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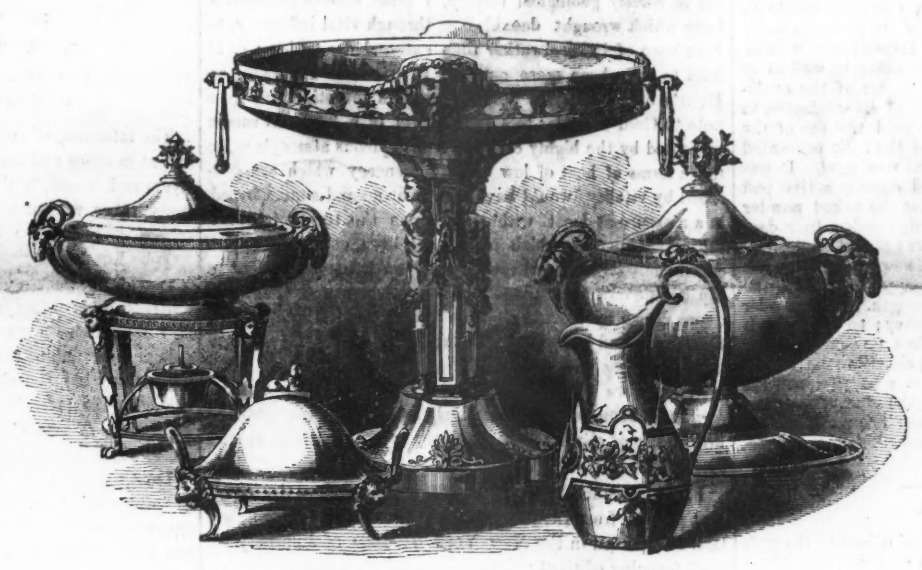
ELECTRO-PLATED SILVER WARE.

With the increase in consumption of silver in this country, we have made steady advance in the art of working it. A piece of silver plate passes through many hands and undergoes many operations before it is ready for service. The manufacture exacts the most careful and skilful workmanship, from the artist who originates the design to the polisher who finishes and burnishes every little crevice and elaborate embellishment. The annexed engraving represents part of a dinner service, made of electro-plated silver. The whole set comprises one center-piece; one sonp tureen; one oyster tnreen; two sauce tureens; two gravy boats; two vegetable dishes and warmers; four double or lock-handle dishes; one salad dish; two pickle dishes; one butter dish; four salt stands; one bread tray; one castor; two salvers. This is one of the styles designed by the Gorham Manufacturing Company, who mannfacture large amounts of silver and electro-plated silver ware. The process of electro-plating has received many improvements from the close attention and persevering enterprise bestowed upon it by this company. In the manufacture of the solid ware the silver nsed is from American and Mexican coin, and its pnrity is thoroughly tested before it goes into the hands of the manipulator. The "scrap" used for making the "skillets" or bars of silver, contains .900 and .925 of silver; the pure silver being reckoned 1.000. The electro-plate consists of a base of "nickel silver" and an external coating of pure silver. The ware passes through the several processes of molding, cutting, shaping, engraving, chasing, annealing and finishing, after which it goes into the hands of the electro-plater, who first dips it in a solution of nitric acid, by which operation it is thoroughly cleansed of any impurities and made ready for its bath of silver. The tank into which the ware is dipped is filled with a composition of cyanite of potassium and chloride of silver, the electric current is turned on and the deposit immediately begins on the surfaces of the articles immersed. The thickness of the silver deposit is snch that the ware possesses all the advantages of solid silver in ntility, and has an appearance nndistinguishable from pnre solid silver. The Gorham Mannfacturing Company have a very extensive and well planned manufactory in Providence, R. I., and their sales rooms, at No. 3 Maiden Lane, New York, are stocked with goods of the most beautiful and elaborate description.



GORHAM MANUFACTURING COMPANY'S ELECTRO-PLATE.

Construction of Mine Shafts.

Mr. H. T. Richardson, of Aber Hirnant, Bala, North Wales, proposes a "tnbnlar shaft-casing and life-stair for mines, etc.," which consists of two galvanized iron tnbes, placed concentrically in a shaft, with a flight of stairs between them; the inner tube is to be nsed as the "trading" shaft. The inventor remarks that of entrances could be left to meet the requirements of galleries, great ventilation could be given to the mine, and a free way of escape would always be open to the miners in case of accident. The diameter of the tubes would be regulated by the size of the shaft. The tubes are to be built in lengths of twenty-five feet; the extra strength of the lower sections wonld be regnlated by the depth of the mine. The casing wonld strengthen the sides of the pit shaft and prevent any falls or giving way of the sides.

Chemical Manufactures at the Late Paris Exposition.

Among the innnmerable variety of chemical prodncts and minerals at the late Exposition, it was gratifying to note so many snbstances which but a few years since, from their rarity, possessed merely a scientific interest, that are now mannfactured at will and in large quantities. Wöhler discovered, in the silicate of alumina—pure kaolin—the metal aluminium, and St. Clair Deville, in 1854, first produced it on a large scale, and since then it is nsed for technical purposes. Although aluminium has not gained the importance which had been predicted for it from its great lightness, it is, notwithstanding, destined to play a conspicuous role in the arts. Cryolite, again, is a mineral which, for a long time known only to the mineralogists as a rarity, was first turned to practical account by Henry Rose. Since the discovery of heavy beds of the "ice-stone," an industry has been established in the extraction of soda and production of fluosilicic acid, a valnable substance, not to be disregarded. In the refining of the crude beet molasses, the beautiful iron-free sulphate of alumina, mannfactnred in large quantities in Natrona, Pa., is being substituted generally for alum, which because of its property of holding a large amount of water of crystallization, increases the expenses of its transportation. The chloride of chromium, a magnificent violet substance, has been applied to the printing of wall paper, imparting a peculiar, beautiful aspect, hitherto unknown. The metal thallium, which was discovered by spectral analysis and exhibited in all its important combinations by Hopkins and Professor Laury, is already employed by the latter as a substitute for lead, in the manufacture of glass, thns forming a new crude material in the preparation of highly refractory optical lenses, and of brilliant imitations of gems. The indinm, exhibited for the first time in bars of several pounds' weight, will find use in pyrotechnics, and, perhaps, also in photography, more so than magnesium, on acconnt of its emitting a chemically, very active light. The naphtaline of the gas works forms the starting point for the preparation of a new coloring principle, which has found use in dying and printing. The camphor-like smelling sesqui-chloride of carbon, a substance theoretically important as forming a link between organic and inorganic chemistry, serves at present for the production of the beantiful aniline dyes, not to refer to its value as an antidote to choiera.—*Scientific American.*

Bridging the Hudson River.

Various propositions for bridging the Hudson River in the neighborhood of the Highlands are now before the New York Legislature. One is a proposition to bridge it at Peekskill, the bridge to rest on Dunderbergh Mountain on one side, and on an eminence near the Road Hook on the other. There is also another project for a bridge across the Hudson, from the top of the ridge at Fort Lee to the high gronnd at Fort Washington. It is said that such a bridge would enable the western lines of railroad, whose terminus is now at Jersey City, to carry their passengers into the npper part of New York, and to save, in doing so, from ten to twenty miles of distance, by a more direct and convenient approach to the City.

Petrified Forest.

Near the tombs of the Caliphs, in the vicinity of Cairo, Egypt, is a perfectly barren and desolate region, where are found numberless fragments of petrified wood. The oak, beech, chesnut and others, none of which are now found growing in the country, are distinctly recognizable among these fragments; but scarcely a trace of the palm, sycamore, or fig tree—which are the species at present indigenous to that region—is found. The largest of these specimens is ten feet long, and one foot in diameter. The original color of the wood is well preserved. The perforations produced by the passage of insects through the bark are clearly visible, and a gummy secretion has been fonnd in some of the holes made by them.

A New Method of Making White Lead.

Several processes have been devised for producing white lead in less time than is reqnired by the old Dutch process, still followed in the manufacture of the best article. They have resulted, however, for the most part, in comparative failures. The pigment produced by precipitation has in general a crystalline character, which seriously interferes with its covering property, and thus deteriorates its value. A process has recently been devised by M. A. Girard, which is perhaps superior to most of the new modes of mannfacturing white lead. Metallic lead is, in the first place, grannlated. It is then placed in a barrel (which must be made of beech or horn-beam wood, not oak), with one-fourth its weight of pure water. The barrel is placed on an axis, so that it can be made to rotate at about thirty or forty turns a minute, and arrangements are made so that a current of air can be forced through at the same time. After rotating for about two hours almost all the lead will be found oxydized; and now a current of carbonic acid is substituted for the air, and the rotation continued for four or five hours longer. After this time nearly all the lead will be found converted into the hydrated carbonate, the true white lead, which can be separated by decantation from any of the metal unacted on, and washed and dried. The product, so made, we are inclined to believe, will be as good as that produced by the old process.—*American Artisan.*

Artificial Gems.

The base of these gems, as patented by the Superintendent of the Royal Porcelain Works at Berlin, is a flux obtained by melting together 6 drachms of dry carbonate of soda, 2 drachms burnt borax, 1 drachm saltpetre, 3 drachms minium, and 1½ onnces of purest white sand. To imitate in color, but of course not in composition, the following minerals, add to the flnx the ingredients named in connection with each gem:

Sapphire.—Two grains carbonate of cobalt.

Opal.—Ten grains oxyd of cobalt, 15 grains oxyd of manganese, and from 20 to 30 grains protoxye of iron.

Amethyst.—Four to 5 grains carbonate of peroxyd of manganese.

Gold Topaz.—Thirty grains oxyd uranium.

Smaragd.—Twenty grains protoxyd of iron, 10 grains carbonate of oxyd of copper.

Beryl.—Ten grains protoxyd of iron.

Fluids in Crystals.

At a late meeting of the Manchester Literary and Philosophical Society, Mr. J. B. Dancer gave a history of the discovery of fluids in crystals, including Sir Humprey Davy's chemical experiments with fluids and gases obtained from the cavities in qnartz crystals: Sir David Brewster's discovery of their presence in the diamond, ruby, emerald, amethyst, chrysoberyl, &c., of the existence of minute crystals in such cavities,

and of the two remarkable fluids, colorless hydrocarbons, found in amethyst from Siberia and quartz from Quebec, named brewsterline and cryptoline; both are sometimes found in the same crystal, but are not miscible. Brewsterline is said to be 32 times more expansible than water. Mr. Dancer described numerous crystals from various parts of the globe examined by him which contained fluids; the most noticeable being in fluor spar of Derbyshire which burst at 180° F. temperature. He suggested the employment of the microscope in distinguishing spurious from real transparent gems. At the conclusion of his remarks, crystals containing fluids were exhibited under the microscope, and, while under examination, the temperature of each was elevated to show the expansion of the fluid within it.

A New Explosive.

We take the following from a San Francisco paper: On the 14th inst. a large company witnessed several experimental blasts on the military road now being cut out of the steep mountain side at Lime Point, across the bay. The first experiments were on two 42-pound cannon balls, of tough gray cast-iron. Into a hole, in each, three inches deep and three-fourths of an inch in diameter, a small quantity of giant powder was dropped. Into the powder was inserted a fuse having a percussion cap at the bottom. The explosion was in each case like the sharp crack of a rifle. The cannon ball was torn apart in every direction, mostly into small fragments. The action seemed to be particularly downward, as nitro-glycerine acts. The power and easy application of the new explosive were made clearly manifest. But this fashion of tearing its way downwards made it impossible for the spectators, at the moment, to observe its effects in the blasts of the loose textured rock which the shock covered up. The workmen who remove the rock can alone pass judgment on the effects, compared with ordinary powder. Two holes adjoining were charged with each kind of powder. One had twelve pounds of common powder, the other three pounds of giant powder. The former made the loudest report, and the greatest shower of stones upwards. The latter gave out the duller sound which indicates more effective shattering below. Wherever the rock was hardest, the power of the new powder was best demonstrated. The place chosen and the variety of rock seemed designed for contractors on open work to judge of the new powder as adapted to such work The chief value of the great powder on this coast would be in quartz mining. We suggest a trial of its power in hard, baked and fully exposed rock, for the inspection of miners The holes should be made to fit the cartouches, as well as to prevent delays as to fairly test the full power of the explosive. The holes at Lime Point were not of sizes adapted to the prepared powder charges, which obliged the use of the article loose, and the fissile character of the rock prevented the retention of the water tamping that was used. It was noted that the operator had his lighted cigar in active puff while handling the loose powder, and that the naked powder was rammed down with a stick, indicating freedom from danger in handling. Some of the powder was placed on a three-inch plank, in a small single envelope of newspaper and fired. It made a ragged and tearing hole downwards through the plank, splintering it along its whole length. The powder looks like guano in color and in consistency; to the touch it is like finely rasped box-wood; it makes no smoke. The purpose of the exhibition was stated publicly to be a final test, upon which depended the closing of a bargain with the inventor. It is not yet patented, and therefore the ingredients are kept secret from the purchasers. Nor will the inventor's agent permit one to have possession of a sample, lest it might be analyzed.

Mining in Mexico.

We have news from the San Luis Potosi Mines to the 26th ult. The Brownsville (Texas) *Ranchero* says that Senor Don Anselmo Frago, State Inspector of mines, for the State of San Luis Potosi, has completed his tour of inspection to the mines of Real del Catorce, Charcas and Cerro de San Pedro. It appears that since the State Mint has been removed from Real del Catorce to San Luis, the state capital, that those mines have been partially abandoned, and that the *marco*, eight ounces, which formerly brought eight dollars, is only valued at four to six dollars at these mines. There are forty rich mines at this place, and should produce with an average number of working hands $350 000 to $800,000 weekly, but yield at present only $50,000. The Charcas Mines are doing well for Mexican mines and are producing just at present the best results of any there in the Republic. The principal mines are San Joaquin el Alto, Santa Rosa, La Vascondado, San Jose, San Andres, San Diego and Minas Grandes. There are here four large quartz mills, named La Luz, La Gongora, San Francisco and Refugio. These are worked night and day by mule power. All are situated in the City of Charcas. The traveler who goes to the City of Mexico through Brownsville, Monterey and San Luis by stage, has to remain all night at Charcas, and he may by stating his desire to do so to the agent of the diligence company remain at Charcas as many days as he wishes. It is worth one's time to do so. One mine alone in this neighborhood, with an expense only of $169,436, since 1862 to January 1, 1868, has produced silver to the value of $5,459,160. The Santa Rosa mining company are taking out at present $95,000 worth of silver each week. It works 460 hands at *tres reals*, thirty-seven and a half cents each, daily. The inspector says that the cost of producing at these mines twelve *cargas*, or about $60 clean silver, is only three dollars. The San Pedro mines will be the subject of another article. The Charcas mines are all within six days stage ride of Brownsville. * * * The silver mines owned by Davis & Co., who lately failed at Zacatecas for $600,000, are making large returns. The creditors of that house refused to take the $30,000 left when they failed, but told them to "go ahead and pay when you can." With that sum they put larger numbers of hands in the mines. The result is that in a few months they will be able to pay dollar for dollar. * * * At the silver mine near Rincon de Romas, in the State of Zacatecas, the miners have met with a layer of gold seven inches in width and three-eighths of an inch thick."

[We hope the *Ranchero* is not given to telling sensational stories.]—ED.

Original Papers.

THE EOZOIC OCEAN—NO. II.

EDITOR AMERICAN JOURNAL OF MINING:

SIR—In further correspondence with STERRY HUNT, since the date of my last note under this head, passages occur whose bearings upon the main subject of that note are so important as to demand attention here, before we proceed further. In fact, by a remarkable coincidence, one passage in a letter received by me on the 20th instant, is in direct, natural and very interesting sequence with my concluding paragraph, as published by yon on the 21st. I take the occasion to point out that the origin and establishment of the principle of formation of metallic sulphides, by the reduction of sulphates through organic matters, were due to him. He now. himself, cites, in illustration of this very position, the following passage from the *American Journal of Science*, May, 1861:

"The great processes of deoxidation in nature are dependent upon organization; plants by solar force convert water and carbonic acid into hydrocarbonaceous substances, whence bitumens, coal, anthracite, and plumbago; and it is the action of organic matter which reduces sulphates, giving rise to metallic sulphurets and to sulphur."

Professor HUNT also indicates that other writers, besides myself, have adopted and advocated this theory, quoting from MOHR'S *Geschichte der Erde*," Bonn, 1866; "*Thesis* 39," page 514.

"Sulfur et sulfuris combinationes in terra ad gypsum marinum referuntur: pyritæ, generaliter dicta sulfureta metallica, ex oxydo metallico, sale sulfurico, corporum organicorum laboro, et aquæ adminiculo, originem ducunt."

[Literally in English:—"Sulphur and combinations of sulphur in the earth, are referred to marine gypsum; pyrites, generally called metallic sulphurets, derive origin from sulphuric salts of metallic oxides, by the agency of organic bodies, and with the aid of water." This recent work of the distinguished chemist MOHR, which I have not encountered, HUNT pronounces "a curious and excellent one."]

To a full comprehension of my own views, a brief comment upon the above passage from HUNT seems needed. As he has summed up the history, it applies exactly to the later eras; but in *earlier* geological history, I must believe the motive force which wrought deoxidation, through vital influences, to have been of internal rather than external derivation; or at least to have been more *cosmical* than solar. Following up HUNT'S own deduction from TYNDALL'S investigations (see note to Gold-Genesis: this Journal, vol. iv, p. 339); the screen presented by the highly carbonic and aqueous atmosphere, to those forms of heat of low radiating energy which are governed by vitality, would have also pent up and concentrated, in a measure at least, within and upon the terrestrial crust, those heat-energies which must have been copiously engendered throughout the chaotic era of *oxidation* antecedent to the Eozoic dawn. I admit that we have, however, the evidence drawn by BUCKLAND from the eyes of trilobites, that solar light had begun to reach the coasts of the Eozoic continents during the earliest Silurian periods; but even in far later times we have strong evidence that the action of solar *heat* must have been comparatively feeble, from the admitted *uniformity of climate* of those days, over the whole earth's surface.

I am also enabled now to lay before your readers the important passage from Dr. HUNT'S Lowell lectures of winter before last, as reported in the New York *Tribune* of February 15, 1867 (evening edition):

"GEOLOGY OF THE METALS.—The metals were doubtless dissolved in the waters of the primeval sea at its formation, and were in great part precipitated in its early sediments, to be again dissolved by infiltrating waters, and brought to the earth's surface. From their soluble oxidized condition, they have been reduced by organic matters, sometimes to the metallic state, as in the copper of Lake Superior, but more generally to the condition of sulphurets. Whenever decaying organic matter encounters sulphates, which abound in sea-waters, they give rise to sulphides, or to sulphuretted hydrogen, which is nature's great agent for precipitating metals, and removing them from the terrestrial circulation. Hence we find in various rocks sulphurets of iron, copper, zinc, and other metals; sometimes in considerable proportion, forming workable beds of ores, but more generally sparingly disseminated. Nature's way of concentrating these sparsely scattered metallic matters is, to dissolve them out by certain mineral waters, generally when the strata are deeply buried. Those waters ascending through joints or fissures in the rocks, and becoming gradually cooled or changed, deposit upon the walls of these their dissolved matters in the shape of ores, often mixed with spars and other minerals which constitute the veinstones. Experiments show that alkaline bicarbonates and sulphides, which abound in the hot mineral waters, are the proper solvents for the diffused metals, and this process of concentrating the metals in veins, is doubtless now going on in portions of the earth's crust."

It will be seen that he repeats here the substance of his paragraph of May, 1861, quoted by me last week; carrying the story, however, further back, as I did in my paper of 1866, (see the first three postulates of my metallo-genetic theory—this Journal, iv, 323;) so as to comprehend the sulphatic view of the constitution of the Eozoic ocean. My further discussion of this point will again, I find, be crowded out, and must be deferred to another note. I wish at present to quote a further passage from Dr. HUNT'S last letter, of special interest as conveying facts regarding the mineralogy of the peculiar Nova Scotia gold-field, which he has very recently visited and thoroughly explored; and of which we have little information from so competent a source, since the report of Prof. B. SILLIMAN, which drew so much attention to this region in the early days of its development.

"I wish to allude to Nova Scotia, probably the richest gold region known; where the sworn returns of the whole quartz raised for three years (nearly 100,000 tons) show an average of 20 dwts. to the ton, much above the average of California or Australia. Here the gold is in quartz bands (of vitreous quartz) interstratified among sandstones and slates, without a trace, in the first place, of chlorite, amphibole, talc, or indeed any silicated mineral beyond the argillite and greenish quartzite. Pyrites, too, is rarely, very rarely, seen. In some lodes a little blende, rarely galena, chalcopyrite, and more often mispickel occur; but great regions show nothing but gold in pure quartz, without a trace of sulphide. Now I am inclined to suggest that gold, as one of the metals least prone to oxydation, is one that is transported without oxydizing media, and probably alkaline sulphides. It seems clear that the same solvent liquid which deposited these beds (for so I regard them, they being veritable floors) of hyaline quartz, also held the gold, and I suppose that to have been alkaline, and the same time sulphuretted. Sometimes, it is true, sulphur seems to have been wanting, as when the gold is directly imbedded in ferriferous carbon spar (at Madoc and in the Chaudière) but these are rare cases."

