves and other fittings, which are so generally used with piping, has incited much enterprise in their manufacture.

Fig. 2 represents the style of globe valves made by the above named firm, who have them in iron or brass of all sizes, from one-quarter of an inch. McNab & Harlin employ over fifty hands at their works, No. 86 John street, N. Y., where can be seen a large assortment of plain and galvanized iron pipe and fittings, pipe taps, tongs and dies, pipe wrenches, gauge cocks, oil cups, steam-whistles, Scotch water-gauge, glasses, &c., &c. These are all so neatly and systematically arranged at the sales-rooms that engineers, machinists and fitters are able to select what they require without delay.

Nitroglycerine or Glonoine.

Nitroglycerine was discovered by the well-known Dr. Sobrero, now Professor of the Technical Institute at Turin, somewhere about twenty years ago. The substance was studied simply in a scientific interest by Dr. J. E. de Vrij, the chemist of the Netherlands Indian Government, well-known for the Analysis of this and testing of the Cinchona bark, and also by Dr. Gladstone, and of late by Dr. Kopp. Up to the end of 1864, nitroglycerine was not only not familiarly known, nor to be had in quantity in commerce, but continued to belong entirely to the domain of science. This may be easily accounted for by the fact that glycerine itself is only in use and to be had on the large scale since the last eight or ten years. When pure, nitroglycerine is a liquid of from 1.525 to 1.6 specific gravity ; it has no odor, is often colorless, or yellowish, has a sweet, pungent, aromatic taste, and is powerfully poisonous. It is only very slightly soluble in water, readily so in either, alcohol, and methylated spirits ; it does not inflame when touched with a light, nor does it explode by being so touched ; but concussion, touching with a red-hot iron, or the concussion due to the explosion of gunpowder, and, better yet, detonating mixtures, and fulminates, sets off the nitroglycerine.

According to Dr. Johann Rudolph Wagner, the well-known technologist to the Bavarian Government, nitro-glycerine may be cooled down to 4° F., without becoming solid ; but it appears, after all, that the nitro-glycerine of commerce, if exposed for a continued period to 46.4° F., becomes solid, crystallizing in long needles, which are most dangerous to handle, since they explode, even on being gently broken, with a frightful violence. At 320° F., the nitro-glycerine begins to decompose, giving off red vapors ; and if the heat be suddenly applied, or slightly raised above this point, the substance explodes instantaneously, and with great violence, shattering even open vessels to atoms. Nitro-glycerine may be assumed to consist of anhydrous glycerine, in which 3 atoms of hydrogen have been replaced by 3 atoms of NO^4. The products of the complete combustion of 100 parts of pure nitro-glycerine are the following :

Water	20
Carbonic acid	58
Oxygen	3.5
Nitrogen	18.5
	100.0

Since the specific gravity of nitroglycerine is 1.6, one volume, say 1 cubic inch of the material, yields on combustion or explosion—

Aqueous vapor	554	volumes, or bulk.
Carbonic acid	469	"
Oxygen	39	"
Nitrogen	236	"
	1298	

According to Nobel, these gases expand on explosion to 8 times their bulk. 1 cubic measure volume of nitroglycerine will, therefore, give 10,384 cubic measures of gases ; while 1 cubic measure of gunpowder will only yield 800 cubic measures of gases. Hence, it follows that, for equal bulks, nitroglycerine is 13 times stronger than gunpowder ; while, by equal weights, the former is 8 times stronger than the latter.

The danger of the use of nitroglycerine is greatly enhanced by the instability of this compound ; even when pure, it is affected by increase of temperature, and at from 68° to 75° F. it is prone to incipient spontaneous decomposition, accompanied by a slow but sufficiently strong escape of gaseous compounds, which, while exerting a slight pressure on the vessels the liquid is contained in, also can cause the fluid to explode on the slightest concussion. During the slow and spontaneous decomposition of the glonoine, there are formed divers products ; among these, glyceric, oxalic, and hydrocyanic acid, and ammonia, and others unknown. Nobel's patent nitroglycerine, or blasting oil, is made in the following manner :—To 13.5 parts, by weight, of strong sulphuric acid, is added 1 part, by weight, of nitrate of potash of best quality, and this mixture cooled down to 32° F. ; the result of which is the crystallizing out of a salt which contains 1 equivalent of potash, 4 equivalents of sulphuric acid, and 6 equivalents of water ; the strongly acid liquid is decanted from the crystals, and to the liquid, commercial glycerine is added, taking care to keep the liquid cold ; the ensuing nitroglycerine is separated from the acid by water, once washed with fresh water, and is fit and ready for use.