I have but space for a few words in comment. While far from disposed to deny the possibility, in exceptional cases, (of which one may have been this remarkably exceptional gold-field,) of ascending currents, and even of alkalic sulphuretted solvents—in the solution, convection and concentration of gold—I cannot think such cases common in the majority of known auriferous districts. Nor can I admit that a deficiency of iron minerals deposited with free gold, necessitates the rejection, even in that special case, of deposition from ferric solution; as local influences seem to me very possible, through which such powerful and extreme oxidations might prevail, as have been indicated by me in Equations 9 and 13 (This Journal, Vol. 5, p. 130), the subsequent deposition of free gold being due to a reduction to the ferrous state only, the iron thus remaining in soluble forms. The conditions Professor HUNT alludes to, of free gold in both vitreous and milky quartz, with little or no iron, are far from uncommon, as local phenomena, in many other gold fields.*

I shall await, with much impatience, the publication of Dr. HUNT'S report of his Nova Scotia explorations, which cannot but be of extreme interest and importance.

HENRY WURTZ.

26 PINE STREET, NEW YORK, March 23, 1868.

* Compare, for example, B SILLIMAN on the Grass Valley District, California, in *Am. Jour. Science* for September, 1867, p. 239.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

THE MICROSCOPE:

History of its Invention, its Geological Teachings, and its Uses for the Miner, Mineralogist and Chemis .

BY P. H. VAN DER WEYDE, M. D.

No. VIII.—Continued from Vol. V., Page 146.

ON THE FUNCTIONS OF THE INFUSORIA AND OTHER AQUATIC ANIMALCULÆ IN THE ECONOMY OF NATURE.

The infusoria, of which we have described the numbers, extent in space and time, and activity, are the scavengers in rivers and oceans, in the same manner as our common fly, and many other winged insects, are the scavengers of the atmosphere.

Who has not observed, when some dead animal is, in summer, lying by the roadside, how it is continually covered with different kinds of flies, who are laying their eggs on its surface; how soon those eggs develop into maggots, which eat the animal in the incredible short time of three or four days, leaving nothing but the skeleton; how the maggots then assume the chrysalis form, like the caterpillar, and again, after the short time of two other days, develop into new winged insects, which go off on the same errand as their ancestors.

LINNÆUS said that three flies would consume a dead horse as quickly as a lion. He referred, of course, also to the offspring of the three flies. It has been proved that a single fly has laid 20,000 eggs, producing as many maggots—each of which eats so voraciously as to increase his own weight in twenty-four hours more than two hundred times.

It has been observed that in seasons and localities where the cholera morbus was raging, the usual number of flies was either entirely wanting or nearly reduced. In a similar manner, when any organic matter, either vegetable or animal, is decaying in water, immediately thousands and millions of infusoria spring up, the function of which is, with insatiable voracity, to devour and assimilate the particles of this organic matter. We must in some degree be indebted to those ever active, invisible scavengers, for the salubrity and purity of many of our waters, as we are indebted to the flies and other winged insects to some degree for the purity of our atmosphere. But this is not all; they perform a still more important office in preventing the too rapid diminution of the present amount of organic matter upon the earth. For when that matter is dissolved, or rather suspended in water, in that state of comminution and decay which immediately precedes its final decomposition into the usual inorganic combinations of carbonic acid, water, ammonia, cyanogen, etc., and its consequent return from the organic to the inorganic world, those wakeful members of nature's invisible police are everywhere ready to arrest the fugitive organized particles, and turn them back into the ascending stream of animal life. Having converted the dead and decomposing particles into their own living tissue they themselves become the food of larger infusoria, and of numerous other small animals, which in their turn are devoured by larger ones; and thus a food fit for the nourishment of highest organized beings is brought back by a shorter route, from the extremity of the realms of organized nature. Prof. OWEN says that "these invisible animalcules may be compared in the great organic world, to the minute capillaries in the microcosm of the animal body; receiving organic matter in its state of minute subdivision, and when in full career to escape from the organic system, turning it back by a new, shorter route, toward the central and highest point of that system."

An important question naturally suggests itself: whence

come the first individnals, which are always found in any amonnt of water large or small, in which organic matter is present, whether in the state of decay, or as living aquatic plants?

The very term *infusoria* is applied, becanse they were first discovered in water where vegetable matter was decomposing, and therefore an *infusion* was considered necessary for their prodnction. It is, however, proved at present that they are prodnced in a higher state of organization in pure streams and clear ponds where living aquatic plants are thriving, than in pntrid and stagnant waters. The aquatic plants and the decaying matter are the food on which they live, and all that is necessary for their apparent spontaneons generation, besides this food, is access of air and light. The doctrine of *spontaneous generation*, which means that atoms of organic matter may, under certain circnmstances, assume vitality and develop into organic structures, had once many supporters; among them LINNÆUS, as I have mentioned (AMERICAN JOURNAL OF MINING, vol. III., page 242); but it was subseqnently abandoned; and at present the most prominent opinion is, that the eggs or germs of infusoria are almost omnipresent, fill the very dust of the atmosphere we breathe, and are always ready to develop a being and spring into active life as soon as the circumstances are favorable to their development and existence. A fact in favor of this doctrine is that when fresh air is excluded, or only air admitted which has undergone a treatment by heat or chemical action sufficient to destroy in it any germ of animal life, no infusoria are developed. LEUWENHOCH discovered as early as 1676 that this was an indispensable condition. It was even fonnd that the animalculæ themselves are endowed with a certain kind of indestructibility, which is very snrprising. When the water or mud in which they have lived in the fullness of buoyant health becomes dried up, they lie an inanimate and invisible speck of matter; but after months, nay years, a drop of water being applied, their bodies will be resnscitated, and in a short time they become active with life. LEUWENHOCH kept some in a hard and dry condition, and restored them to life after twenty-one months. OWEN saw animalculæ that had been buried in dry sand for four years, retnrned to all the activity of a new life, and SPALANZANI tried the experiment of alternate life and death, and accomplished it in some cases on the same objects fifteen times in snccession.

The most wonderful of this, is the consideration that it is their very smallness which protects them most perfectly from mechanical injnry; this is strikingly illustrated by the microscopic inspection of the covering on the surface of a so-called Porcelain visiting card; it is Paris white, which is nothing but exceedingly fine ground chalk, of which the coarser particles are washed out. This kind of whiting is also sometimes used on the walls of our houses, and scraping off a minute particle, we find it to consist of the calcareous shells of the animalculæ which once originated this deposit, for the greater part in perfect condition, uninjured by the grinding and rubbing it has nndergone. In fact rubbing in a mortar will scarcely destroy the forms of these organized atoms.

Add to these facts the elaborate complexity of their vital organisms, and we must be astonished how such a degree of indestrnctibility may be combined with this complexity by the simple reason of being of such infinitesimal dimensions. To this complexity I have already allnded (Vol. III. p. 242) and will qnote here, SWAMMERDAM, who in Holland, already two hundred years ago, wrote:

"I cannot, after an attentive examination of the nature and structure of both the smallest and the largest of the great family of natnre, bnt allow the smallest an equal, perhaps a snperior degree of dignity. Whoever dnly considers the condnct and instinct of the one, with the manners and actions of the other, must acknowledge all are nnder the direction and control of a snperior and snpreme life-giving and omnipresent Intelligence; which, as in the largest it extends beyond the limits of our comprehension, escapes onr researches in the smallest. While, if we dissect with care the larger animals, we are filled with wonder at the elegant disposition of their limbs, the inimitable order of their mnscles, and the regular direction of their veins, arteries and nerves, to what height is our astonishment raised when we discover all the different parts arranged in the smallest of them in the same regular manner? How is it possible but that we mnst stand amazed, when we reflect that those little animals, whose bodies are smaller than the point of our dissecting knife, have muscles, veins, arteries, or the equivalent to those and every other part common to larger animals! Creatures so very diminntive, that our hands are not delicate enough to manage them, nor onr eyes sufficiently acnte to see them!"

This excellent investigator of natnre was almost two centnries ahead of the times, as it is only in our day that the importance of this branch of stndy to the geologist and mineralogist has become fully appreciated. The combined efforts of the microscopists, in different parts of the civilized world, have prodnced the knowledge of nearly 2000 different forms, of an incredible variety, notwithstanding that only a comparatively small portion of the earth's surface has been explored for this purpose. In fact, only the easily accessible portions, sitnated at no great distance from the ocean, have been investigated; and millions of sqnare miles of monntainous regions, and the bottoms of the oceans, are a new field, waiting for the searching and scrutinising eye of the investigator, armed with that powerful instrument, the microscope.

When placing snch organised dust under the microscope, nothing bnt dust is seen; the form remains entirely hidden. EHRENBERG invented a method to make them visible, which method is now universally used for that purpose; and will be explained in the next nnmber of this journal.

[TO BE CONTINUED.]

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

MINING AND METALLURGY IN MEXICO—VII.

A SKETCH OF THE SYSTEM OF WORKING MINES AND OF EXTRACTING THE PRECIOUS METALS FROM THEIR ORES, AS PRACTICED IN MEXICO. BY DAVID COGHLAN, MINING ENGINEER, SCRANTON, PA.

Continued from Page 162.

AMALGAMATION IN BARRELS.

This is practiced partially in some districts of Mexico, and is successful with some classes of ore, bnt is not generally popular. It has been adopted more extensively in Real del Monte than in any other mining centre. In Germany, the whole ore of a district being treated in government metallurgic works, and the silver paid for according to amonnt shown by previous assay—the different classes can be so mixed as to contain exactly the proportion of silver and pyrites suitable for this method, and this gives a great advantage over a private establishment, where only one class of ore is generally available, and partly accounts for its greater snccess in Europe. Besides, the best talent of the mining schools is available, and each man can devote himself to a particnlar branch of the operation for his lifetime in extensive establishments of that sort. In Real del Monte the barrel works are moved by water power, but small concerns generally use horses. I have seen an ingenions application of this latter power. In a vertical axis turning freely is inserted the horizontal axle of the barrel, also turning freely in bearings inserted in the vertical one. To the outer rim of the barrel is attached a wheel of about a foot greater diameter than the barrel itself, which rolls on a circular rail, having the axle for radius; between this rail and the centre of the circle, is a depressed pit for emptying the barrel at the conclnsion of the operation. A horse is attached to the outer end of the horizontal axle and goes ronnd in a track outside the rail, drawing the barrel, and causing it to revolve at the same time. No gear is required, and the apparatus is extremely simple, and never gets out of order as long as the barrel lasts. No description of this process is required, as it has been so frequently described. The silver yielded by this amalgam is always very impure, and must be refined in a cnpellation furnace. The cost of this system of treatment is estimated at abont $40 a ton in the small establishments. The charge of each barrel is 750 ponnds, and they consider that the richness of the ore best fitted for this process, is from 100 to 200 ounces of silver per ton of ore. Only a part of the silver is obtained from the ore in this way, in Real del Monte, and the remainder is afterwards extracted in the "patio."

SMELTING.

The ores subjected to this process are silver lead, ruby silver, very pure sulphurets, and ores rich in native silver. For those in which lead is the leading ingredient, it is the only method used, and, where fnel is available, is done economically and quickly, owing to the easy fusibility of the mineral. Indeed, it is the only available way of treating these ores. The calculation of its desirableness depends as well on the price of lead in the vicinity, as on the amount of silver contained. Generally speaking, the amount of the latter metal is small, though sometimes rich mines are found. After the extraction of the lead from the gangne, by smelting, it is submitted to cupellation, to separate the silver—the lead being transformed during the process into litharge or oxide. Ruby silver, native silver, and common sulphurets, when attaining a certain degree of richness—say 40 lbs. to the ton—are also invariably treated thus, bnt require an addition of litharge and carbonate of soda—the first to combine with, and gather up the particles of silver, as well as to aid the fusion of the accompanying substances. The carbonate of soda is entirely for the purpose of forming the easily fnsible alkaline silicates. The principal reason for preferring this method for ruby, snlphuret, and native silver, when rich, is owing to the enormous loss of quicksilver, in proportion to the quantity of ore, which would take place if treated by amalgamation; thns rendering preferable the reduction by fire; though this is also extremely costly, and mnch more nncertain in its results. In Germany the tendency seems to be to treat almost all classes of ores by fire, rather than by amalgamation, since railroads have lowered the valne of fuel in the mining districts; but I would wish to explain the reason this method cannot be followed in Mexico with advantage, except in the rare cases of very rich minerals. First, The price of fnel is every where most extravagant. 2nd, The apparatns employed is of the most primitive and ineffective sort. 3d, From the preceding canse, as well as owing to the want of skillfnl workmen, there is a loss of fifteen to twenty-five per cent of silver. 4th, This method mnst be carried on by night and day; and in many other ways it affords a facility for dishonest abstraction of the silver, without the closest snpervision. From this we see that, while the amalgamation processes have been carried to very great perfection in Mexico, the same is far from being true as regards smelting operations.

When a considerable amonnt of blende and snlphur accompanies the ores, previons bnrning is reqnisite, for these are as great enemies of the smelter as of the amalgamator; but generally no such operation is reqnired. When it is practiced, the ore is heaped on a layer of charcoal, and retained by a loose wall with apertnres to admit the air, when the fuel is fired, and it is left to smoulder for a week or ten days. The smelting furnace is abont 6 ft. high, built of "adobe" or snndried bricks, of so bad a quality that the sides and front must be replaced once a week. The npper part into which the ore and fuel is thrown, is about 2 feet long and 1½ feet wide, tapering downwards to the nozzle of the bellows, which enters through the wall behind, about a foot above the sole; and where the interior of the furnace is not above a foot in diameter, a dome is built over the furnace, so as to catch the fumes, and carry them off as much as possible, to save the workmen from their injurions effects. The construction is the same as those represented as being in nse in Germany, bnt the smaller height (only abont ½) is injnrions to its efficiency; the blast is weak, and the materials of construction are of the worst class. The blast is formed by a pair of bellows moved by hand, but sometimes by horse power. Water power is also applied to form a blast, either directly by the falling of the water in a confined tnbe, or by cranks attached to the shaft of a water-wheel, and moving the bellows. The fuel nsed is charcoal. The ore, broken to the size of a nut or smaller, and well cleaned, is mixed with carbonate of soda and litharge, also with the slag of preceding operations, and portions of the hearth of the cnpelling fnrnace, saturated with litharge. The proportions of these different ingredients depend on the class of ore, or judgment of the smelter. The proportion of litharge is generally from ½ to 1½ times the weight of the ore. These additions are only used with the ores not containing lead; plnmbiferous minerals require no admixture. The carbonate of soda used is an impure one, and is gathered in great abundance on the shores of many lakes scattered through the country. Its composition has been determined by Berthier to be:

Anhydrons carbonate of soda	516
Anhydrous sulphate of soda	153
Sea salt	45
Water	247
Earthy mattors	30
	990

Charcoal being lighted in the base of the furnace, a quantity of poor lead ore is added, layers of each material being piled up so as to fill the furnace, and the blast is sustained. This is done for the object of coating the sides with a lead glaze, and to avoid the waste of rich mineral for this purpose. Then the layers of charcoal and the mixture described above are continued, the furnace tapped at intervals, prodncing each time a pig of rich lead, from which the slag is removed. These small furnaces will not smelt more than a ton and a-half a week of refractory ore, at a cost, inclnding refining, of from $150 to $300 a ton; a qnantity of lead equal to the weight of ore being lost. But the case is very different with silver lead ores, as each furnace will smelt three times the quantity and no additional mixtnre being used, the expense is much less, not being above $15 a ton. I have known of Pattinson's process being applied but in one place near Monterey, and it was successful. After undergoing this preliminary operation, the pigs are put in a cupelling fnrnace of the following description:

The arrangement of fireplace and hearth very mnch resembles in miniature a reverberatory furnace. The hearth is about three feet in diameter, covered in by a low dome of brick, and the flame of a fire of resinous wood plays over the lead bath and ascends through a sloping flue, about six feet long. No stack or other means of creating a dranght is employed. A bellows is placed behind so as to blow a current of air on the surface of the lead, at right angles to the direction of the flame, and in front is a small hole, through which the oxide of lead is skimmed with an iron hook. The draught from the bellows both oxidizes the metal and forces the film formed on the surface to the opposite side. When the lead has been all oxidized, a reguln of silver remains; the colors of the iris appear, marking the conclusion of the operation, the precise moment of which is evident to a practiced eye; the blast is stopped, the fire slackened, and the silver soon solidifies into a cake, which, after a few moments, can be removed with a tongs.

The furnaces used for making ingots, or bars of silver for transmission to the mint, are of exactly this construction, only no bellows are needed. The pieces of silver are thrown on the hearth, so as to form a bar of about 75 lbs. weight; they soon melt down, the outlet is tapped, and the molten silver runs into a square iron vessel, coated with a lining of ashes and refractory clay. Melted silver has the property of absorbing twenty-two times its own bulk of oxygen from the air, and this causes, by its escape as the bar cools, violent ebullition, forming excresences, spoiling the smooth surface of the top, and even projecting small grains to a distance.

Sometimes small qnantities of very rich ores are smelted and refined at the same time in the cnpelling furnace. The powdered mineral being ponred on a lead bath, the silver combines with the lead, and the dross and slag are skimmed off; then the refining process is carried on with the remaining rich lead. In some places, Germans have erected furnaces in the most approved European fashion—the masonry consisting of cut gneiss blocks, which last for a very long time without repairs, bnt these cases are exceptional.

☞ An Electrical Clock in the rotunda of the Philadelphia Merchants' Exchange has a running gear of the simplest description, consisting merely of two cog wheels and a ratchet wheel. The driving power is supplied by a weak galvanic battery, the currents from which, transmitted through two galvanometer coils placed one on each side of the clock case, act upon steel bar magnets set within the pendulum ball. The latter swings between the two coils, so that when one of them is "positively charged" the ball is attracted until by contact it becomes similarly electrified, and consequently repelled, then swinging over to the "negative" coil, it becomes negatively charged, again repelled, and thus the vibrations are kept up indefinitely, or as long as the battery continues working. The alternate positive and negative charges are made and broken by a simple slide bar moved by a wire pin on the pendulum rod.

Mining Summary.

GOLD AND SILVER.

Colorado.

CENTRAL CITY, C. T., March 12, 1868.

EDITOR AMERICAN JOURNAL OF MINING:

I believe I promised, while with you last summer, to favor you with a letter, occasionally, on affairs in Colorado. Upon my arrival out, I wrote you, in general terms, of the condition of things—of the hopes and expectations there prevalent. People were still betting largely on Prof. Hill's smelting operations, or rather preparations, and on Buckner's roasting in cylinders, though they were not so enthusiastic as earlier in the season. Some were building hopes on Kenyon's process, and these last, I believe, will prove well founded. But of that anon. Prof. Hill started one matting furnace last fall, and was so well satisfied as to be able, upon visiting his friends East more recently, to get all the backing he needed, amounting, it is said, to $300,000. His works on north Clear Creek, below Black Hawk, are not open to to the public since his return, but it is generally understood that they are to be enlarged at once. He has the matting furnace in successful operation, and purchases ores on a somewhat complicated plan, which may, perhaps, be generally approximated thus: gives 30 per cent. in gold for ore worth $50 a ton, and so, on a graduated scale, upward to 60 per cent. for ore worth $200 per ton. As to the Bruckner cylinders, I believe the impression is well settled that they are too expensive of construction and operation to be available for the treatment of gold ores, while they are an improvement on any roaster known for our silver ores containing less than 20 per cent. of galena. They are being put into three mills in the silver mines, where their superiority has been demonstrated by Garrott & Martine. Crosby & Thompson are still engaged with their process at South Boulder, and are as sanguine of final success as ever. Theirs and the Keith process have about ceased to occupy public attention, however. Last September, the Keith mill of the Colorado Ore Reducing Company was running successfully on custom ore, treating at a cost of $12 50 per ton. Subsequently it burned down, and the company, not feeling encouraged to rebuild, Behr and Du Bois, the management, leased the original Keith mill, belonging to the Mammoth Company, with which they now propose to carry on the old business. The rest of the Keith mills are idle, Keith himself having turned his attention to the silver mines at Georgetown.

In my letter of September 4, 1867, published in your journal, I said: Stockholders should no longer despair, and allow their property to be sold under the sheriff's hammer for trifling debts. Let me enforce this advice again by an incident. The Briggs Company have allowed their fine property on the Gregory lode, and 50-stamp mill, to be sold, and the redemption to expire, to satisfy a judgment of $20.000. It was bought by the original owners, who well knew its value, and, within the last three months, $30,000 worth of gold has been produced by it, at a cost of about $10,000. The success of the few stamp mills that were persistently run last year, (an idea of which may be got from the pamphlet I published a few months since, noticed favorably by the AMERICAN JOURNAL OF MINING,) and perhaps some other causes, as, for instance, the reduction in prices, the decay of speculation, pinching times throughout the entire world, "the strong necessity of doing, etc.," seem to have revived stamp milling during the winter now nearing its close, and to have encouraged hopes of better times after the season shall have fairly opened. All the mills that were in condition have been running steadily, and several schemes for building new ones at Black Hawk and Idaho are in embryo. The regular price for crushing is $40 per cord, (8 tons in a cord,) and there is fair money in it. With large mills, driven by water, there would be at $25. The winter has been very fine—but little snow or cold weather—and the gold product larger than for either of the last four or five winters—about $100,000 a month, and gradually but steadily increasing—this, although nearly all the mills in Nevada have been idle for want of water.

The following named companies are either at work themselves, or have leased their property to experienced hands, who are doing well with it: Alps and Granada, North Star, Jacques, First National, Clark-Gardiner, Ophir, Colorado, Gilpin, Saratogo, Fairfield, Bobtail, Sterling, Sensenderfer, Smith & Parmelee, Briggs, Black Hawk, Rocky Mountain, Manhattan, Union, Bate-Baxter and the Narragansett and Consolidated Gregory are expected to soon start up. The Confederate Pump Company, on the Bobtail lode, are putting in a 12-inch pump. The Black Hawk Company, who took out $275,000 worth of gold last year, but were compelled to stop in January last for the want of adequate draining machinery, are putting in a 14-inch pump; so that these two king lodes of the district will be in better shape than ever before by the time spring opens. Besides the companies named, others are contemplating trying their hands at legitimate mining, probably having been pretty clearly scooped out manipulating stocks, and many lodes, idle for the last four years, are being taken hold of by individuals, as in the good old days before speculation came to blight us, when selling, instead of working, became the fashion. There will certainly be three times as much mining done this year as last. Indeed, prices have become quite reasonable, compared with the range of two and three years ago. Mining supplies, labor, fuel, mine timbers, lumber, provisions, groceries, feed, grain hay, everything, are little more than half as high as in 1865. Then wages were $4 to $6; now they are $3 to $4. Stoping was $70 to $75 per fathom; now it is $30 to $35. Then running drifts cost $20 to $27 50 per foot; now it costs but $11. These and kindred facts explain the present revival of quartz mining and milling in Colorado.

A telegram, dated yesterday, says the St Louis Pacific Company are going to begin work again on their railroad at once. It will be very near Denver by fall. Steps have been taken to secure a railroad connection with the Omaha Pacific at Cheyenne. Denver has to grade the road, furnish the ties and bridge timbers—estimated cost $650,000—and New York capitalists have contracted to complete it and put on the rolling stock in sections of 20 miles, as fast as it shall be made ready. Arapahoe county, of which Denver is the capital, has voted $500,000 in bonds towards the work, and Denver men have taken at par one-half these bonds. It is believed there will be no trouble in disposing of the rest of them at par in Cheyenne, Chicago and the East. The first assessment has been paid in. There can be no flinching. If the mountain won't go to Mahomet, Mahomet must go to the mountain. Denver must go to the railroad or bring the railroad to her. What must be will be. There is nothing surer than that the construction of the road will begin in the spring, and be completed during the year. Once at Denver, Golden City, 12 miles nearer these mines, will have influence enough to get it continued to her lap, when it will be to the interest of Denver and all parties concerned to push it into the mountains to Central City and Georgetown. So you see we are looking for a railroad to our very doors, within two years, that shall cheapen our hay, fuel, and all other bulky merchandise another 50 per cent. Our silver interest is also worth mention in a general review of the situation. We are not going to have the reduction works we need at Georgetown this year, but the smelting works have been placed in competent management; the mills of the Baker & Brown companies will be in operation, and with Garrott & Martine's and the furnaces of the Washington Association, the reducing capacity of the district will not be less than 100 tons a week—at $100 a ton, the average richness or yield of the ore so far, $10,000. The lodes are keeping up their reputation this winter. Ore in considerable quantity has been brought to Black Hawk, and treated at an expense of $165 per ton, leaving then a very large profit, strange as it may seem. The operations of the present year will establish the most unbounded confidence in the Georgetown silver mines. They are 35 miles within the mountains, on South Clear Creek, the average grade of which is 85 feet per mile, the valley for half the distance being open and smooth, and a railroad ought to connect Georgetown with New York ere the beginning of 1870.

So we think we are generally in a prosperous way. The new mines, north and south, on the Sweetwater, in Dakota, and on the Cimarron, in New Mexico, are taking off some of our floating population, but although there is no donbt of the existence of good mines in both localities, the drain on us will only be temporary, or, at the worst, will be made up to us soon by the States, now that railroads have annexed them to the Rocy Mountains, exterminating the Indians and annihilating space and time. Our people have generally had enough of ronghing it, too. They know the chances as well as the fellow who deals faro. They are convinced that no better mining country exists on the globe than Colorado. They like her central location, sitting on top of the world, looking toward the great Mississippi Valley, her fine climate, varied resources—gold, silver, iron, lead, copper, coal, salt, oil, timber, water, soil—why, she has tointy million acres of pastoral land unsurpassed in the world. Money in stock actually donbles every year. Calves a year old are worth more than their mothers. Our coal stands second only to the anthracite of Pennsylvania, and the beds are from twelve to twenty feet thick. Very few of the real settlers of Colorado will be finally drawn off by the new gold fields.

But a long way back I mentioned the Kenyon process. You know a cheap method of expelling the sulphur from our snlphurets, leaving them in condition to amalgamate successfully, has been a, if not the, great desideratum with us for several years. Also how the public have become tired ont with the snbject, and almost of the opinion that there is no such thing. So men once laughed at the idea of harnessing steam into our land and water carriages. The class of men who have been trying to improve on the stamp mill treatment of sulphuret ores, in so far as they have been honest with the public, and have not sold an imperfect for a perfect thing, deserve not only a respectful hearing, but encouragement, whereas they too often get bnt abuse. They have had a diffienlt, expensive and most disconraging task, but the conviction of the exceeding richness of the snlphurets, and the great loss to the world involved in the use of stamp mills, has ever been with them to enconrage their efforts. Among the most persevering of this class is Mr. Joseph Kenyon. His mill is on North Clear Creek, just below Black Hawk, and was built, in 1863, for what is known as the Bertola process. That not snceeding as was hoped, Mason's process was essayed. Not to particularize needlessly, experimenting has never ceased in this mill. When one manipnlation falled, another was attempted. This necessitated the building of additions to the mill—the tearing away and altering of furnaces and machinery without end. At last daylight begins to appear. Mr. Kenyon has so nearly arrived at the end he had in view, as to not only satisfy himself, but others conversant with the business, of his ultimate success. His mill is not well adapted to his treatment, as finally perfected, and so cannot show it off to as good advantage as is desirable; that is to say, a mill so constructed as to economize labor to the utmost would make a more favorable exhibit as to cost of treatment than this mill, which is little more, in reality, than a huge laboratory.

Mr. Kenyon's improvement lies in such a manipulation of the raw pulverized ore as to prevent its slngging in the furnace, and in the chemicals used in the grinding and amalgamating, in iron pans, of the residunm left in the Tyrolean amalgamators—in the vernacular, "dolly tubs." The process may be divided into drying, pulverizing, mixing, desulphurizing, burnishing, concentrating, grinding, amalgamating and retorting. The drying is a simple brick chamber, of any desired capacity, the fire passing under and over it. Only a small proportion of the ore used generally needs drying. The pulverizing is accomplished by a cracker and barrel grinder, the ore being made fine enough to pass through a 30-to-the-inch mesh. The mixing is done in a mill like those used in kneading clay for brick, the ore being wet by a liquid, the preparation of which is a secret, that prevents its slagging in the furnace. Delivered by the mixer, it is shoveled into the furnace, each shovelful torming a mass by itself, at first drying and hardening under the action of heat, then burning, crumbling and dropping through the grate, which is of fire-clay, on an apron that delivers it outside the furnace on a cooling floor. The furnace now used by Mr, Kenyon is three feet wide by twelve long, the grate on which the ore is placed ascending at an angle of ten to twenty degrees from the fire-box to the flue. Along one side are doors for feeding, and below, on the other side, are the same for discharging, which operations are both contiuuous. This furnace desulphurizes ten tons in twenty-four hours, consuming about one cord of wood. It is possible to improve on its construction, in my judgment, further economizing fuel, time and labor. The trick is in the manipulation of the ore rather than in the construction of the furnace, the latter being purely a mechanical question. TThe former is solved. From the furnace the ore is self-fed into a burnisher, (rude barrel grinder,) whence it passes steadily into a "dolly tub," water being let on, at the point of discharge, from the burnisher. The "dolly-tnb discharges into another one, and so on, as long as anything valuable escapes. A ton of raw ore is reduced, in desulphurizing and passing through the "dolly tubs," 80 to 90 per cent. The residuum, collecting in the tubs, and removed when necessary—consisting of the gold, pyrites imperfectly or not at all desulphurized, and perhaps some unoxydizable minerals, is treated in iron pans with chemicals—just how is also a secret. The gold may be extracted from the raw ore by this pan treatment, without the intervention of fire, but it would be too expensive. The great use of fire is to concentrate the ore—ten tons into one. That done, it can be chemically treated and ground in pans to advantage. The treatment varies with different varieties of ore, and a good deal must be lest to the judgment of the manipulator. Some idea may be obtained from the foregoing, however, of its general course.

To reduce the cost of treatment, by this or any other method, to the lowest possible figure, economy must be studied in the plan of the mill. Let it be built in bents against the foot of a hill, so that the ore will need no handling. To reduce 20 tons a day, using water for a motor, would require but little machinery. One cracker and two barrel grinders would do the pulverizing. An old boiler would answer for burnishing. The amalgamators are mere wooden tubs, and iron pans for grinding the residuum are so plenty in Colorado as to be a drug in the market. The furnaces are of the cheapest—the brick being made on the ground wearing indefinitely. Mr. Kenyon says the chemicals required are comparatively cheap. Let us recapitulate:

Cost of mill 30x100 feet	8,000
Pulverizers and furnaces	6,000
Burnisher, amalgamators, pans, shafting, belting, gearing, pullies, putting up machinery, etc.	11,000
Total	25,000

Such a mill would require twelve hands, six on the day and six on the night shift. Say their wages average $3 50 per day, we have as the cost of treatment:

Help, 12 men, $3 50 each per day	$42
Wood, 3 cords, $6 a cord	18
Chemicals	20
Incidentals, wear and tear	20
Total	$100 per day.

Now, however opinions may differ as to the average richness of the gold ores of Gregory district, few will deny that millions of tons, worth $25 each in gold, might be produced from the well-known lodes of the district, and at a cost of $5 a ton, even now. Reduce the expense of treatment to the same figure, and guarantee 80 per cent of the fire assay, which is what Mr. Kenyon proposes to do, and we have a profit per ton to divide between the miner and reducer, of at least $10. These facts and considerations stamp this as *the* process of the future. Most anything will do for high grade ores, though, of course, the cheaper the better in any case. But what the country is dying for is a treatment that shall make it profitable to work her average mines—those yielding from $20 to $30 a ton only. Give us that, and the wildest guess would barely measure our prosperity.

O. J. H.

Montana.

HELENA, Montana, Feb. 22, 1868.

EDITOR AMERICAN JOURNAL OF MINING:

Your readers will doubtless feel somewhat interested in a brief description of the manner in vogue here, by which the precious metals are extracted from the ores. The general features in this process are a pulverization of the rock and the washing of the quartz powder which thereby results. The most primitive method in which to extract gold, is by means of a hand mortar, and this plan of operations is adopted in prospecting, much to the disgust of apothecaries, who have their mortars and pestles sadly damaged by the cutting angles of the quartz of many a sanguine gold-hunter. The old-fashioned Spanish arastra is the most rude mill in which gold is practically worked. We can best describe it as a huge, stone-bottomed tub, into which the quartz is thrown to be ground, rather than stamped, to a powder, by heavy stones being dragged over it. These heavy stones are attached to arms, revolving about an upright shaft, and the whole moved by horse or mule power, or, in some instances, by water power. But the machinery in most general use, and, at the same time, as experience has proved, the most efficient, is what is called the stamp mill. A stamp mill consists of a series of heavy iron stamps, weighing several hundred pounds each, raised at regular intervals by cams attached to a horizontal revolving shaft. Under these stamps are heavy iron boxes called batteries, the lever side of each consisting of a fine screen; into these batteries the quartz having been broken into pieces twice the size of an egg, is thrown, and is crushed by the heavy stamps falling upon it, a stream of water keeping it moist in the meantime and washing it out through the screen after it has become sufficiently pulverized. After leaving the batteries, the quartz powder passes over amalgamating tables, which are nothing less than large copper plates having a gentle slope, and coated with quicksilver. A great portion of the gold unites with the quicksilver forming the amalgam, and such particles of the precious metals as escape from the tables are afterwards secured by being carried in the water over blankets or into arastras, settling vats or similar contrivances. Quicksilver is also placed in the batteries themselves, and a largo quantity of gold is thus secured. About once a week, more frequently on Sundays, a "clean up" takes place. The amalgam with which the table and portions of the batteries is coated, is all scraped off and washed free from whatever sand may have remained in it. It is then pressed through a cloth, in much the same manner that we have seen adopted by our grandmothers when making Dutch cheese. By this means a great portion of the pure or thin quicksilver is pressed out, leaving a hard mass of gold and quicksilver mixed. The latter is then almost entirely driven off by means of heat, the mass being placed in a retort for the purpose, and from this fact, the gold, when it comes from the heating goes by the name of retort. Here the work of the miliman generally ends. This retort may be used in trade where gold dust is the circulating medium, here in Montana, for instance, at sixteen dollars per ounce. Or he may sell it to the nearest banker, or have it melted into bricks and assayed, and its value stamped upon it and then sent to New York as is frequently done. As a person walks into a quartz mill he cannot make himself believe that the clatter of iron stamps which renders it almost impossible for him to think, to say nothing about making himself heard, is resulting in the extraction of hundreds and, in many cases, of thousands of dollars worth of gold per day. He sees none of the precious metal anywhere, nothing bearing its color even, and he is tempted to look upon all quartz speculations as humbugs and all quartz mills as so many machines for grinding a man's money to so fine a powder that he will never be able again to see or feel it. But when he goes to the assay office and handles what he cannot help calling the "sweet golden brick," still warm, like a new-laid egg, from the mould in which it has been cast, and worth from five thousand to twenty-five thousand dollars, he only wishes that he *could* keep it, and that he were the fortunate owner of an interest in the mine which produced it. And here, let me ask, who are these fortunate owners? I can tell you who they are not. They are not those who wish to see one hundred per cent. on their investment already taken from the mine and minted before they will venture a dollar. On the contrary, the most successful of our quartz miners are those who, with but little capital to start on, have put unlimited faith in their mines, and risked every dollar in them until they have returned them the golden fortune for which they have so long looked. In quartz mining, more than any other branch of business, Davy Crockett's motto is peculiarly applicable: "Be sure you're right, then go ahead." Montana is not wanting in rich mines. In this vicinity we have the McClellan, Whitlatch, Union, Munson, Merritt, Uncle Sam, Extension and Washington, and the Poor Man's Joy, Camanche Hope, Speckled Trout, Camanche Extension, Appache, Cliff, Cole, Saunders, Boomerang, Plymouth, Salmon and Kitty Clyde in the Flint Creek county. Fearing lest I may trespass too much on your space precludes my making mention of many rich ledges deserving attention, but I cannot forbear noticing the Great Atlantic Cable lead in the Flint Creek county, which is to gold leads, what the 'Poor Man's Joy" is to silver mines, and upon which a mill has just been set at work, with ten thousand tons of quartz already out for crushing. For the same reason I am compelled to slight the famous Ten Mile Gold and Silver District, of which Prof. Swallow, the celebrated geolgist, has spoken so highly, and which includes the rich ledges of Argenta, Anoma, O. K., Grey Eagle, Henry Allen and Hong Kong. Montana is, to-day, the most prosperous portion of the United States. Those who have been east and returned, confirm my statement, and all the newspapers which come here from various portions of the country contain stories of hard times, which make Montana seem a Paradise in comparison with the old States. Our great need now is more mills, and, therefore, more money with which to buy them. When I make this statement I do not wish your readers to infer that our people are all poor, for quite the reverse would come much nearer being the case. I have stated the great want of Montana before, and have been met with the response, "If your mines are so rich, and your people are so well to do, why do not your own citizens in-

vest to an extent sufficient to work all your mines to their full capacity?" The question is easily answered. A new country offers almost immeasurable fields for investment, into which every one rushes to an extent even greater than their means will allow. The consequence is that money is in great demand, and held at a high rate of interest, five per cent. per month being commonly charged. Now money, like every other commodity, is always sought for in the lowest market. If it is worth from eight to twelve per cent. per year in the States, it is much better to obtain it there than here. Hence it is that our miners search in the State for capital instead of applying for it here. The States capitalist thinks he has done well if he has made twenty per cent. per year on an investment, and the Montana man is not satisfied with less than one hundred per cent. It is not strange, therefore, that owners of Montana mines to so great an extent organize their companies east of the Missouri river. One parting word: Do not believe everything you are told, either good or bad, about Montana, for, I venture to say, no country has ever been so prolific of enormous falsehoods as this. Believe neither the stories of Indian catacombs and golden pots at the head of the Yellowstone, nor those other tales of horrible Indian massacres. Most of all, do not believe the stories of every one that wants to sell you quartz. Thoroughly investigate the character of the man who approaches you, see with whom he is associated, see what proofs of the truth of his statement he offers, and then, and not until then, "go ahead." By following the above parting advice your readers will advance their own best interests, and never have cause for other than the kindest feelings towards ORO.

We take the following items from the Helena *Post* of the 7th inst.: The thirty stamp mill of the Philadelphia mining company, and the twenty four stamp mill of the I. X. L. company cleaned up, on Saturday last, after one week's run on rock from the Union lead. The coin value of the retort from each mill is as follows: Union mill, (the P. M. Co.) $4,268 67; the I. X. L. mill, $4,475 71, making a total of $8,744 38. With gold coin at 51, the currency valuation would be $12,329 57. The retort of the Union mill exceeded that of the I. X. L. by over 30 ounces, but the latter was about $3 to the ounce finer.....The two pieces of retort from the first clean-up on Atlantic Cable lode, which arrived in our city on Wednesday last, was decidedly the finest lot of lead retort which has yet been brought to our city, or probably turned out in our territory. The retort amounted to $9,216 49, and assayed nine hundred and forty-two fine. It was the result of nine days' running for the twenty stamp mill recently put up on the lead by Messrs. Knowlan & Plaisted, and although the number of tons of rock crushed is not definitely known, yet it will be seen that the mill made the average of over $1,000 per day, which is sufficient without inquiring any further. .....Nowlan & Weary, bankers, received per Wells, Fargo & Co's Express yesterday, from the Esler furnace at Argenta, one hundred and fifteen pounds of silver bullion.....A stampede occurred on Thursday night to a gulch situated in the Belt range of mountains, some eight miles from the Musceleshell. Nothing definite is known in reference to it, but it is supposed to be a good thing.....We are informed that good prospects have been found in Ramshorn Gulch recently, near Professor Mapes' mill. The party sinking on the claim took out ten cents to the pan all the way through the gravel, which is four feet deep. The diggings are shallow, the gulch about 12 miles long and plenty of water.....The Virginia City *Post*, of the same date, has the following: For a nine days' run of the Wm. Nolan mill, they cleaned up a little over nine thousand dollars. It will close two weeks for repairs.

California.

Alpine County.—We condense as follows from the Monitor *Miner*, of Feb. 15: The tunnel of the Pennsylvania company continues to encounter small veins or feeder of quartz, bearing fine ruby silver ore. They think they have about seventy feet more to make to cut the main lode.....The Pittsburg company has struck a lode in the main tunnel.....The lateral tunnel of the Monitor Consolidated company has gone in on the ledge over forty feet.....The great event of the week here has been the receipt of intelligence from London, by telegraph, that Captain James Jones had sent to his brother here, the five thousand dollars necessary to redeem the old Michigan tunnel and mining property from the private judgment which prevented Mr. Chalmers, the managing director of the Imperial company, getting possession on his arrival here in November last.....From the same paper, Feb. 22, we learn as follows: The owners of the Sam Booth, Alert and Esmeralda properties, adjoining the Tarshish ground, on Monitor mountain, are working slowly in with the Alpine tunnel, their upper works.....The Morning Star shaft is now down 100 feet, and is running in as pretty clay easing as one need see. When down about ten or fifteen feet further, Mr. Gamble, the superintendent, intends to cut across the lode.....The Leviathan company, finding it impossible to prosecute the work of opening their claim as it should be, with additional ventilation, have commenced raising a shaft out .... The contractor, Wm. Mercer, for 150 feet of tunnel on the Imperial S. Q. company's ground, has his force of six men regularly at work now.