The best mode of manufacturing nitroglycerine where it is desirable to use it,—and that is the case in open quarries where one has to deal with tough, hard, rock,—is to make it extempore on the spot where it has to be applied. Take a sufficient quantity of strong nitric acid, density from 1.4758 to 1.4902 ; mix therewith the double of its weight of strong sulphuric acid ; weigh off 3,300 grammes of the acid mixture when quite cool ; take 500 grammes of glycerine, which must be free from either lime or lead salts, and mix the same cautiously with the acid, while keeping the mixture very cool by constantly stirring. Let the mixture stand quietly for about ten minutes, then pour it out in from five to six times its bulk of cold water, taking care well to stir the same all the while. The nitroglycerine will sink to the bottom ; the dilute acid is removed by decantation, the nitroglycerine once more washed with water, when it would be fit for use after the removal of the latter. The glycerine to be used should have a specific gravity of from 1.2459 to 1.2562 ; *i. e.*, contains from ninety-four to ninety-six per cent. real glycerine. Dr. Gladstone has found, while engaged with his researches on nitroglycerine, that the perfectly anhydrous glycerine did not yield, when treated with a mixture of nitric and sulphuric acids, an explosive compound ; but, on the contrary, one which, when touched with a flame, or red-hot metal, burns off pretty quietly. Impure nitroglycerine is dangerously self explosive, even while standing quietly.—*Journal of Chemistry.*

Coal Statistics.

An interesting blue-book has just been issued, containing reports from Her Majesty's Secretaries of Embassy and Legation, respecting the production of coal in different countries. According to these reports, the production of coal in Belgium, in 1866, from 286 mines, was 12,774,662 tons ; the quantity exported in the year was 3,938,768 tons, nearly all of which was sent to France. With reference to the exhaustion of the coal mines, a subject to which public attention has been directed in Belgium, it appears that in Hainault alone, of a coal-producing surface of 54,173 hectares, only 23,423 hectares had been explored in 1860. It is estimated that there were about 4,700 millions of tons yet to be worked, at an easily workable depth, and the exhaustion of the Hainault coalfields above a depth of 1,000 metres, would not take place before the expiration of a century and a half. In Brazil large coalfields have been discovered in the province of St. Catherine's. In China, coal has been discovered at Ponghou, the chief island of the Pescadores. It is reported that no coal useful for steam purposes had yet been found ; a judicious miner, however, could alone settle the question as to the extent of these mines, and the quality of the coal.

At Iwanai, in the island of Yeddo, in Japan, coal mines had been discovered. An experiment was made with some of the coal picked out from the surface of the seams, in the galley fire of Her Majesty's ship Salamis ; seventy-nine lbs. of coal yielded 12:27 per cent. of ash, 1:5 per cent. of clinker, an average volume of smoke, and a strong, durable flame. Another coalfield was found at Yeddo, in the immediate vicinity of the port of Hiogo. The natives had been working it for the last ten years, but not continuously.

Prussia, as is well known, is rich in mineral fuel, especially in very good coals. The quantity of coal to be obtained by the working of the coal pit of the river Saar would suffice for the supply of 3,000 years, at the rate of 2,500,000 metrical tons per annum. The coal pits of the river Ruhr extend over ten miles in length, on the Lower Rhine—a Prussian mile being equal to 24,000 Prussian feet—nearly 4¾ English miles. There were 65 strata of coal more than twenty inches deep, the united thickness of which gives a pure coal 210 feet. It has been estimated that the produce of these pits will last more than 5,000 years, at the rate of 1,000,000 metrical tonnen per annum. In 1865, there were 402 pits at work in Prussia, producing 371,842,299 centners, or nearly 18,000,000 tons of coal—value, £4,954,986 ; they gave employment to 89,192 persons. Hanover possessed thirty-three coal pits. The more considerable fields of brown coal were in the provinces of Saxony and Brandenburg. In 1865, there were 511 of these pits at work, producing £710,437. An appendix to the consular reports shows that in Tasmania, workings have been successfully opened at the north end of the Douglas river coal field. Coal of good quality for steam purposes has been discovered on the east coast of South Brani Island, at Adventure bay ; and a bituminous coal of fair quality has been discovered near Hamilton. Coal deposits are reported in Trinidad ; the finest quality was found at Point Noir ; it burns rapidly, with much flame, and little smoke.

A report by Mr. Oldham, superintendent of the Geological Survey of India, shows that the British territories cannot be considered as either largely or widely supplied with coal. Extensive fields exist, but they are not distributed generally over the districts of the Indian Empire. Specimens of coal from seventy-four localities, showed that the average composition per cent. was, fixed carbon, 52:2 ; volatile matter, 31:9, and ash, 15:5 ; against an average composition of five English specimens of fixed carbon, 68:1, volatile matter, 29:2, and ash, 2:7. He states that the very best coal of the Indian fields only touches the average of English coals, and that Indian coals are not capable of more than two-thirds—in most cases not more than one-half—the duty of English coals. These results of the quality of Indian coals would show the groundless nature of the hopes which have been expressed, that the coalfields of India, Borneo, Australia and New Zealand, would not only contribute large supplies, but would also serve to coal the ocean steamers trading between Europe and those far distant regions. As far as Indian coal is concerned, Mr. Oldham fears it will never supplant the better fuel, now obtainable elsewhere, for ocean voyages.