Nevada County.—The *Gazette*, Feb. 9, says: Great activity prevails among the miners at Birchville and vicinity. The companies are all at work, and are either making money or have fine prospects ahead. The Granite company clean up, on an average once in 25 days, and the yield is at the rate of about $150 a day. The Kennebec company use 400 inches of water, and their last clean up, after a run of seven days, yielded $4,500—an average of over $650 a day. Sloan & Co., owners of the American claims, have recently commenced operations, with the best prospects of large results. Furth & Co., owners of the San Joaquin claims, use 400 inches of water and are doing well. The Irish American and Don Jose companies have leased their claims to a company of Chinese, who run 250 inches of water to each claim. They are said to be making money very rapidly. The Buckeye claims between Birchville and Sweetland, owned by Evans, Stidger & Co., are in the full tide of successful operation. They are taking out a larger amount of gold than any other company on the ridge. Several of the clean ups last year yielded as high as $24,000—each run of 40 days costing the company about $10,000. Some of the owners have refused to sell their interests at the rate of $75,000 for the whole ground. At French Corral, mining operations are carried on with the greatest energy and activity. That place and Birchville are at present the most active mining centres on the ridge, and the prospects are favorable for a long season of prosperity. At French Corral, there is a broad, deep stratum of rich cement underlying the hydraulic ground, which will afford employment for hundreds of stamps for many years. Eddy & Co., whose claims cover 75 acres of ground, employ 20 men, and use 1,500 inches of water. In one run of 30 days they cleaned up $30,000. The claims of Schardin, Bell & Co., adjoin the Eddy's. They have a large bed of cement, which they are now crushing—the mining being done by white men, while Chinese are employed in packing away and piling up the boulders. Adjoining these are the claims of Crittenden & Co. They are sluicing off the surface, and at the same time erecting a mill to crush the cement. The machinery for the mill is mostly on the ground. Burke & Co. have eight men employed, and run 400 inches of water. The Glaister claims employ four men, and are yielding well. Ayer & Co. employ three men, have three pipes, use 200 inches of water, and are now working to open their ground. The Slow and Easy company, (Sullivan & Co.) use 100 inches of water, and are making money. The Dockum company —composed of a party of Frenchmen—have four pipes, run 400 inches of water, and in the past two years have cleared $53,000. Their claims are extensive, and will last many years.

Arizona.

The Arizona *Miner*, of Feb. 15, has encouraging news from the mining districts adjacent to Prescott. It says: "In Big Bug district the placer miners are making as high as ten dollars a day to the hand. Work is being pushed forward on the Eugenie lode, with flattering prospects. Two shafts on the Chase lode, in Hassayampa district, were, several days ago, down respectively 46 and 43 feet, and, at these depths, the lode was fully five feet thick and rock rich. Joe Young called into our office yesterday, and showed us the result of three tons of Chance ore which he had worked in the Sterling mill, under very unfavorable circumstances, owing to the cold weather, and the fact that this ore was the first of the kind treated by Mr. Reed; but the result proves beyond a doubt that Reed can work the ore, and that it will pay big. The three tons yielded 100 ounces of nicely retorted gold and silver amalgam, worth, at least, five dollars an ounce. We are satisfied, from the color of the amalgam, which is nearly yellow with gold, that it is worth several dollars more per ounce than the figures guessed by Mr. Young."

Georgia.

A correspondent writing from Gainesville, says: "I have opened a vein of argentiferous galena from 5 to 10 feet thick and yielding from $10 to $60 per ton of silver, and from $5 to $50 of gold—one assay reached $2,176; from twelve assays the average was $44, excluding that of $2,176. The vein has been opened out 20 feet at three points 100 yards asunder, at one of which the sulphurets are iron. It is nearly vertical in micaceous slate that dips (S. E) 40 deg. The range of the assays are higher than the celebrated Comstock lode, which varies from $15 to $40, with occasional flights to $500 and $2,000. But the cost of working their ore is about $16 per ton. This can be mined for $4. There miners' wages are $5 per day, here $1 to $2. There wood costs $16 per cord, here $1 50, and every thing in proportion. The prospect is very favorable for this section, being rich in silver. The predominant rock is granite, gneiss, micaceous and talcose slates, accompanied with hornblende, stealite, itacolumite, &c."

Siberia.

The Shanghai *News Letter* has the following in reference to an alleged important gold discovery in Russian Asia: "We are informed by a gentleman now in town, and lately from Passiet, that extensive gold mines have been discovered on Termination Island, about twenty miles from Port May, in Russian Siberia. Our informant has seen specimens of this ore, and pronounces the whole country particularly rich in gold. The Russians, however, are very jealous, and had driven away a party of six hundred Chinamen who were mining there. The gold is said to be found in Rotten quartz, and also in surface diggings.

COPPER.

Michigan.

We have the following February products of the Portage Lake Mines:

QUINCY MINE.—Stamps, 68 tons, 1,430 lbs.

HOAR & BROTHERS.—Stamps, 18 tons, 905 lbs.

HANCOCK MINE.—Barrel and stamp, 30 tons, 1075 lbs.

OGIMA (ONTONAGON.)—Masses, 7 tons, 474 lbs.; barrel work, 5 tons, 673 lbs. Total, 12 tons, 1,152 lbs.

SOUTH PEWABIC MINE.—Stamps, 78 tons, 6 lbs.

ISLE ROYALE.—Barrel and stamps, 31 tons, 616 lbs.

COPPER FALLS.—Mass, 44 tons, 1,978 lbs.; barrel, 16 tons, 451 lbs.; stamp, 18 tons, 1,919 lbs. Total, 80 tons, 4,348 lbs.

The following January products have been reported:

QUINCY.—Stamps, 60 tons, 1,105 lbs.

COPPER FALLS.—Mass, 38 tons, 1,058 lbs.; barrel, 22 tons, 640 lbs.; stamp, 2 tons, 647 lbs. Total, 63 tons, 1,145 lbs.

NATIONAL.—Barrel and mass, 22 tons, 1,500 lbs.

Four Ontonagon District mines return as follows for February:

EVEREEEN BLUFF MINE.—Mass, 6 tons, 268 lbs.; barrel work, 11 tons, 1,595 lbs. Total, 17 tons, 1,863 lbs.

OGIMA MINE.—Masses, 7 tons, 474 lbs.; barrel work, 5 tons, 678 lbs. Total, 12 tons, 1,152 lbs.

ROCKLAND MINE.—Mass, 625 lbs.; barrel work, 4 tons, 820 lbs.; stamps, 2 tons, 180 lbs. Total, 6 tons, 1,634 lbs.

SUPERIOR MINE.—Mass, 1,709 lbs.; barrel, 1 ton, 153 lbs.; stamps, 3 tons, 1,210 lbs. Total, 4 tons, 3,063 lbs.

From the Portage Lake *Mining Gazette*, of the 5th inst., we cull the following items of interest: Active preparations have been made for a speedy resumption of work at the Huron mine. The stamp mill of thirty-two heads of Gates stamps, having been got ready, it commenced work on Tuesday, taking its supply of rock from the great stock pile. In a week more the mine will be cleared, ready for the beginning of work. Mr. T. W. Buzzo retains the agency. The name of "Agawam" is to be discarded and the more acceptable one of Huron Copper company will be adopted.....The treasurer of the Grand Portege reports that the gross amount received from sales of copper in 1867 was $123,957 73, and the total expenses were $123,500 39, leaving a balance of $537 34, as interest on investment, wear and tear, &c. .....The Cliff mine is reported as looking better than in two or three years before, and the January product as being one hundred tons or more. A large quantity of silver was found about a week since. A mass weighing about eight hundred pounds has been taken out, which is composed, as near as can be determined, of about equal parts of silver and copper. On it are horns of solid silver as large as a man's fist.....We are indebted to the same paper for the following statistics:

ASSESSMENTS, 1867.

Adams, April 15, $2; Oct. 10, $3	$100,000
Algomah, Nov. 20, 25c	5,000
Alloux, Oct. 29, $2 (cancelled); Dec. 20, $8 50	70,000
Arnold, July 25, 50c	10,000
Aztec, July 26, 50c	10,000
Bay State, June 10, $1; Oct. 24, $2	60,000
Caledonia, Feb. 7, $1	20,000
Calumet, Feb. 26, $5; Sept. 4, $5	200,000
Concord, June 22, $1	20,000
Evergreen Bluff, Oct. 1, $2	40,000
Flint Steel River, Feb. 25, $1	20,000
Franklin, Juno 12, $5; Jan. 11, 1868, $2 50	150,000
Hancock, Jan. 12, $5; May 27, $1	120,000
Hecla, Feb. 27, $5; July 1, $5; Sept. 1, $5; Nov. 21, $5; Jan. 21, 1868, $4	480,000
Huron, April 30, $3; Sept. 21, $3	120,000
Isle Royal, Jan. 25, $5; Sept. 7, $3 50	170,000
Iroquois, May 1, $1	20,000
Kearsarge, Feb. 1, $2	40,000
Ossipee, Feb. 1, $3 50	70,000
Pewabic, Aug. 27, $3; Jan. 3, 1868, $2 50	110,000
Phenix, April 18, $3; Dec. 3, $3	120,000
Rockland, Jan. 1, $1; Oct. 1, $1; Feb. 1, 1868, $1	60,000
Resolute, May 10, 50c	10,000
St. Clair, March 11, $1; Jan. 1868, $1	40,000
Seneca, July 15, $1	20,000
South Pewabic, June 20, $5; Sept. 11. $3; Nov. 16, $4	240,000
Superior, Jan. 1, 1868, 50c	10,000
Total	$2,335,000

DIVIDENDS, 1867.

Central, April $2 50	$50,000
Pittsburgh and Boston, Feb. $3	60,000
Total	$110,000

FEBRUARY, 1868, DIVIDENDS.

Quinbey, $3 per share	$60,000
Central, $2 per share	40,000
Total	$100,000

COAL, IRON, AND OIL.

Canada.

The London, C.W. *Free Press* has a very comprehensive article on the present position and prospects of the petroleum trade in Canada. For the past two years the trade has been one of continued relapse, and prices, both for crude and refined, have steadily receded. Thus in the winter of 1865–66, crude realized $10 a barrel, and refined 65c. a gallon; in the winter of 1866–67, crude had fallen to $1 25 per barrel, and refined to 20c. per gallon, and in the winter of 1867–68 we find crude had fallen to 40c. per barrel, and refined to 10c. per gallon! This continuous but persistent fall in the price, both of crude and refined petroleum, is attributable to several causes. First, the finding of very productive oil fields, on which, last summer, were located wells of extraordinary yield; some produced oil at the rate of 250 barrels per day, the supply quickly swamping the market. The second cause of the decline was the over-competition in the manufacture of refined oil; scores of stills have been erected over and above the requirements of the country. The third cause of the rapid fall must be attributed to the financial weakness of both producers and refiners, necessitating sales at any sacrifice. The demands of Canada, as a consumer of refined oil, have been vastly overrated. It is estimated that 87,260 barrels of refined, equal to 109,062 barrels of crude, is sufficient to serve Canada for a twelvemonth. When the production of crude exceeds the weekly average of 2,000 barrels, the market becomes glutted, and values recede; and in like manner when the average quantity of refined, manufactured for Canadian consumption exceeds 1,640 barrels per week, then the refined market becomes glutted, and prices fall, to the injury alike of producers and refiners—this be it remembered, in the absence of a foreign market. Up to the present, not a single effort has been made to export refined to Europe in competition with American oil. Although the United States in 1867, exported 1,600,000 (one million six hundred thousand) barrels of refined oil to the various countries of the world, yet not a single barrel of Canadian oil found its way across the ocean. The low price to which the crude article has fallen, has compelled four-fifths of the Canadian producers to close their wells and suspend operations; the price, 40c. to 50c. per barrel at the wells, does not reimburse the operator for his time, trouble and outlay of capital. Many have tried it with large wells to back them, but all with the same result—ruin! At present there are not even a dozen wells pumping at Petrolia, the united yield of which is from 1,400 to 1,500 barrels per week, an amount below the average demand. But this quantity is more than is now needed, seeing that owing to the glut of refined, and the low price of the article, refiners are not manufacturing largely. Of the refineries, at least one-third are entirely closed, and have suspended operations, the remainder are all on half time, and several contemplate closing their establishments till June or July. The fact is the business does not pay in Canada. The quantity of crude now stored at Petrolia in the underground tanks, free from danger of fire, and in fire-proof iron tanks, is about 170,000 barrels; of this, perhaps 30,000 barrels are of inferior quality. There is thus enough crude already pumped and stored to serve the wants of Canada for a year and a half. The cost of pumping and tanking this oil has been about $1 per barrel, and it cannot be procured for a less sum. One firm, operating from Chicago, holds 50,000 barrels. There is little further to add to the foregoing review of the petroleum trade of Canada. Nearly every one who has touched it—whether the producer, the refiner or the dealer—has been a loser during the past two years. The continuous fall has baffled the expectations and predictions of the acutest business men. Nearly every person who has touched oil has lost money in the operation, and those who have still money invested in the business, are striving in every way to avoid impending disaster.

Montana.

A correspondent of the Helena *Post* writes from Bozeman City, Feb. 9: An extensive coal bed has been discovered about eight miles from this place, near the headwaters of Middle creek. Laborers have been employed for the last two months in stripping down a facing and giving it a thorough test before taking any initiatory steps. The vein is about thirty feet wide, and depth yet unknown. A tunnel has been run in, large enough to admit a horse, it being the intention of the company to run out the coal by the horse car. Experienced colliers from the Pennsylvania and English coal mines pronounce it as being of a superior quality, surpassing the Missouri or the Illinois coal. Col. Chestnut has sent a load to the Helena foundry for a trial test.

Michigan.

There are now in operation several very important coal mines in the State of Michigan. Those that are producing coal of any qualities at present, are situated in the vicinity of Jackson, near Corunna. The Woodville mine, located four miles west from Jackson is the most important. The coal is adapted in its different varieties to almost all purposes, whether for use in machine shops or railways, or steamboats or for domestic purposes, and at the mine commands from $2 to $5 per ton, according to the quality. Last year 9,000 tons were turned out from the mine, representing an aggregate value of about $31,500, and at present the mine with the present force is producing fifty tons per day, with hardly any stock on hand. The markets are the Michigan Central railroad, which uses the coal both on those freight and passenger engines which are coal burners, the cities and towns on the Michigan Central, especially a very large trade in the city of Jackson, as indeed is that over the line, and now a new, and what will eventually prove a large market, has been opened by the construction of the Jackson, Lansing & Saginaw railroad. Wood in the city of Jackson ranges from $2 to $6 per cord. An effort is to be made during the present season to augment the force of miners at the Woodville mine, so as to double the amount of coal got out; with the present shaft 300 tons per day can be got out. Next in importance comes the Walker mine, worked by Messrs. Walker, Amphlett & Co. They employ about 40 men, and last year, working all the time, turned out about 12,000 tons of coal, representing a value of about $12,000. Besides these two large mines, there are two small ones in the vicinity of Jackson, which are worked some, but are owned by individuals, and only turn out a small quantity of coal per annum. The aggregate production of the Jackson mines for 1867 was about 22,000 tons, representing a money value of about $77,000. For 1868 the production will be largely increased. One mile east of the village of Corunna, is located a mine which has been worked on a pretty extensive scale since the early part of 1866, and until the commencement of the winter of 1867. During that period it produced about 5,000 tons of coal of very excellent quality, representing a value of about $17,500. The mine is now mainly owned by eastern capitalists, who are wealthy men, and who do not seem disposed at present to push mining operations with any particular energy. It is as yet uncertain, therefore, whether mining will be recommenced in the spring or not. The aggregate production of coal in this State, then, for 1867, was about 25,000 tons, representing a value of $97,000, and as the business is certain in future to rapidly increase, it can justly be regarded as one of the most promising sources of Michigan wealth.

MARKET REVIEW.

FRIDAY EVENING, March 27, 1868.

Gold and Silver Stocks.—But a small business was done to-day at the first board. The market has been quite active, however, all through the week. Montana continues quite firm at 80c , and sales were made to-day, b.3, at 85c. Quartz Hill is held at $1 15, but we note sales at $1 10. American Flag sells at 65c., and is quite firm ; Black Hawk has advanced to $4 25, and is held firmly, and Bobtail to $1 15 ; Combination Silver is again gaining ground, and to-day was held at $60 00 ; Manhattan Silver is now held at $165, against $150 offered. Quotations range :

	Bid.	Asked.		Bid.	Asked.
Alameda Silver	80	1 00	Keystone Silver	— 2	— 3
American Flag	— 64	70	La Crosse Gold	— 46	54
Atlantic and Pacific	— —	1 00	Liberty Gold	— 2	4
Bates & Baxter Gold	— —	— 75	Manhattan Silver	150 00	165 00
Benton Gold	— 20	— 40	Midas Silver	— 50	75
Black Hawk G	4 25	5 25	Montana Gold	— 80	90
Bobtail Gold	1 15	1 35	New York	— 64	70
Bullion Consolidated	— —	1 00	New York & Eld'o	— —	1 75
Columbian G. & S.	— 3	— 6	Nye Gold	— 2	4
Combinstion Silver	— —	60 00	Overyee Mining	17 00	— —
Consolidated Gregory	3 10	3 20	Ophir Gold	— —	— —
Corydon Gold	— 28	— 32	People's G. & S. of Cal	— 5	12
Edgehill Mining	3 50	— —	Quartz Hill	1 10	1 15
Gold Hill	— —	4 00	Reynolds Gold	— —	— 4
Gunnell Gold	— 60	1 00	Rocky Mountain Gold	— 20	— 21
Gunnell Union	— —	45	Smith & Parmelee Gold	2 60	2 70
H'n G & S. bs	— —	92	Sensenderfer	— —	7 00
Harmon G. & S. bs	— —	3 00	Symonds Fork Gold	— 50	— —
Holman	— 5	10	Texas Gold	— 7	— 12
Hope Gold	— 13	17	Twin Riv Sil	— —	75 00
Kipp & Buell Gold	— 10	25	Vanderburg G	— —	— —

Copper Stocks.—The market to-day was thus quoted .

Caledonia C	— —	10 00	Hilton	— —	1 00
Canada	— —	— 50	Knowlton	— —	2 00
Davidson	40	50	Minnesota	3 00	— —
Gardiner Hill	— —	1 00	Ogima	3 50	— —
Evergreen Bluff	— —	— —	Rockland	....	4 00

Petroleum Stocks were thus quoted to-day :

	Bid.	Ask'd.		Bid.	Ask'd.
Bonnchoff Run	1 70	1 90	N. Y. and Alleghany	1 50	3 00
Brevoort	....	35	Pit Hole Creek	50	80
Buchanan Farm	39	40	Rathbone Oil Tract Co	....	....
Central	50	70	Rynd Farm	6	12
Clinton Oil	75	1 25	United Pat. Farms	....	12
Manhattan	....	10	United States	1 80	1 95
National	....	3 00	Union	1 25	....

Miscellaneous Stocks—Del. & Hudson Canal, 150@152 ; Cumberland, 31 ; Quicksilver M., 20¼@20½ ; New York Central, 118½ ; Erie, 69 ; Readiug, 90¾ ; Michigan Southern, 88 ; Northwestern Pref., 74¼ ; Toledo, 102½ ; Rock Island, 91⅞ ; Fort Wayne. 102 ; Ohio and Mississippi Certificates, 29½ ; Pacific Mail, 193 ; Western Union Telegraph, 84 ; Adams' Express, 74@74¼ ; American, 67½@68 ; United States, 70 ; Wells, Fargo & Co., 35⅝@35¾ ; Merchants' Union, 35 per cent., 34¼@34½.

Government Stocks are steady, but trausactions are limited. Quotations range ;

U. S. 6s, 1881, coupon	110¾@111
U. S. 5-20s, 1862, coupon	100½@100¾
U. S. 5-20s, 1864, coupon	107⅛@107⅞
U. S. 5-20s, 1865, coupon	107⅞@108⅛
U. S. 5-20s, July, 1865, coupon	106⅛@106⅜
U. S. 5-20s, July, 1867, coupon	107 @107⅛
U. S. 10-40s, coupon	100⅜@100⅝
U. S. 7-30s, June, large	105⅜@105⅞
U. S. 7-30s, July, large	105⅛@105⅞

Foreign Exchange is dull. There is a rather better supply of bills, but the demand from importers is very limited, and rates are weak. We quote :

London, (prime bankers')60 days'	109⅛@109½
London, (prime bankers') sight	109¼@109⅞
London, prime commercial	— —
Paris, (bankers') long	5.17½@ 5.16¼
Paris, (bankers') short	5.15 @ 5.13¾
Antwerp	5.20 @5.17½
Swiss	5.20 @5.17½
Hamburg (bankers')	36 @36⅛
Amsterdam (bankers')	41 @41⅛
Frankfort (bankers')	41⅞@41
Bremen (bankers')	79 @79½
Berlin (bankers')	71⅛@71¾

Gold is quite firm, and the price ranged, to-day, between 138¼@138⅝.

American silver is in moderate demand at 6@7c. below the price of gold. Mexican dollars are dull at 102¾@103¾ in gold.

Of Commercial paper there is little offering, the rate being 7@9. Call loans are 7 per cent. in gold.

We have advices from San Francisco to the 29th ult. The gold deposits in the Branch mint to the 31st Januarv, inclusive. were 9,145, ounces gold, end 32,420 ouuces silver, while the coinage for the same period amounted to $17,000 silver. The mint reopened on the 18th January, consequently the above returns are for less than one-half the month. Our roads, says the San Francisco Commercial *Herald*, have been for weeks in an almost impassable condition, communication with the interior and mining regions being difficult, and frequently impassable. For this reason the Virginia office of Wells, Fargo & Co. has ceased to receive hullion, not being able to send it forward. Gold bars are scarce and in demand, selling at the advanced rates of 910, and with every prospect of reaching 92¢ before the sailing of the steamer, on the 29th lustant. The silver bullion market is in an excited condition, owing to unusual competition among capitalists for its possession. Silver bars are very scarce, and ranging all the way from ⅛ to 1¼, and even as high as 1½ per cent. premium, with a strong upward tendency.

Copper—Has been very quiet, and during the last few days, several parcels have been forced at ½c. decline for Lake. 100,000 lbs,, Detroit, sold at 23¼, and 50,000 lbs., Portage Lake, 23@23¼ ; Bethune is good 23c. for June delivery. 100,000 tbs., Detroit, were sold at 23c.

The English advices are very favorable. On the 14th, Chili was quoted £73 10s. 7d. Best selected, £82.

Tin.—Straits is sold by the dealers at 23¼ ; 500 slabs, Banca were sold at 26½@23¾, in lots ; Bnglish, 23¾c., all gold.

The English market was firm at £91 10s. for Straits.

Spelter—Has been sold at 6½c., gold; for 50 tons Silesian to arrive.

Lead—In steady demand, at 6¾c , for ordinary foreign.

Scotch Pig Iron—Is wholly nominal. Glengarnock $41, from ship, and $42 from yard.

American Iron is also quiet at $40, the nominal quotation.

Petroleum—Both crude and refined in bond is dull, but firm. We quote : Crude, 40@47 gravity, in bulk, per gallon, 12½@13 ; crude, 40@47 gravity, in bbls, 17@17½c. : refined, in boud, 110 test, prime light straw to white, 25½c. : refined, in boud, 110 test, standard white, 26½c. ; residuum, per bbl., $3 50.

Receipts for the week ending March 24	pkgs.	....	11,119
Exports for the week " "	gails.	....	1,012,870
" from Jan. 1st	"	....	9,720,171
" same time last year	"	....	5,522,316

THE IRON TRADE.

NEW YORK, March 27, 1868.

The market is quiet with no change in prices which, however, are firm. The past week has been quite a dull one for all branches of the trade. March is proverbially a quiet month with iron men, and nobody expects to do a great deal of business until later in the spring. All things considered, there is an average business doing in pig at our prices. We note sales, to-day, of 50 tons wrought iron scrap, from yard, at 47½c. We also note sale of 700 tons old rails at private terms ; also, 400 tons Scotch pig at our figures ; also, 300 tons scrap, private. Bar, from store, is held firmly. An invoice of 50 tons Belgian refined, sold, ex ship, at $85 per ton currency.

BOSTON, March 25, 1868.

The supply of Scotch pig is small, and with a steady demand from the trade, full prices have been realized. Some 600 and 700 tons have been bought up, and the supply is now mostly in the hands of one house. The sales have been from $43@$45 per ton for Gartsherrie and other brands, No. 1, and American at $44@$45 per ton. Bar iron is in steady demaud at previous prices ; and Russia sheet iron remains nominally the same as last reported.

Weekly Statement of New York Imports.

The following table shows the quantity and value of iron and steel imports at the New York Custom House, for the week ending and including March 20, 1868 :

	QUANTITY.	VALUE.
Chains and Anchors	74	$2,945
Iron, hoop, tons	78	3,233
Iron, pig, tons	620	11,372
Iron, Railroad bars	15,049	69,450
Iron, other, tons	471	11,203
Steel	806	8,162
Total value		$103,365

Boston Imports of Pig Iron from January 1 to March 21, 1868.

	1868.	1867.
From Great Britain, tons	1,573	8,475
Coastwise Ports	3,244	1,099

Lehigh Valley Iron Trade.

The following table shows the amount of Pig Iron transported over the Lehigh Valley Railroad for the week ending March 21, 1868, and for the season to that date.

From	Tons.	Total
Carbon Iron Co	440	2,885
Lehigh Valley Iron Co	380	2,640
Thomas Iron Co	695	6,595
Lehigh Crane Iron Co	660	3,650
Allentown Iron Co	425	1,515
Robert Iron Co	345	2,620
Glendon Iron Co	870	4,940
Other shippers	270	2,002
Total		26,847

Exports of Iron and Steel from Great Britain to the United States

During the month of January, 1868, there were exported from Great Britain to the United States 22,846 gross tons of Iron, and 719 gross tons of Steel. During the corresponding period in 1867 the exports of Iron amounted to 20,397 gross tons, and of Steel 2,198 tons, as follows :

	1867. Tons of 2,000 lbs.	1868. Tons of 2,000 lbs.
Iron, pig and puddled	7,359	1,799
" bar, angle, bolt and rod	3,220	1,830
" railroad, of all kinds	7,823	17,999
" castings	60	11
" hoop, sheet and boiler plate	1,055	969
" other wrought, of all sorts	880	238
Total of iron	20,397	22,846
Steel unwrought	2,188	719

Market Prices.

NEW YORK, March 27, 1868.

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

Anthracite, No. 1, best.	$40 00@	— —	
" " 2x, fdry	38 00	— —	
" Grey Forge	32 00	35 00	
Scotch 1 ig, from yard	42 00	43 00	
Charcoal, coal blast	50 00	60 00	
Old Wrought sc'p, fm yd.	47 50	— —	
" " " fm. vsl.	43 00	— —	
English rails, gold	52 00	53 00	
American " at works.	78 00	80 00	
American Bar Iron.			
Common, cash per ton	85 00	85 00	
Refined, " "	90 00	95 00	
Old Railroad Iron	46 00@	....	
RETAIL PRICES.			
Hoops, ¾ per ton	$190 00		
" ¾ "	160 00		
" ½ "	150 00		
" 1 "	140 00		
" 1¼ "	137 50		
" 1¼ to 2 per ton	137 50		
Scroll Iron—½x14 per ton	180 00		
" 12 "	170 00		
" 10 "	160 00		
" 3-16 "	150 00		
" ¼ "	140 00		
" ⅜x14 "	160 00		
" 12 "	160 00		
" 10 "	150 00		
" 3-16 "	140 00		
" ¼ "	135 00		
" ⅜ "	132 50		
Swed'h I'n, ord'y sizes	150 00		
Swedish Iron.			
1½x⅜ to ½ and ⅞ to 2 in sq	155 00		
1¼x⅜ to ⅝x⅞ "	160 00		
6 to 12x⅜ to 5-8	165 50		
Common Iron			
⅜ to 2 in. round and sq	....		
Refined Iron.			
⅜ to 2 in. r'd and sq	95 00		
1 to 6 in. wide x ⅜ to 1 th.	90 00		
3¼ and 3½ round and sq	105 00		
Rods—5-8 and 11-16, round & sq., per ton	100 00		
½ and 9-16 round & square	105 50		
7-16, round and square	115 00		
⅜, " "	120 00		
5-16, " "	125 00		
¼, " "	130 00		
3-16, " "	160 00		
Horse Shoe Iron	125 00		
Band—1 to 6 in. x 3-16 to No. 12	130 00		
Ovals and half Rounds.			
⅜ to 1⅜	120 00		
⅜ & 11-16	125 00		
½ & 9-16	130 00		
Nail Rods, per lb.			
"	9@10		
Norway Shapes	8¾c		
Spring Steel	—@ 9¾		
Tire " ⅞ to ½x1¼ & 5-16	10¼c		
Toe Cork Steel	10¼c		
Sleigh Shoe Steel	10¼c		
Plow Steel—6 to 14x¼ to ⅜	10c		

PHILADELPHIA, March 26, 1868.

Prices of Pig Iron. Manufactured Iron remains unchanged.

Anthracite Pig, No. 1	$ 37 00@$	40 00
" " No. 2	34 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)	39 00	41 00
Railroad Bars (American)	78 00	80 00
Refined Bar	83 00	87 00
Common Bar	72 00	78 00
Band Iron, 1¼ to 6	110 00	116 00
" 12 to 3-16	135 00	— —
Hoop Iron, 1 and upwards	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	7¾ per lb.	
Railroad Spikes	5@6c. per lb.	

PITTSBURGH, March 21, 1868.

Pig Iron and Blooms.—As a consequence of the heavy transactions of the last fortnight in crude irons, there is somewhat of a lull in the market. However, a fair amount of business has been done at full rates. Holders are generally well sold up, and are firm in their views of present and early prospective values. In Foundry Irons there is an improved demand. We quote the following sales :

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORES.

100 tons Medium Gray Forge	$37 25	4 mos.
100 tons " " "	37 50	4 mos.
300 tons Common Gray Forge	35 00	4 mos.
50 tons Inferior, deliverable at furnace	31 50	4 mos.
1,000 tons Medium Forge, at furnace	35 00	4 mos.
57 tons Common Forge from yard	35 00	6 mos.
100 tons Good Medium Forge, at furnace	34 00	cash.
60 tons Open Gray Forge, from yard	38 00	4 mos.
200 tons Open Gray Eorge, at furnace	34 50	30 dys
1,000 tons Gray, a favorite brand, Open Gray, deliverable at furnace for another market	private terms.	

CHARCOAL.

100 tons Hanging Rock Mill	44 00	6 mos.
50 tons " " "	44 00	6 mos.
100 tons " " No. 1 Foundry	47 00	5 mos.
50 tons " " " "	48 00	4 mos.
100 tons " " No. 2 Soft	45 00	5 mos.
100 tons " " "	45 00	5 mos.
50 tons " " "	46 00	6 mos.
127 tons " " No. 1 Foundry	46 00	6 mos.
25 tons " " a favorite brand	48 00	4 mos.
30 tons " " " "	48 00	4 mos.

ANTHRACITE.

50 tons Gray Forge	36 00	cash.

BLOOMS.

50 tons Charcoal	90 00	cash.

BOSTON, March 18, 1868.

Swedish—common ass'd	$150@155	Scotch Pig, No. 1	
English—com	85 90	Gartsberrie	$43@45
do refined	95 100	No. 1, other brands	43 45
do sheet, per lb	6½@10c.	American, No. 1	44 45
Russia, sheet	15@16c		

SAN FRANCISCO, Feb. 29, 1868.

Recent imports of Pig Iron have been considerable. The market, though firm, is quiet, few sales transpiring. Leading holders are not offering below $40@45 for Scotch ; others are under limits of cost and cha ges, which brings the price well up. In other descriptions of metals, markets are dull and prices altogether nominal. At auction, 9,000 lbs. Old Yellow sold at 10?¢. At the close, $40 is offered and $42 50@45 asked for White American and Scotch Pig, while a small invoice of French Iron recently at hand is reported sold at $65.

LONDON, March 7, 1868.

Iron.—In Staffordshire a few ironmasters report a slight increase of orders, but the improvement is as yet mainly confined to anticipation, people hoping that the growing activity in the North will shortly affect South Staffordshire. As the make of pigs is so greatly reduced, stocks are lower, and there is a good prospect that any decided improvement in the trade would strengthen prices. In Welsh, it cannot be said there is any actual increase in operations in the trade, hut orders are being offered more freely. The United States continue to be by far the largest foreign customers. In Swedish Iron no alteration has taken place. In Scotch Pig iron the market has not been quiet during the past week, and only a moderate business has been done. Very little variation has occurred in prices, the last price received from Glasgow being 52s. 9d.

Steel.—No change.

Bars, Welsh in Lond.	£6	5	0@..	....	Do. railway, Wales.	£5	5 0@£5 10 0
Ditto to arrive	6	5	0 ..	....	Do. Swd. in Loudon	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	12 6 2 17 9
Bars	7	7	6 8	10 0	Do. f.o.b, Tyne, Tees.	2	9 6 .. ....
Hoop	8	7	6 9	12 6	Do. Nos 3, 4, f.o.b. do	2	6 6 2 7 0
Sheets, single	9	2	6 10	0 0	Railway chairs	5	10 0 5 15 0
Pig, No. 1, in Wales.	3	15	0 4	5 0	" spikes	11	0 0 12 0 0
Refined metal, ditto.	4	0	0 5	0 0	Indian Charcoal Pigs in London, pr. ton,	7	0 0 7 10 0
Bars, common, ditto.	5	7	6 5	10 0			
Do. merch. Tyne or Tees	6	10	0 ..	....			

STEEL.

Swed., kegs (rolled)	14	5	0 ..	.. ..	Swed., in faggots	16	 0
" (hammered	15	5	0 15	10 0	English, spring	17	0 0 23 . 0

THE COAL TRADE.

The principal feature of the week was the Scranton sale, at which 75,000 tons were sold at prices showing an average decline of 25 cts. per ton. Lump sold at an advance of 27½ cts., while steamer declined 46½ ; Egg 45 cts ; Stove 33½ cts., and chestnut 25 cts. This decline did not take the market by surprise, from the fact that the Delaware, Lackawanna and Western R. R. Company were unable to deliver the coal sold at this sale under at least thirty days. We understand that there is at present at the 'Port, some two hundred boats waiting their turn. Therefore the prices obtained are no criterion of the prices in the market to-day, but that of a month hence. We have often expressed our disproval of these sales at any time, and cannot but feel that the company greatly injures business here, in the persistent continuation of them, particularly at a time like the present, when they are unable to deliver what they sell, and the general effect is to create a weak and unsteady market Dealers will more particularly comprehend the drift of our remarks, perhaps, when we claim that the full prices, if not a slight advance, would have been obtained over the last sale, had purchasers been able to obtain their coal immediately. The following table exhibits the prices obtained at the sale, compared with that of last month :

Lump coal	$3 45	a	—	$3 65	a	$3 80
Steamer coal	3 80	a	—	3 65	a	3 70
Grate coal	4 25	a	4 40	3 80	a	3 90
Egg coal	4 27½	a	4 57½	3 95	a	4 00
Stove coal	5 10	a	5 25	4 75	a	4 95
Chestnut coal	3 90	a	4 00	3 60	a	3 82½

The general market is bare of coal, consequently those who have any are firm in their prices, and make ready sales to those who are greatly in need.

Freights are from 25 to 35 cents lower to the Eastern ports, and 5 cents lower from the 'Port and in the bay. The Pennsylvania coal company have began shipping from Newhurgh on contract orders. This week will be found a carefully compiled list of freights from Elizabethport, Newhnrgh and Philadelpuis, also the dates of transportation to tide water, by railroad and canal.

PHILADELPHIA, March 25, 1868.

The market is dull, Locust Mountain lump and steamboat is quoted $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 59 ; Lehigh lump, steamboat, and broken, $5 00 ; do. prepared, $5 00 ; chestnut, $4 25.

BOSTON, March 25, 1868.

English Cannel is scarce, and prices are nominal. In retail lots the article commands very high prices, hut to arrive it is offered at $20 per ton. In Sydney and Picton, nothing of any consequence has been done. Prices are quite nominal. Cumberland has been selling in a small way, at $7 20 per ton ; Anthracite is unsettled and sailing in retail lots at $9@$10 per ton.

The following table exhibits the quantity of Coal passed over the following rontes of transportation for the week ending March 21, 1868 :

	1867.		1868.		INC. OR DEC.	
	WEEK.	YEAR.	WEEK.	YEAR.	WEEK.	YEAR.
Phil. & Reading R. R.	54,816	553,933	56,104	606,806	i 1,288	i 52,873
Lehigh Valley R. R.,	25,060	327,682	37,059	540,837	i 11,999	i 213,154
Scranton North	7,422	77,065	5,994	82,581	d 1,428	i 5,516
" South	23,596	259,811	19,261	218,713	d 4,335	d 41,098
Penn'a Coal Co. Rail.	12,851	100,541	13,821	116,138	i 970	i 15,597
Shamokin	9,008	76,261	5,818	71,958	d 3,191	d 4,303
Trevorton	.....	3,866	.....	4,174	.....	i 308
Short Mountain	28	4,110	1,879	8,967	i 1,851	i 4,857
Lykens Valley C. Co.	1,252	7,459	1,670	18,268	i 417	i 10,808
Broad Top	.....	39,092	4,772	38,561	.....	d 2,532
W'mstown Col'y, E.	1,490	13,281	2,980	25,868	i 1,490	i 12,587
Total	147,590	1,463,101	149 348	1,730,871	.....	.....
	.....	.....	135,523	1,463,101	.....	.....
Increase	.....	.....	d 13,825	267,770	.....	.....

Schuylkill Coal Trade.

BY RAILROAD, FOR WEEK ENDING MARCH 27, 1868.

St. Clair	30 759
Port Carbon	5,046
Pottsville	272
Schnylkill Haven	14,260
Auburn	1,781
Port Clinton	4,633
Total for week	56,751
Previously this year	606,806
Total	663,557
Same time last year	604,367
Increase	59,190

Lehigh Coal Trade.

SHIPPED BY RAILROAD FOR THE WEEK ENDING MARCH 21, 1868.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREVIOUSLY Tons. Cwt	TOTAL. Tons. Cwt.
WYOMING REGION.			
Franklin Coal Co	.....	.....	.....
Audenreid	.....	50 06	50 06
Lehigh & Susquehanna	.....	.....	.....
Germania Co	301 11	3,546 17	3,848 08
Wilkesbarre Coal & Iron Co	675 12	11,723 18	12,399 10
Warrior Run	430 13	4,953 17	5 384 10
Parrish & Thomas	1 361 17	17.659 03	19,021 00
New Jersey	292 08	4.748 09	5,040 17
Union	.....	2.316 09	2,316 09
Wyoming Coal & Transportation Co	.....	3,227 02	3,227 02
Newport C. C	.....	.....	.....
Morris and Essex Mutual C. C.	.....	821 11	821 11
Consumers	.....	192 12	.....
Everhart C. Co	.....	.....	.....
Plymouth C. C	.....	152 14	152 14
H. B. Hillman & Son	329 00	2,571 15	2,900 15
Bowkley, Price & Co	.....	149 08	149 08
Mineral Spring	821 15	3,820 15	4,642 07
Valley Coal Co	.....	.....	.....
Enterprise Colliery—J. H. Swoyer	358 13	6,749 11	7,108 04
G. B. Linderman & Co	.....	.....	.....
Washington C C	.....	.....	.....
West Pittston	.....	.....	.....
Barclay Coal Co	.....	.....	.....
Shawnee	75 13	2.248 15	2,324 08
Consumers Coal Co	94 13	1,134 07	1.421 12
Harvey & Bro	50 05	1,034 11	1,084 16
Wyoming Valley	73 10	755 16	829 06
Other shippers	.....	4 10	4 10
Total Wyoming	4,865 07	67,862 06	72,727 13
B. M. REGION.			
New York & Lehigh	.....	8,918 17	8,918 17
Honey Brook	2,968 18	30,588 12	33,557 10
German Penna. Coal Co	1.200 10	10,159 16	11,360 06
Spring Mountain	1,554 17	22,316 13	23,871 10
Coleraine	672 07	14,622 07	15,294 14
B. Meadow, D. W	.....	.....	.....
John Connery	.....	.....	.....
Lehigh Zinc Co	.....	.....	.....
Spring Brook	.....	.....	.....
Other Shippers	6 14	85 07	92 01
Total B. M. Reg	6,403 06	86,691 12	93,094 18
HAZLETON REGION.			
Central Coal Co	.....	.....	.....
Asbhurton Co	133 11	300 04	433 15
Mount Pleasant	485 07	4,776 04	5.261 11
Hazleton	5,097 01	54,567 16	59,664 17
East Sugar Loaf	2,438 15	34,262 12	36,701 07
Mount Hall	.....	219 14	219 14
Latimer (A. Pardee, Jr., Bro. & Co)	469 18	8,031 03	8,501 01
Stout Coal Co	672 12	5,998 08	6,671 00
Harleigh	835 12	14,539 03	15,374 15
Ebervale C. Co	1,516 13	18,556 05	20,072 18
Jeddo (G. B. M. & Co)	1,875 10	34,395 00	36,270 10
Woodside, J. C. Co	465 11	3,276 12	3,742 03
Highland Coal Co	1,299 01	17,731 09	19,030 10
Cross Creek	455 13	5,669 05	6,124 18
Council Ridge	1,658 05	24,040 06	25,698 11
Buck Mountain	513 18	16,539 03	17,053 01
Other shippers	.....	.....	.....
Total Hazleton	17,917 07	242,903 04	260,820 11
UPPER LEHIGH REGION.			
Upper Lehigh Coal Co	882 19	18,324 14	19,207 13
Total U. L. Reg	882 19	18,324 14	19,207 1

MAHANOY REGION.			
Trenton Co.	.....	591 00	591 00
Mount Etna	.....	.....	.....
Mahanoy Colliery	557 07	7,585 00	8,142 07
Delano	.....	.....	.....
Glendon Colliery	368 08	8,510 13	8,879 01
Primrose Colliery	.....	550 05	550 05
E. S. Silliman	263 08	29,919 04	30,182 12
McNeal Co	1,533 19	7,249 05	8,783 04
Knickerbocker	1,293 09	13,204 07	14,497 16
Thomas Coal Co	1,057 06	4,774 04	5,831 10
Williams & Herring	267 00	2,210 16	2,477 16
New Boston C. C.	1,517 13	8,391 03	9,908 16
Shamokin C. C.	.....	.....	.....
Caledonia M. and M.	131 15	4,994 13	5,126 08
Coal from Catawissa Railroad	.....	.....	.....
Other shippers	.....	15 13	15 13
Total Mahanoy	6,990 05	87,996 03	94,986 08
Grand total	37,059 04	503,777 19	540 837 03
Same time last year	25,060 04	302,622 08	327,682 12
Increase	11,999 00	201,155 11	213,154 11
Decrease	.....	.....	.....

Cumberland Coal Trade.

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

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

Consolidation Company		1,656 09
American		933 09
Borden	do.	588 19
New Hope	do.	218 02
Midland	do.	904 19
Total		4,301 18
From Eckhart Railroad.		
C. C. & I Co		1,217 04
Total		5,519 02

No report from Piedmont region.

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

At New York, March 27, 1868

Schuylkill R. A., choice	$....@$....		Lehigh Broken	5 25	....
" Ordinary	....	....	" Egg	5 25	....
" W. A., Lump	....	....	" Stove	6 00	....
" Steamboat	....	....	" Chestnut	4 75	....
" Broken	....	....	Wilkesbarre Lump	5 00	....
" Egg	....	....	" B'ken & Egg	5 50	....
" Stove	....	....	" Stove	6 00	....
" Chestnut	....	....	" Chestuut	4 75	....
Lehigh White Ash Lump	5 75	...			

SPECIAL COALS.—DEALERS' QUOTATIONS.

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

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

At Philadelphia, March 27, 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	....	....	" 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	Lorherry Coal	4 50	....
" W. A. Lump and Steamboat	3 00	3 25	Shamokin	....	....
" Broken	3 35	3 50	Franklin, (Lykens Valley)	4 75	....
" Egg and Stove	3 90	4 00	Broad Top	4 60	....

Scranton Coal at Elizabethport, March 27, 1868.

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

Lump	$4 00@....		Egg	4 75	....
Steamer	4 25	....	Stove	5 50	....
Grate	4 75	....	Chestnut	4 25	....

Prices for Pittston Coal at Newburgh, March 27, 1868.

(Corrected weekly by Penna. Coal Co.)

Lump, per ton of 2240 lbs.	$4 00@....		Egg " " "	4 10	....
Steamer, " " "	4 00	....	Stove " " "	4 45	....
Grate " " "	4 00	....	Chestnut " " "	3 90	....

70 cents additional to New York.

Lackawanna at Rondout, March 27, 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, March 27, 1868.

Lump	5 00@....		Chestnut	4 50	....
Steamboat and Broken	5 00	....	Stove	5 50	....
Egg	5 00	....			

Wilkesbarre Coal at Elizabethport, March 27, 1868.

(Corrected by Wilkesbarre Coal & Iron Co.)

Lump	$4 50	....	Egg	5 00	....
Steamer	4 50	....	Stove	5 25	....
Broken	4 75	....	Chestnut	4 50	....

Ten cents additional on shipments from Jersey City.

At Baltimore, March 27, 1868.

Wilkesbarre & Pittston W. A. by car	$5 50@5 75	From wharf or yard, 75c. to $1 per ton additional.	
Lykens Valley R. A. by car	5 75@ 6 25	Ret il, deld, per 2.240 lbs	7 00@7 75
Sunbury & Shamokin R. or W. A. by car	5 50 5 75	George's C'k and Cumberland f. o. h. at Locust P't for shipping	4 60@4 75

At Havre de Grace, Md.

Wilkesharre or Pittston, W. A., on board	$4 85@5 10	Sunbnry or Shamokin, R. or W. A., on board	....@5 25
		Lykens V'y. R. A. on b'd.	5 60@5 85

The above rates are only nominal. Shipping at this port is suspended lor the season.

At Georgetown, D. C.

George's Creek and Cumberland on board ..... $....@ 4 50

Prices of Gas Coals.

March 28, 1868.

PROVINCIAL.	Coarse. Gold.	Slack. Gold.	AMERICAN.	Coarse. Gold.	Slack. Gold.
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	75	Penn	8 50	8 00
Pictou	2 13¾	1 00	Newburgh Orrel Gas	8 50	8 00
Little Glace Bay	1 75	....	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	$11 00	Liverpool House Cannel	—@20 00
" " Cannel	14 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.)

From Elizabethport.

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

Rates of Freight from Newburgh

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

FROM NEWBURGH 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
Sangerties 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 52
Peekskill	40	Fewport	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
New York	70	Pawtucket	1 75
		New Bedford	2 25
		Boston	3 00
		East Cambridge	3 00
		Salem	3 00
		Newhuryport	3 25
		Portsmouth	3 00
		Portland	3 00

Rates of Transportation to Tide Water.

To Port Richmond. [BY RAILROAD.]		[BY CANAL.] To Port Richmond.	
Transportation from Schuylkill Haven to Pt. Richmond	$2 00	From Schuylkill Haven to Port Richmond	$1 00
Freight from Pt. Richmond to N. Y.	1 50	Freights and tolls by Raritan Canal	2 20
Total	3 50		3 20
Drawhack	50	Drawhack	20
	3 00	Total	3 00

From Port Carbon, 8 cents per ton more.

To Elizabethport		To New York.	
L. V. Railroad from Mauch Chunk to Easton	$ 81	From Mauch Chunk to New Brunsw'k. By Lehigh, Del. Div. and Del. & Raritan Canal	$ 90
C. R. R., N. J., Easton to Elizabethport	1 22	Freights through	1 25
	2 03	Towage	22
Shipping Expenses at Elizabethport	28		2 37
Total	2 31	**To New York via Morris Canal.**	
To Port Johnson.		Lehigh Canal	$ 34
L. V. R.R.	$ 81	Morris "	50
C. R. R. of N. J.	1 29	Towage	10
Shipping Expenses	25	Freight	1 45
Total	2 35	Total	2 39
To Hoboken.		**Expenses from Mauch Chunk to Jersey City for Re-shipment.**	
L. V. R.R.	81	Lehigh tolls (net)	$ 34
Morris & Essex R.R.	1 29	Morris "	41
Shipping Expenses	25	Freight	1 40
Total	2 35	Re shipping	30
		Total	2 45

Provincial Freights.

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

Freights nominal.

Foreign Freights.

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

SAN FRANCISCO COAL TRADE.

[From the San Francisco *Commercial Herald*, Feh. 29.]

We know of no special movement to record. Receipts of all kinds of foreign continue to be exceedingly moderate for the time being, though there are decided indications of a large increase in our Australian supplies during the next six months. The Mt. Diablo mines across the Bay, continne to furnish a large portion of the local steam requirement of this coast, selling at low rates, say $7@ 9. We are without receipts from Bellingham Bay, though the arrivals from Nanaimo appear to he steadily on the increase. A few sales of Australian soft and of Anthracite hard are reported, hut, as customary, terms and details withheld. We, however, quote the former at $13 50@14 50, the latter lor Wallsend. The various kinds of Anthracite, $15@16; Chili, $12@13; Cumberland, in hulk, $18@19; in casks, $21@22. The Reynard, for Hongkong, carries 150 tons.

Imports from January 1st to Febrnary 16th:

Anthracite, tons	9,233	Coos Bay, tons	1,354
Australian, tons	980	English, tons	2,202
Bellingham Bay, tons	2,800	Mt. Diablo, tons	12,812
Cumberland, ets	945	Nanaimo, tons	3,348
Chili, tons	308		

SAN FRANCISCO STOCK MARKET.

A telegram from San Francisco, dated March 25th, to Messrs. LEES & WALLER, Bankers, 33 Pine street, this city, quotes Nevada silver and other stocks as follows:

STOCKS.	Bid per Pt.	STOCKS.	Bid per Pt.
Gonld & Curry	600@ 605	Belcher	395@ 397
Savage	156@ 160	Imperial (per share)	267@ ..
Choliar Potosi	227@ 207	Alpha	81@ 85
Ophir	165@ ..	Kentuck	410@ 432 50
Hale & Norcross	..@ ..	Cal. Steam Navigation Co.	..@ ..
Crown Point	2,175@2,270	Cal. State Telegraph Co.	..@ ..
Yellow Jacket	1,420@1,445	Greenbacks	..@ ..

BOSTON STOCK MARKET.

(By Telegraph.)

BOSTON, March 27, 1868.

Calumet	—	Quincy	25
Copper Falls	22¼	Cary Improvement	7¼
Franklin	14¾	Isle Royal	—
Hecla	29½	Water Power	19½
Hancock	5	Bos., Hart & Erie RR	13¾
Minnesota	—	Rockland	—

Sales at Boston Stock Exchange, March 26.

500 shs Water Power	20	235 shs Pewahic	8
200 do Bos. Hart & E	13¾	34 do Quincy	28
250 do do	13⅞	100 do Rockland	3
50 do do	8.30 13¾	500 Star	62¼c
200 do do	13 13-16	SECOND CALL.	
100 do do	8.30 14	50 do Ko3., H & F	13¾
10 do Bates, M. Co	115		

London Copper Trade Circular

Messrs. Turnbull and Watson (Feh. 28) write—The sales since our last have been as follows:

Mine or Ship.	Tons.	Price.	Mine or Ship.	Tons.	Price.
Bars, P. Dawson	50..£70	0 0	Bars, Acapulco	30..£69	12 6
Ing. Star of West	60.. 74	0 0	Bars, Ulicoats	50.. 70	10 0
Ing. do	10.. 74	0 0	Bars, second hand	125.. 71	0 0
Bars, Second hands	125.. 69	10 0	Bars, Powhatan	78.. 71	0 0
Bars, Good hrand	100.. 69	15 0	Ores, A. Sharp	776.. 0	14 3
Bar, Sundry ships	200.. 0	14 9	Reg. Magnet	700.. 0	14 6
Bar, Oriente	50.. 70	0 0	Bars, Ulicoats	50.. 70	10 0
Bar, River Ganges	14.. 70	10 0	Ores, Canadian	300.. 0	14 6
Reg., Glenudal	250.. 0	14 1¼	Ore, Canadian	143.. 71	00 0

Arrivals from the West Coast, Sonth America, dnring the past fortnight:

Acacia, Guayacan, 622 tons ingots; Arequipa, Arica, 175 tons harilla; Acapulco, Valparaiso, 80 tons hars; M. Jackson, Valparaiso, 118 tons bars; Annie Sharp, Caldera, 800 tons ores. At Swansea—William Leckie, Chanarel, 300 tons bars.

Stocks of Copper produce (Chilian and Bolivian).

Liverpool	2064	936	5043	1600	301
Swansea	1067	..	200	700	63
Havre	..	..	3500	560	..
Total	3131	936	8743	2860	364

Equal to 12, 300 tons in fine copper: same period of 1867, 12,500 tons.

Messrs. Vivian, Younger, and Bond (March) write—A large business has been done in Chili produce. About 550 tons of bars have sold at prices rising from £71 10s lor good, to £73 for favorite brand spot, whilst 700 tons of Urmeneta ingots were sold at £75 and £75 10s. A cargo of regulus (250 tons) was taken at 14s. 6d. per unit, and later 200 tons of the same have fetched 15s. per unit. Bars are now held for £73 for good ordinary brands, at which, however, only a limited quantity could he had. Fine foreign has been dealt in at higher prices. Waharoo has fetched £79 10s. to £80 10s. cash, and £11 to £82, with full prompt. Burra has commanded £82 10s. and £83 cash. English smelters are firm and cautious sellers at our highest quotations lor the different descriptions.

The Copper Mines of East Tennessee.

True to her policy in all lands, of placing her treasures in the most inaccessible places, nature has guarded her rich deposits at Ducktown with a care equal to their value. These placers of copper are found in a region more impregnably begirt and secluded by mountains and surrounded by precipitous and frowning obstacles, perhaps, than any other spot on the eastern side of the continent. They are found in just the spot where the genii, up to the habits of nature in holding her treasures, would be likely to look for them. Where the lines of Tennessee, Georgia, North Carolina and South Carolina approach each other, also converge into a kind of "hump" the spinal back-rocks of several ranges of mountains and high ridges, and this vicinity is rationally supposed to comprise a great metallic field, of which the Ducktown mines are but the outcropping, or hint. The mines, yet in their mere infancy, as far as opened, are scattered over an area of five or six miles only, in the midst of a plateau corrugated with ravines about 1,500 feet above the level of the sea. The mines belong to various enterprising proprietors, quite a number of them being the property of the Union Consolidated Mining Company of Tennessee. As an evidence of the richness and extent of these mines, we may state that the latter company, last year, from the only one of their mines worked since the war, (the East Tennessee mine) produced and gave to commerce over one million pounds of refined copper. At an early day in the history of the Ducktown mines, the facilities for removing the ore to where it could be thrown upon the great channels of transportation were of the crudest character In 1851 the ore was carried in sacks on the backs of mules from the steppes of the mountains to the railroad station at Dalton, Georgia; and it was not till a wagon road was constructed at a great expense—being mostly hewn out of the solid rock—along the Ocoee River, that a more convenient outlet for the purposes of transportation became available. After the construction of this road, the amount paid in a single year by a single mine for wagoning out ores for transportation exceeded the sum of seventy thousand dollars. The nearest available outlet from the great copper ore projecting from the earth at Ducktown is by the way of Cleveland, Bradley County, at which place connection is made with the East Tennessee and Georgia Railroad. A railroad has been projected, and placed in the way of ultimate completion, from Cleveland to Ducktown, and then connecting eastwardly with one or more lines to the seaboard. An experimental survey of the route from Cleveland to Ducktown has been made (a distance of forty-two miles), of necessity following the tortuous and wild career of the Ocoee a considerable portion of the way. Independently of its influence on the copper mines, such a railway would be of great importance as a link connecting by an air-line the ports of Wilmington, Beanfort and Charleston (via the Rabun Gap road) with the Mississippi at Memphis, or the Ohio at Louisville. The two North Carolina railways, running parallel from east to west, with their respective termini at Rutherford and Morgantown, are likely to be consolidated and continued to Ashville. From this point it was first proposed to extend them to Knoxville, but a point on the State line, near Ducktown, was finally adopted instead, on condition that the intervening line of 40 miles, between Ducktown and Cleveland, should also be constructed. To these railways the aid of the State of North Carolina was pledged, and, since the new constitutional provision, forbidding all State aid to such enterprises, has been rejected by the people, that pledge remains in force. The railway between Ducktown and Cleveland, therefore, is destined to be a part of a great highway, over which will pass an immense traffic, and as such it can hardly fail to be a successful enterprise. We are informed that efforts are now being made to commence the completion of these important roads, with every reasonable hope of an early success. It is easy to perceive that the completion of such a road as the above to the Ducktown regions would greatly add to the net earnings of the mines, bnt to what vast extent it would add to the wealth of the country by encouraging the development of other mines and enlarging the operations of those already opened is only within the power of the liveliest imagination to conceive. When such a road is completed, and its great creative results are visible, we shall then look rfor a justification of our belief that the Ducktown region, in permanent mineral wealth, is one of the richest in the world.—*Nashville Press.*

Steel Rails.

H. Riddle, General Superintendent of the Erie Railway Company, strongly recommends steel rails as being safer and more durable than iron ones. It is probable that steel rails will take the place of iron ones on the principal roads in the country, as soon as the change can be made with convenience. Mr. Riddle says: With the ten miles of track laid with the John Brown Bessemer steel no fault need be found. But one rail has broken dnring the winter, and no lamination and very little wear is perceptible. Twenty steel rails were laid in Jersey City yard last March, the iron rails adjoining, subject to the same wear, have been renewed four times since the steel was put down, and I have no doubt the steel rails will outlast three times as many more iron rails. This winter's experience has satisfied me that the quality and weight of the iron rails in use cannot be depended upon to sustain the traffic of the Erie Railway. Forty-two ton locomotives, hauling trains of 50 and 60 loaded cars, and passenger engines weighing 37 tons, running at a speed of 30 to 40 miles per hour, literally crush and grind out the iron rails beneath them. Instances have been reported to me of rails removed from the track being too much worn for safety, when the imperfection was visible bnt the day before being removed. In view of this state of things, what is the remedy? Manifestly the adoption of steel rails as far as practicable, and iron rails of superior quality and heavier section, to be followed by the gradual reduction of the weight of engines and cars as new equipment becomes necessary. The tendency of late years has been to larger and more powerful locomotives, and heavier, stronger cars, and this has been carried to such an extent as to render them out of all proportion to the strength and durability of track. Especially has this been the fact upon the Erie Railway.—*Ex.*

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NEW YORK, SATURDAY, MARCH 28.

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NOTICE TO SUBSCRIBERS.

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

ANTIQUITY OF MAN.

The article in SILLIMAN'S, for March, by Prof. E. ANDREWS, of the Chicago Medical College, on the localities of human antiquities at Abbeville, Amiens and Villeneuve, deserves attention, not only on account of its ability and interesting character, but also because it shows how careful geologists should be, in generalizing from their local observations, and in attempting to obtain from the indications which the earth affords of the relative chronology of different formations, conclusions as to their actual age.

The problem presented at Amiens and Abbeville, in the valley of the Somme, in France, is briefly this: In the fluviatile drift of this valley, consisting of gravel-beds, overlaid on the lowlands with a bed of peat some twenty-six feet thick, have been found flint hatchets and the bones of man, in connection with remains of extinct species of the elephant, rhinoceros and other animals. Before reasoning upon these occurrences, it is necessary to settle their genuineness, and then to determine their antiquity. Prof. ANDREWS admits the genuineness of the remains; and, indeed, though men of science should be as strictly as ever on their guard against pseudo-discoveries, and—what is perhaps still more dangerous—dishonest tampering with real facts, and dressing them up, to render them more impressive, yet few will be disposed to deny that the observations already accumulated of the existence of human remains, in strata of great apparent antiquity, are too numerous and too respectable to be treated as parts of a stupendous hoax.

Prof. ANDREWS remarks that, conceding the genuineness of the remains in the valley of the Somme, it is necessary to suppose that the *Elephas primigenius* has lived later, or Man earlier, than is usually believed. The solution of this inquiry involves the question of the antiquity of the remains, which it is sought to discover by estimating the probable time consumed in the deposit, first, of the gravel, and secondly, of the peat overlying it.

Before sketching his argument upon these heads, we have to point out that the mere juxtaposition of the bones of an extinct mammal with human remains in river-drift, does not prove an identity of age between them. Nothing is more easily conceivable than the displacement by a stream of the fluviatile deposits of a former age, and their collection together with much later remains in new localities. Or, if the hunter who first found the hairy mammoth in Siberia, had frozen to death by its side, the two skeletons might turn up in some subsequent age, as evidence of the co-existence of the two species. A special argument is therefore necessary, to prove that *Elephas* and *Homo*, even when really found in the same formation, were both alive at once. That they are both dead at once is an interesting, but not a conclusive part of that argument. Far more direct and convincing is the reported discovery of a tooth of the elephant aforesaid, upon which a complete and lifelike picture of the animal is rudely drawn, leading almost irresistibly to the conclusion that, although the particular individual upon whose ivory this work of art was perpetrated, was not alive when so great a liberty was taken with his bones, some other specimens of his hairy race must have roamed in those days the woods of France.

But we return to the subject of the antiquity of these fossiliferous deposits, since that involves the most important question of the pre-historic age of Man.

1. It is claimed that the gravel was deposited very slowly, through a period of untold ages, by the imperceptible action of the river with about its present annual amount of water. Prof. ANDREWS finds evidences, on the contrary, of powerful ice-action, and such rapidity of deposition that blocks of frozen material four feet in diameter were completely covered and had horizontal strata laid above them, before they had time to melt: also, that, when the upper strata were laid down, the stream during its floods was a mile and a half wide, and not less than twenty feet deep. The conclusions indicated are, that the ancient river, and consequently the annual rainfall, was for a time immensely greater than at present, and that the rapidity of the gravel deposit was, at least in places, very great, and the time required for it proportionately short.

2. It is claimed that the twenty-six feet of peat have accumulated at a rate not exceeding one and a half or two inches in a century, which implies an age of 15,000 to 20,000 years for the whole bed, or, in other words, for the period since the termination of the gravel deposits. This calculation is based upon the fact that there has been no perceptible accretion to the peat from time immemorial, and the belief that an increase of more than two inches in a century could not have escaped the notice of the inhabitants. The formation of ordinary peat, by the peculiar properties of such plants as *Sphagnum*, which die at the root while they continue to grow at the top, and draw up and retain moisture in their living parts—this formation, we say, is indeed a slow and tolerably uniform one; and, as it has been frequently studied in Europe, would suggest itself to a European geologist as one of the fairest methods of calculating the lapse of long periods of time. But Prof. ANDREWS points out that the beds in question are forest peat, formed by the annual crop of fruits, twigs, leaves, windfall trunks, and the undergrowth of grass, herbs and mosses of a dense thicket-swamp. That such a deposit may increase in depth two or three feet in a hundred years, an American woodsman will readily believe; but in Europe, where (as Prof. A. remarks) few trees are allowed to grow and none to decay, the study of such phenomena is impossible. As the valley of the Somme long ago ceased to have any forests, and is wholly reduced to cultivation and pasturage, and as the fundamental condition for the formation of peat of any kind—excess of moisture—is removed by artificial drainage and, to some extent, by the decreased volume of the river, it is no wonder that these peat-beds have not increased within the memory of the present inhabitants. "Hence all calculations of age, based on the present want of progress, are necessarily erroneous."

Prof. ANDREWS then gives an independent proof that the formation of these beds must have been a rapid process, in the fact of the occurrence of numerous trunks of trees, standing erect in the peat. He argues, that as stumps do not stand long in the damp air of a swamp without decay, and those which are found in this manner must have been covered to their summits before they had time to rot away. These trunks are sometimes a meter in height, though generally less. According to the former hypothesis of the slow growth of the bed, a stump one meter high would have stood in a swamp some two thousand years without decay.

3. But these peat beds contain historical relics: near the surface, those of the middle ages; below that, to the depth of six feet, Roman and Gallo-Roman remains, and underneath these, pure Gallic and earlier traces. According to the hypothesis referred to, the Romans would have come about two thousand years before Christ; but a more rational interpretation, allowing six or seven centuries since the disappearance of the forests and the cessation of the peat-formation, and a centennial growth in depth before that time of about six inches, agrees with history in placing them nearly at the Christian era. The age of the whole bed, at this rate, would be about 5800 years. An examination of the famous gravel cones of Villeneuve, at the eastern end of Lake Geneva, leads Prof. ANDREWS to a similar reduction of the enormous European estimates of time. We have not space to sketch this portion of his paper; but must rest content in the hope of having awakened an interest in the mind of the reader which will lead him to peruse the whole.

There are few subjects in geology concerning which so much looseness of thought and language prevails as are manifested in regard to this subject of time. It has been said that time is the only element of which the geologist may make, in his theories, unlimited use; but this maxim is too often perverted from its legitimate application. The tendency of scientific discovery is to show that the recent and present changes of our terrestrial surface are more rapid and extensive than we have been accustomed to believe. When the Gulf Stream changes its current in a day, islands disappear or emerge from the deep, and continents heave as with the beating of gigantic breasts; when harbors fill up, deltas grow, and rivers forsake their channels almost beneath our eyes, it will not be wise to attempt to manufacture æons out of the swamps of the Somme or the sweepings of the mountain torrents of Switzerland.

THE PROPERTIES OF NINE.

Once in a while we hear of the mysterious and wonderful properties of the number nine; and it is a curious commentary on the superficiality of our mathematical education, and the manner in which we confound conventionalities with nature and symbols with facts, that these properties are believed, even by many educated men, to inhere in the number itself. Yet, in fact, they are simply consequences of the artificial decimal system of notation, and belong therefore to the figure 9, and not to the number at all.

Take, for instance, the simplest expression of this "mystery." When 9 is multiplied by any other digit, the sum of the digits of the product is always nine.

Thus:—

9 multiplied by 6=54, and 5 plus 4=9
9 " " 9=81, " 8 " 1=9

and so with all the rest. Now what are the nature and reason of this phenomenon?

Our decimal notation expresses numbers, not by the mere juxtaposition of units, like the score chalked behind the door of an ale-house, but by the use of the conventional nine digits and the zero, and by the repetition of these digits in different ranks—it being arbitrarily agreed that ten units of any rank shall be expressed by the symbol of one unit in the rank above. The number nine, then, without any reference to its real "properties," happens to be the highest number of units expressible in any one rank. From this simple circumstance arise all the relations which seem so inexplicable. Let us state the proposition in the most general form, using algebraic symbols, in order to emancipate ourselves from the usual arithmetical notation.

Let m be the modulus of any system of notation, that is, let m units of any rank be equal to one of the rank above. (In the decimal notation $m = 10$.)

Let a and b be two digits, each representing, of course, a number less than m, (just as in the present system, each single digit must represent a number less than ten). Let the number represented by a, however, be the highest that can be represented by a single digit, or $a = m - 1$. The product of a and b can not require more than two digits—a point we need not pause to demonstrate—and we will denote these two by x and y. The product itself would be denoted by $mx + y$. We have then a general equation: $ab = mx + y$, in which $a = m-1$. Hence b $(m-1)$ or $bm - b = mx + y$. Now, x, representing the units of the second rank, is the integral quotient obtained by dividing the whole number by m; and y is the remainder. (Just so we divide, say, forty-three inches by twelve, and write 3 ft. 7 in. or we intuitively divide fifty-four by ten and write 54.) If we take the product of a and b, namely, ab, or $bm - b$, and divide it by m, we have as a quotient $b - \frac{b}{m}$, or a quantity less than b by $\frac{b}{m}$. This fraction, as b is assumed less than m, must be less than unity. In other words, m is contained in $bm - b$ less than b times, but more than $b-1$ times. Hence the integral part of the quotient, namely, the number of units of the second rank, represented by x, must be equal to $b-1$. Substituting this value in the equation $bm - b = mx + y$, we have $bm - b = bm - m + y$, or $y = m - b$. Hence $x + y = b - 1 + m - b = m - 1 = a$. As a general proposition then, it follows that under any modulus of notation, the highest digit being multiplied by any digit, the sum of the digits of the product will be equal to the aforesaid highest digit. The highest digit in our system is 9, because our modulus is ten; but if our modulus were twelve (as in calculations of board-measure), the "properties of nine" would become the properties of eleven. Thus:

11 times	7 are 77—duodecimally,	6' 5"
11 "	9 " 99	"	8' 3"
11 "	11 " 121	"	10' 1"

The sum of the numbers in the last two columns is always equal to 11.

In the same way the remaining peculiar properties of nine may be shown to belong to the symbol, not the number, and to have no foundation in nature for one number more than another. The real properties of numbers themselves are independent of symbols; and, before hastily pronouncing any observed peculiarity to be natural and not conventional, the young student should apply the simple test of a change of notation. What is not equally true in Roman and in Arabic numerals, for instance, cannot be said to be a truth of numbers at all.

BLAKE'S STONE BREAKERS.

We gave a few weeks ago, on our first page, an illustration description of this machine, and we recur to the subject for the purpose of offering a few observations as to the place which the stone-breaker should occupy in mining. We do not make the AMERICAN JOURNAL OF MINING a vehicle for editorial puffery; neither do we abstain from expressing our honest opinions in these columns for fear lest we might be supposed to be puffing somebody. Hence we have no hesitation in saying as editors, what we know as individuals, that BLAKE'S crusher is a widely used and successful apparatus. It does well the work for which it is designed; and its fundamental principle, that of the alligator jaw, is the only one which can compete in economy of time and power with the direct blow of the falling stamp. There are, we believe, more than five hundred of BLAKE'S machines now in operation in this country, England, Canada, South America, India, Australia, New Zealand, Cuba, and most of the States of Europe. A considerable number are employed at the copper mines of Lake Superior, some being so large as to weigh nearly twenty tons, and capable of receiving stones twenty-four inches wide by eighteen inches thick, weighing half a ton or more. Their sale, however, has been considerably hindered by the introduction of other machines, involving the alligator jaw, and the consequent law-suits between rival patentees. With the merits of these disputes we do not propose to deal at present, though we believe that some contests have resulted in favor of the BLAKE patent; and that every machine in which the alligator jaw is applied to the crushing of rock, and driven by a revolving shaft and fly-wheel, is an infringement of that patent. However this may be, the machine to which we allude is the typical "rock-breaker"; and what we have to say of it will apply in some degree at least, to all rock-breakers.

The Blake rock-breakers have the following recommendations:

1. Their power is enormous, and their capacity for breaking rock per day changes less with the hardness of the rock than would that of stamps. The day's work of a crusher is more uniform, if it be properly attended, than that of a stamp, working, say, at different times, on ores from different mines.

2. They reduce ore to a given coarse size with a minimum of dust. If grains of a certain size are required for dressing or for roasting, all the fine dust produced in crushing is so much trouble, if not loss; and the stamp-mill inevitably produces a good deal of slime, even when arranged for coarse crushing.

3. They are consequently in demand for crushing the stone used to macadamize roads; since the two excellencies of quick crushing and little dust are in such cases most desirable. On the other hand, there are certain peculiarities of rock-breakers, which render them unsuited to particular circumstances; and, among these, continuing our enumeration, we mention:

4. They are liable to be choked with clay, dirt or soft rock; and now and then a piece even of hard rock, of peculiar shape, catches in the alligator's throat, and the jaws "get no purchase" upon it. This latter difficulty is but trivial; the attendant can overcome it at once by changing the position of the offending fragment; but the former is an evil which experience has proved to be serious, especially in those machines which allow but little motion to the jaws at the bottom, in order to crush more finely than is (we think) expedient.

5. They cannot be arranged with automatic feeding apparatus, but must be carefully attended. Sometimes two men are required to attend a rock-breaker—one as a feeder, and one to prepare with a sledge the masses which are too large for the machine.

6. The product of the crushing is not uniform in size. Quite large pieces sometimes pass unbroken, as though the alligator, being in a hurry, were bolting a part of his food without due mastication. The best remedy is to use rollers, or different sizes of breakers, passing the ore from one to the other. Some machines are manufactured which are claimed to combine the operations of breaking and uniform fine crushing in one; but they are less successful and economical than the simple breaker followed by some other apparatus for comminution.

We may gather from these brief hints the real use of the stone-breaker in mining. It should be preparatory to the roller, the stamp or the grinder, and not used entirely alone, since it is not suited to soft clayey material (of which there is much in all mines), nor to that uniform fineness of crushing which is so important for the subsequent treatment of the ore.

In its proper sphere, and in faithful hands, the rock-breaker well deserves its high reputation, and economically relieves the miner of the labor which he formerly shared with convict road-makers—breaking up the rock with hammers. This is the wisely moderate claim of BLAKE BROTHERS; and it is one which they have abundantly made good.

FRANCO-AMERICAN TELEGRAPH COMPANY.

This company proposes to lay a direct cable between New York and France. It was registered in London last January, with a capital of one million pounds sterling; and it is claimed that one-third of this amount is already subscribed in England, and a second one-third "contracted for" in France, while the last one-third is now offered to American capitalists, "in order to make this an international enterprise."

We should of course be glad to see one or more additional cables between this country and Europe; and we do not care to interfere with any truly international enterprise to that end; but in a case like the present, it is interesting to inquire *who makes the cable, and gets the contract for laying it;* and how much of the capital so eagerly subscribed and contracted for in England and France is to go back into the pockets of subscribers and contractors in the form of payments on account.

We have heard of a rolling-mill which did a good business in supplying a certain new railroad with rails, taking pay, half in cash and half in bonds of the road; but in that case, the proprietors made the thing sure by charging twice the usual price, thus securing the full price in cash, and the bonds as so much extra gain. If there is any such chance to do a good thing in the submarine cable line, we hope that, with true international courtesy, the American manufacturers will be allowed their share. We understand that the Franco-American Company do not offer that sort of reciprocity of interest.

NEW PUBLICATIONS.

ANNUAL OF SCIENTIFIC DISCOVERY, *or Year-Book of Facts in Science and Art, for* 1868, *Exhibiting the Most Important Discoveries and Improvements in Mechanics, Useful Arts, Natural Philosophy, Chemistry, Astronomy, Geology, Biology, Botany, Mineralogy, Meteorology, Geography, Antiquities, &c., together with Notes on the Progress of Science during the year* 1867; *a List of Recent Scientific Publications; Obituaries of Eminent Scientific Men, &c., Edited by* SAMUEL KNEELAND, *A. M., M. D.* Boston, Gould & Lincoln.

The importance, indeed the necessity, of scientific annuals, is generally recognized. The literature of science has four phases. New discoveries and hypotheses first make their appearance in papers read before learned associations, or contributed to the journals of the day. They are opposed, discussed, and investigated; and, if they stand the test of time and criticism, adopted by the world of experts. Sooner or later, some competent authority sums up the debate, showing what is the real extent and value of the new theory, or the bearing of the new fact. Perhaps once in ten years a standard work on the science in question makes its appearance, and incorporates the results of the progress of the decade; and, finally, the new discovery, having long been a familiar topic of thought and discussion, is digested into the elementary text-books and employed in the instruction of the young. Unfortunately the latter process is frequently a slow and imperfect one. We might almost say that our best school-books of science at the present day are those which do not tamper with the latest achievements of science at all; since many attempts to incorporate the new and old, result in a confusion of both. But this were a judgment both sweeping and unjust. The dark recesses of nature, which we were wont to see gradually made clear by the gradual, creeping dawn, are now illumined by swift, successive lightning flashes; and we see a thousand novelties in a moment, though we are not, perhaps, quite so sure of what we see. Observers, too, have been multiplied; and the world is full of voices, crying lo! here, and lo! there. Authors cannot be blamed, therefore, if they but hesitatingly and partially accept the opinions that are afloat; and, for all that we can see, the young disciple, like all the rest of us, must grapple with the difficulty of attempting to seize and make his own a knowledge that flies while he pursues.

Scientific annuals are intended to afford the experienced student a general view of the progress made or attempted during the year. They may record only those facts which are fully established; or they may take from all sources the alleged discoveries of the year, requiring no other qualification than that the proposition advanced shall be "important, if true." The work before us is of the latter class; and we are not sure but it is more useful than if it had been more severely and cautiously clectic. It bears the same relation to natural science that a scrap-book of newspaper paragraphs bears to history—the relation, namely, of indispensable material. For many purposes of investigation the record of error is as important as that of fact. How often does one call vaguely to mind some statement which he has seen in the papers, he cannot remember when or where, and which he would give much to have at hand for convenient reference? Perhaps it might turn out to be of little value, if it were found; but so long as it is not found, the lack of it is distressing. With the Annual of Scientific Discovery (which now amounts to a goodly row of volumes) on his shelves, he will be likely to obtain, quite easily and rapidly, the information of which he is in search.

If we were inclined to find fault with so useful a book, we should complain that the editor has left upon it no marks of any instrument except the scissors. There are many articles scattered through these pages, and given without comment, which contain palpable inaccuracies of thought and language, and which for the sake of unskilled readers, might have been accompanied with brief notes, exposing the fallacy, or, still better, omitted altogether. For instance, there is a page and a half devoted to what is called the "fatality of numbers," and especially to the properties of "the number 9," which are pronounced inexplicable to any but an advanced mathematician. Our article on this subject in another column, presents the true explanation of this "mystery." We cannot understand how the matter should be considered a part of scientific progress for 1867; and certainly there was material enough at the editor's hand, to make up a book, without resorting to childish enigmas. But we have said enough to show both the weak and the strong points of works of this class; and we need hardly add that the numerous patrons of the Annual, who have found by long experience its true use and real convenience, will be satisfied with the present volume, and not demand of it that perfect accuracy and comprehensiveness which do not properly lie within its plan and scope. The book is adorned with an excellent portrait of Prof. WILLIAM B. ROGERS, LL.D., President of the Massachusetts Institute of Technology, and is for sale at the office of the AMERICAN JOURNAL OF MINING.

THE AMERICAN JOURNAL OF SCIENCE AND ARTS for March contains the following, among other, papers of value: An interesting sketch of FARADAY'S life and works, translated from the French of Prof. DE LA RIVE. Notes on the Lignite Deposits of the West, by Prof. F. V. HAYDEN, one of our most industrious and successful field geologists. Prof. H. arrives at the conclusion that there are no valuable beds of lignite west of the Mississippi, in formations older than the Tertiary, while he shows, from analyses, that some if not all of these western lignites are superior as fuel to those found in any other portion of the world. It has been hitherto held that much of the Rocky Mountain coal is Cretaceous. An admirable contribution by Prof. ANDREWS, to the discussion of the antiquity of man, is more fully treated in our editorial columns. Prof. O. C. MARSH writes briefly on the vexed question of the *Palæotrochis* of EMMONS, which he asserts to be, not a fossil, but a formation of inorganic origin, appearing to have some analogy with the "cone in cone" structure. The argument is too much condensed to be, to our mind at least, conclusive; and we must regard the *Palæotrochis* as still a historic possibility. The celebrated Taconic system, which EMMONS sought to establish on the evidence of these fossils, among other proofs, now rests on pretty good stratigraphical grounds; and we suppose the question of the genuineness of the alleged corals has no longer so great a significance as it at one time obtained. Messrs. RAPHAEL PUMPELLY and ALBERT S. BICKMORE furnish papers on recent geological changes in China and Japan, that of Prof. PUMPELLY concerning more particularly the delta-plain, and the changes, within the historical period, of the course of the Yellow River. The science of geology, based originally on the observed phenomena of a limited European field, has already received important modifications from the study of the North American formations; and doubtless the explorations of Asia, Africa and South America will vastly enrich its literature and increase its progress.

Scientific Meetings.

LYCEUM OF NATURAL HISTORY.

The regular weekly meeting of this Association was held last Monday evening, March 23—present, twenty-eight members, Prof. NEWBERRY in the chair. Mr. WATERHOUSE HAWKINS was also present as a guest.

Dr. FEUCHTWANGER exhibited gold specimens from Nova Scotia, pointing out, as a rarity, one containing gold disseminated in chloritic slate. Dr. CREDNER remarked, that in the Southern States gold frequently occurred directly and without gangue, in chloritic, micaceous and especially talcose slate, in such quantity as to pay for working. Prof. HITCHCOCK said that graptolites had recently been found in the auriferous schists near Halifax, indicating their Silurian age; these discoveries seem to be not altogether free from doubt. The discussion terminated in the appointment of Messrs. HITCHCOCK and CREDNER as a committee to collect facts bearing on the occurrence of gold direct in crystalline schists and the age of the strata.

Prof. SEELEY exhibited a specimen of Franklinite and red zinc ore, said to have been found in Connecticut, but its great mineralogical and paragenetical similarity to the New Jersey ores caused much doubt to be expressed as to its actual occurrence in Connecticut.

Prof. SULEY showed photographs, illustrating the action of sunlight on different kinds of glass.

Dr. EDWARDS exhibited and explained an apparatus for gas-volumetric analysis, invented by Messrs. DIVINE and SEELEY and improved by himself. Prof. MEYER read a passage from FRESENIUS' "*Zeitschrift der analytischen Chemie*," showing that the same method and apparatus were used some years ago by DIETRICH and FRESENIUS; and Messrs. MEYER and SCHWEITZER asserted that the variable absorption made the employment of the method very difficult, and, without the use of DIETRICH'S tables, impossible. This gave rise to a debate of considerable length.

Prof. HITCHCOCK addressed the Lyceum on the classification of the Eozoic rocks of New England, the pre-Silurian age of which is still often called in question. He divides them into (1) The Felspathic Gneiss Group, distinguished by predominant felspar, and occurring chiefly in eastern Connecticut; (2) The Calcareous Gneiss Group, containing many characteristic intercalated lime-stones (To this belongs the gneiss of Manhattan island); (3) Ferruginous Gneiss with magnetite, in eastern and middle Connecticut; (4) Upper Gneiss, poor in foreign enclosures and mineral species, and principally occurring in middle Connecticut. Besides these, the Syenite of eastern Massachusetts, the relation of which to these four groups is not certain. Nevertheless, it underlies the Boston Basin, in which are found outcropping strata containing *Paradoxides*, and also conglomerates with fragments of the syenite—which prove it pre-Silurian. Prof. JOY reported meteorological observations for the past week; and the Lyceum adjourned, after the announcement that Mr. WATERHOUSE HAWKINS would repeat his lecture on the Unity of the Plan of Creation in the Animal Kingdom, at Cooper Institute on Thursday, March 26th.

Agreeably to the above notice, a large audience assembled on Thursday evening at the appointed place. The lecturer was gracefully introduced by Prof. NEWBERRY.

Mr. HAWKINS said that in Great Britain, as here, the one great subject which occupied the minds of her leading men was the education of the masses. Nothing was more important in this connection than a knowledge of natural history. For want of this knowledge England had already destroyed her salmon, and was rapidly destroying her oyster fisheries. Prussia was following the bad example by eating up the ova of her sturgeon in the form of caviare. All this arose from ignorance of the fundamental laws of natural history, which would teach us, if rightly interpreted, to make the most of what the Creator has given us. Throughout the animal kingdom there is perfect unity of design. Commencing with the sea anemone, as it is called, the lowest form of animal life, which consists of but a stomach, the lecturer showed that the next highest type consists of a stomach and a heart. As we proceed higher in the scale, a breathing apparatus and a brain are added. Illustrating these facts on the black-board, by diagrams sketched with wonderful precision, Mr. Hawkins then drew the internal organs, brain, arterial and venous circulations and nervous organization of a fish, showing how these soft parts were covered, and protected by the bony structure, and how wonderfully the animal was adapted to inhabit the medium in which it had been placed. By a few slight alterations he showed how the fins became legs, and the fish became a cayman, fitted for locomotion either on land or in the water. A few more alterations and the cayman became an animal, somewhat resembling a hog. From a hog the animal changed into a bird, the two front legs having expanded into wings, and the two hind ones remaining as before, only furnished with claws. Mr. Hawkins said it might be seen from the diagrams he had drawn that a real unity of

plan ran through the whole animal kingdom, and that from the teeth, jaws, claws, and a few of the bones of any animal, it was comparatively easy to determine what form it had born. He also referred to the Darwinian theory of the development of species, which he said no comparative anatomist could believe in. No one had yet ever heard of a fish-egg bringing forth a bird, or *vice versa*. No difference could be detected even with a microscope in the different ova of fishes, yet salmon had always salmon, and other fish each their kind. Nature abounds in variety, yet through all her plans, so far as the animal kingdom is concerned, runs a unity of design, complete and wonderful, and showing the hand of God himself.

The lecture was listened to with great interest by the large audience present, and the lecturer was frequently applauded.

POLYTECHNIC BRANCH OF THE AMERICAN INSTITUTE.

The meeting of the above association was well attended on Thursday evening last, with Prof. S. D. Tillman in the chair. Mr. Francis Millward, of Cincinnati, exhibited a small oscillating engine, which was stated to be two-horse power, and weighed only 195 lbs. The merits of this engine brought out a discussion on the mechanism of oscillating engines, and the vibrations of pendulums. The subject was treated by Mr. Emery, of the Novelty Iron Works, Dr. Bradley, Professor Van Der Weyde, and others.

Mr. Emery gave some interesting formulæ respecting safety valves, which we shall publish in our next issue, as interesting to many of our readers who have a taste for mechanics and engineering.

The principal feature of the evening was a lecture by Mr. T. P. Pemberton, on GEOMETRY IN NATURE AND ART. Remarking the wondrous beauty of the works in nature, the lecturer proceeded to speak of the geometrical beauties therein displayed, and cited the forms of the planets and their orbits, as most interesting instances. He then proceeded to speak of the human figure. He said: The whole body displays wonderful mechanism and provision. The scull, as the casket that preserves the brain, is spherical, or a hollow sphere. It is light and of the strongest form—capable of bearing a great amount of pressure, and sustaining a superincumbent weight. The eye is elliptical; the nose is triangular; the neck is cylindrical; the heart is a cone; the tapering fingers are conical, and the bones themselves are hollow cylinders, whilst the whole body in outline shows the most graceful and beautiful curves.

The proportions of the human figure are strictly mathematical. The whole figure is six times the length of the foot. Whether the form be slender or plump, this rule holds good. Any deviation from it is a departure from the highest beauty of proportion. The Greeks made all their statues according to this rule. The face from the highest point of the forehead where the hair begins, to the end of the chin, is one-tenth of the whole stature. The hand, from the wrist to the end of the middle finger, is the same. From the top of the chest to the highest point of the forehead, is a seventh. If the length of the face from the roots of the hair to the chin, be divided into three equal parts, the first division determines where the eyebrows meet, and the second the place of the nostrils. The navel is the central point of the human body, and if a man should lie on his back with his arms extended, the periphery of the circle which might be described around him, with the navel for its centre, would touch the extremities of his hands and feet. The height from the feet to the top of the head is the same as the distance from one extremity to the other when the arms are extended. These are the general measures of the species. The lecturer then spoke of geometrical forms and solids in trees, flowers, plants, fruits and vegetables.

Common beholders, he said, see these things constantly without observing them, and yet there is not a leaf nor a blade of grass which does not present a treasure of geometrical beauty; for we have leaves that are round, circular, cylindrical, oval, ovate, oblong, triangular, leaves that have five angles, and so forth. The seeds of flowers have the same resemblance to geometrical solids. Among fruits we have the apple, the peach, the pear, the plum, the grape, the nut, and many others of a spherical or conical form. In a carrot we find the cone, which, cut transversely, shows concentric rings and circles. The transverse sections of trees present similar rings—and the whole trunk is full of cylindrical pores for the conduction of sap. The forms of trees are conical and cylindrical; the branches and twigs taper off in a conical manner for evident reasons. Again, in animals and their products, we remark the display of geometrical provision, accuracy and beauty. The ovate form of eggs; the spider's web; the heads of fishes; the cycloidal flight of the eagle when pursuing his prey; the zig-zag lines made by the hare when chased by enemies; the graceful outline of the greyhound and of many other animals; in short, from the largest elephant to the most diminutive animalculæ, we trace geometrical figures and forms.

The hexagonal cell of the honey-bee has always been a subject of wonder and of interest. In every regular hexagon the distance from its centre to any one of its angles, is exactly equal to any one of its sides. This is the crowning beauty of the regular hexagon, and it is this peculiarity which renders it so admirably adapted to the architectural instinct of the bee, and other insects, which construct hexagonal cells. In common with the equilateral triangle and the square, the regular hexagon can also be united, side to side, to others, similar and equal—a property not possessed by any other regular polygon of a greater number of sides. It is well known to mathematicians that the regular hexagon affords greater capacity and strength, in proportion to the quantity of material, than either the triangle or the square.

In mineralogy we find cubical, and spherical crystals, prisms, and rhombs; such as are seen on Iceland spar. On examining snow-flakes beneath a microscope, they are found to consist of regular and symmetrical crystals, having a great diversity of form. Here again the hexagonal figure is the most prominent, as the majority of a number of flakes show six points or sides.

The lecturer next proceeded to consider the geometrical principles of architecture. The various styles of architecture which have prevailed in different countries, are really exponents of the social development of the people where those styles have prevailed. In Egypt, where the people were serfs, and the religious ideas predominated over all others, the style of architecture was devised to embody the idea of the vast, the infinite, the enduring. And to embody these ideas, no style of architecture has yet been devised which equals the Egyptian. Its striking peculiarity is the oblique line—neither vertical nor horizontal—but oblique to the vertical. And this, though a simple element, when combined with massive parts and sacred symbols, gives an idea of almost eternal endurance and power. The style of architecture which has been principally studied for sacred edifices, is the Gothic. Here the leading ideas are to embody in symbols the doctrines of Christianity, and by attracting the eye of the beholder from the lower parts of the building to the higher, to raise his thoughts from the things of earth to the mysteries of heaven. He looks upon the foundation, and has his eye carried forward by some molding, or line developed in the material of the structure, until, on the outside, it is carried up to some pinnacle, or a tower or spire; the leading lines all tend upward. The ornaments are all designed according to the unerring laws of geometry; so that Gothic tracery is symbolic of the unerring government of Providence. The circle symbolizes eternity—having neither beginning nor end. The equilateral triangle symbolizes the doctrine of the "Trinity in Unity." The trifoliated leaves and tricuside tracery, are also symbolic. While the upward tendency of all the main lines of construction, are symbolic of the other great doctrine of Christianity—the resurrection. The leading characteristic of the Grecian style, is the horizontal line—the beam supported by columns.

Mouldings are varied in both Grecian and Roman architecture. Those in the former are generally irregular in their curves, and are elliptical or parabolic. Whereas, those on Roman architecture are arcs of a circle.

Turning to mechanics, we find geometry at every point and in every direction.

The draftsman regards it as his especial science. He is a regular dealer in lines, angles, and circles, and measures them out in good measure, pressed down and shaken together. His language becomes geometrical, his fingers move geometrically, and he is, or should be, a geometrical thinker. Enter a machine-shop, and we find the artisan obtaining plane surfaces by the planer, the chisel and the file; curved surfaces by the lathe and the milling machine; circles and cylinders by the drill and borer. He can point out octagonal brass boxes for journals; hexagonal nuts for tightening up work; cylindrical pulleys; conical plugs; ball and socket joints; levels for finding an horizontal line, and plumbs for perpendicular ones. His very chisels are pyramids; the ends of his levers move in arcs of a circle, and all his work assumes geometrical figure and form.

Mr. Pemberton's delivery was animated and agreeable, and at the close of his address a vote of thanks was tendered to him by the Society.

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

Correspondence.

The Ogima Mine.

GREENLAND P. O., MICH., March 7, 1868.

EDITOR AMERICAN JOURNAL OF MINING:

My attention has just been called to the article in your paper of January 11 last, headed "Lake Superior," in which the following passage occurs: "More pathetic is the report given by the Superintendent of one of the Ontonagon Mines, the *Ogima*, which raised during the year fifty-four and a half tons of copper, at a cost of thirty-five thousand dollars, the market value of the same being about eighteen thousand dollars. This sort of business can scarcely pay with any amount of protection."

At the bottom of the article in the *Lake Superior Miner*, upon which you based your editorial, I called especial attention to the amount of ground stoped, as an explanation of the apparent high cost of production. The whole cost was no more chargeable against the copper raised as a basis for future operations, in the sense that your article infers, than the cost of clearing a piece of land of trees, building a fence around it and a barn on it, would be chargeable against the first crop of wheat, to show how much it costs a bushel to raise it. The statement given by me as a *whole* was sufficiently plain to mining men, and had nothing pathetic about it. It showed that by sinking and drifting, about 1,920 cubic fathoms of ground had been opened in the mine ready for stoping, and that by sinking, drifting and stoping, 240 cubic fathoms of that amount had been removed, yielding 54½ tons of mineral, leaving 1680 fathoms standing ready to be stoped. The average yield per fathom was 500 lbs., and at that rate there would be 420 tons of mineral in the ground left standing. In making these figures, I have calculated the width of the vein at 9 feet; it runs from 4 to 30 feet. Now let us look a little farther. We have stopped opening for the present, and commenced to stope out this ground, and during the past two months have stoped or broken 71 cubic fathoms, and have got from it 49,414 lbs. of 70 per cent. mineral, mass and barrel work, or 700 pounds to the fathom, exclusive of stamp work, the total cost of which to put it on the grounnd ready for shipment has been, in round numbers, $4,300, or *twelve and a half cents per pound of ingot copper*.

Taking this last naked statement alone, you might argue that if we could raise copper at such a price (currency), we do not need a protective tariff, but you would be nearly as far from the mark as in the first instance. The cost of opening transportation, smelting charges, etc., must be added. I might give you very near what the cost per pound of ingot copper would be, provided the cost of production, yield, etc., remained the same, but it would unnecessarily lengthen this article. You will notice that for the past two months there has been a yield of 200 lbs. more mineral per cubic fathom, than the average of last year, which (if it holds good through the rest of the ground) would give us 168 tons more to add to the 420. At the present time we are raising copper at a profit notwithstanding its low price; but we are doing it at the expense of the working man; that is, we have got our miners ground down to very near the pauper condition to which they are reduced in the mining sections of the old world. This the companies are forced to do or stop mining, and the miners are forced to submit because they cannot get out of the country. During the past month the average wages of miners at this mine, was $34,50 per man exclusive of mining cost; board is calculated at $18 per month, add $1 for doctor, and it leaves $15 50 clear to a single man, but if there is two mouths to feed, it falls short $2 50 of being enough for provisions alone; then add a few children and you touch on the verge of starvation.

If you wish to see this state of things continue, or the mines closed up, uphold the present policy of the Government in its unjust discrimination against our copper mines. If not, help us to the equitable and just protectiom to which we are entitled.

WM. H. SPALDING,
Superintendent, Ogima, Minn.

[We have published the above letter in full, with the exception of one or two passages, in which the writer impugns both our motives and our ability to judge of matters connected with practical mining. We certainly did not intend to injure the Ogima company, nor do we feel inclined to submit our qualifications as critics to the judgment of our correspondents. We may have done an unintentional injustice in the matter referred to; and we are quite ready to allow the Superintendent of the company to present the case from his own standpoint. Up to a certain point, the cost of opening new ground in a mine is a regular part of the running expenses, and should be compared rather to the annual ploughing of a piece of land than to the first clearing, fencing, etc. Of course, however, where more preparatory work is done in any one year than the proper share of that year, the cost should not be laid upon the product of that year.

We take pleasure in informing our Lake Superior friends that they will probably get the protective tariff they desire. This we gathered while in Washington recently, when we had opportunity to speak a good word for them. We have never opposed this measure; but we have taken the liberty to question whether it would really help Lake Superior as much as is hoped. We fear not.

As for the miners, whose sufferings are depicted in the above letter, we sincerely hope they are the same persons who lorded it over their employers so arrogantly four or five years ago. We paid our teamster ninety dollars a month and board in 1863; and the miners we imported into the country, and carried to the Lake at our expense, ran away before we gained anything by the operation. In those days the outlanders who were not liable to the draft, were "cocks of the walk," and they used their opportunity so well as to break down a good many mining companies.

Take the protective tariff, friends, if you want it to relieve oppressed and suffering capitalists; but don't plead too earnestly the sorrows of the miner.]—ED.

Manufacturing and Mechanical Notes.

No. XII.

Large Boiler.

A new boiler that is an excellent piece of workmanship, has just been completed for the Steamer *Neversink* by Messrs. Hubbard & Whittaker, of Brooklyn. The boiler is of the fire-box order, with cylindrical shell and steam chimney. The following are some of the principal dimensions:

Front, 9 feet 2 inches; diameter of shell, 9 ft. 2 ins.; whole length of boiler, 18 ft. Two flues 20 ins. diameter; 2 flues 13 ins. diam.; 2 flues 9½ ins. diam.; 2 flues 11 ins. diam.; 2 flues 10½ ins. diam. One hundred and eighty-four tubes, 3 ins. diam., 12 ft. long; steam-chimney 13½ feet high, 7 ft. diameter. Two furnaces 4 ft. by 6 ft. 9 ins.; stay socket bolts are ¾ in. diameter, and average 7½ ins. centre to centre; centre to centre of rivets 1¾ ins.; centre to centre of rivets on courses, about 4 ft.; bridge wall back of the furnaces, 18 ins. wide; water space at sides, 4 ins.; at centre 4½ ins.; tube head plates, ⅝ in. thick; flue tube heads and shell, 5-16 in. thick. There are three plates in each course, some 500 cubic feet space for water, and about 2000 square feet of heating surface. The space between the outer and inner plates of the steam chimney is 18 ins.; thus leaving the chimney for carrying off the products of combustion 4 ft. diameter. It will be seen that the area of grate surface amounts to 3,888 × 2 = 7 776 square inches. The products of combustion pass first over the back water bridge, then within the flues and return through the tubes passing up the interior of the steam chimney, and thereby superheating the steam.

At the back connection is a space of 18 ins., and a man-hole with door is placed here in order to facilitate the inspection and cleaning of the flues and tubes. The boiler has been tested to a pressure of 65 lbs. to the square inch, and cost 6000 dollars. The steamer Neversink has an engine with a cylinder 40 ins. diam. by 8 ft. stroke, and should she fail now to give her best speed it cannot be attributed to the want of steam, as the boiler was first fired up on the wharf with wood during one of the coldest days, and steam was "got up" in twenty-five minutes. The results of this first firing and testing proved that the boiler was thoroughly made, and was everything that could be desired as regards both workmanship and strength. Messrs. Hubbard & Whittaker have just contracted for some large engines and boilers, which is an encouraging fact, and augurs of an improvement in business. The Company's works are situated at 102 Front street, Brooklyn, where they have excellent facilities for the manufacture of all kinds of engines, boilers and machinery in general.

No. XIII.

Brick Machine.

An improved brick press is now on exhibition at the Morgan Iron Works in New York city, which is simple in construction and very powerful in its operation. It seems to have been the aim of the inventor to have as few parts as possible, and thus to preclude the necessity of frequent and extensive repairs. The press is constructed to mould and press bricks by an arrangement consisting of a horizontal, revolving wheel, in which are placed permanent moulds, extending from the upper to the lower surface. In these moulds are placed movable plungers, which are used for pressing the bricks. This wheel is made to revolve and pause, so that the moulds pass continually under a mixing cylinder, from the bottom of which clay is forced into the moulds, and then a toggle-bar presses plungers into the moulds; the clay being retained by a fixed cover, under which each mould passes and stops as the wheel revolves and

pauses. When the bricks are pressed, the wheel moves, and they are forced gradually out of the moulds, and are moved off, by an adjustment, on to a board or an endless belt, as may be desired. The clay is first ground by rollers, and thence carried by buckets on an endless belt into a cylinder, in which it is mixed by revolving arms, that also force it into the moulds. The pressure is obtained by a toggle-bar, and this is a good arrangement for obtaining a suitable compression of the clay. The invention can be quickly adjusted to mould bricks of wet clay without pressure; or the pressure can be increased to hundreds of tons for dry clay. The press can be made single or double—the capacity of the former being 30,000 bricks per day of ten hours, and that of the latter 60,000 bricks. The invention, although in its infancy, has thus far been received with much favor by practical brick-makers and machinists.

Iron Manufacture in Illinois.

A company has been organized in Chicago, with a capital of $250,000, for the manufacture of pig iron from Lake Superior ore. The basis of the enterprise is the coal found at Brazil, Clay county, Indiana, on the line of the Terre Haute and Indianapolis Railroad. Until a comparatively recent date, it was not known that this coal would answer the purpose, but the matter has been definitely determined by the erection of three blast furnaces at Brazil, by Chicago parties, which have been in successful operation about three months. The Briar Hill variety of coal has been considered one of the best for the purpose, but it has been ascertained that pig iron can be manufactured with the Brazil coal at a saving of three-fourths of a ton over the Briar Hill, to a ton of pig iron. The location of the furnace is not yet definitely determined, but it is probable that they will be somewhere upon the South branch. It is the intention of the company to erect immediately two blast furnaces, of the capacity of 30 tons each per day. The Chicago *Times* says: The entire practicability of the enterprise and its importance to the city can be better appreciated by the following facts: While Chicago, and through Chicago, the whole north-west are heavy consumers of iron, not a ton of pig iron has ever been manufactured in the city. A part of the needed supply has been brought from Lake Superior, where there are a number of small furnaces in operation, but the great bulk of the pig iron used here comes from eastern points. The ore has been taken from Lake Superior to Cleveland, at the extra expense of the Sault Ste Marie ship canal tolls, towage through the St. Mary's, the St. Clair and Detroit rivers, and from thence, except the small portion smelted at those two cities, it is taken to Pittsburgh to be manufactured into pig iron, to be sent to Chicago for manufacturing purposes. The great loss in transportation, both ways, must be quite apparent. It is certain that Lake Superior ore can be delivered in Chicago, via Escanaba, thus saving canal tolls and tonnage, at least $1 per ton less than can be done either at Detroit or Cleveland. With so many manifest advantages, there is no reason why Chicago should not become one of the first iron manufacturing cities in the country, and this enterprise seems to point to such a result. Following the move of the "Chicago Iron Company," it is reported that capitalists already contemplate the erection of many extensive nail manufactories, and the day is not far distant when Chicago will probably rival Pittsburgh in this very important branch of manufactures.—*Ex.*

Improvement In Hot Blast Furnaces.

An improvement highly important to the iron interests of Pennsylvania has been made by Colonel Richard Long, of Chilicothe, Ohio, in hot air blasts for furnaces, which will greatly increase the yield, as well as reduce the expense of operating. The improvement consists in substituting fire clay pipes for iron, and supporting the walls with fire brick and iron plates, thus overcoming contraction and expansion, the pipes being made oval in form (the narrow edge uppermost), thus preventing the accumulation of dust and equalizing the heat. The joints are coupled with the same material, and made perfectly tight; at the same time easy of access and readily removed or renewed. The use of fire clay for purposes somewhat similar, is understood and appreciated, particularly where high heat and consequent contraction and expansion come in question; and it appears singular that it has not heretofore been used for this specific purpose. The main points suggested by this invention, are the cheapness and durability of the material used, the ease with which it is renewed or removed, the perfectly tight joints, and the reduction in friction, thus increasing the power of the engine, and consequently the production of iron. This improvement must be of incalculable value to iron manufacturers both East and West.—*Pottsville Standard.*

Electric Test For Oils.

Several years ago M. Rousseau, of France, discovered that olive oil, the feeblest conductor of electricity, when mixed with one-hundredth of its volume of oil of poppies, increased the number of vibrations of a magnetic needle in a given time, when the same was made to form parts of an electric current. Mr. Warner, an English experimenter, has enlarged the field thus opened, and shows that difference or resistance will show the purity of oils. He gives a table of resistance of volatile and fixed oils, and as turpentine and alcohol are the principal adulterants of volatile oils, and as the former has an immense resistance and that of the latter is enormously lower than any of them, the variation in the deflector compared with that given in the tables, will detect and show the extent of adulteration.

Personal.

—DR. VAN DER WEYDE is reported to have sold his patent for making ice for $65,000.

—WHITLACH, one of the richest and most successful miners of Montana, is in town and is stopping at the Metropolitan Hotel.

—COL. A. L. SAUNDERS of Montana is stopping at the Fifth Avenue Hotel.

—GEORGE MCDOUGAL, who was among the early discoverers of Gold in California is prospecting for gold with the Patagonian Indians at Sandy Point in the Straits of Magellan.

—O. J. HOLLISTER has disposed of his interest in the Central City (Colorado) *Miner's Register* and resigned the Editorship of it.

—PROF. HENRY DUSSAUCE has resigned his position as chief Editor of the *Journal of Applied Chemistry.*

—DR. J. ADELBERG, Mining Engineer, of this city, is engaged professionally in the island of San Domingo. We are glad to learn that his health, which has been impaired for some time, is now improving.

—PROF. WM. M. GABB, the California palæontologist (whose name was erroneously printed GALT in our version of BROWNE'S report, week before last) is now stopping in Philadelphia.

—CULLOM, the inventor of the jigger that bears his name, is gone to Europe to visit the mining districts and schools of Germany.

—PROF. F. V. HAYDEN is busy in preparing some scientific reports and arranging collections, at the Smithsonian Institution in Washington.

—JOHN SUTCLIFFE, the Superintendent of the Eagle Slate Quarries of Vermont is gone to Wales to examine and report on the slate quarries there.

—C. H. CONCANNON and C. H. HOWLAND have recovered $13,886 for services rendered the Atlantic and Pacific Railroad Company.

—GUIDO KUSTEL, will soon leave San Francisco for Arizona to superintend the erection of some reduction works there.

—JOHN W. WELLS, Indian Agent, committed suicide in Washington city Saturday before last.

—THADDEUS DAVIDS has manufactured ink for 45 years and is reported to have made $150,000 out of it.

—HENRY DERRINGER, the inventor of the pistol which bears his name died recently in Philadelphia, aged 81 years.

—BRIGHAM YOUNG is a widower, five of his wives having died of pneumonia during the past Winter.

—WM. H. HALLOCK, Esq., of the New York *Journal of Commerce*, intends sailing in a few days for California, thence to China and other interesting parts of Asia.

—MR. WILLIAM W. LONGSTREET, for the last three years president of the Lehigh Valley Railroad Company, and for several years previously president of the Beaver Meadow Railroad Company before its consolidation with the Lehigh Valley Company, has resigned his office, being admonished thereto by the effect of increased cares and responsibilities on impaired health. He is succeeded in office by that veteran in the history of the Lehigh coal trade, Hon. Asa Packer, assisted by Charles Hartshorne, Esq., as vice-president.

—COLONEL DAVID E. BUEL arrived at Austin, Nevada, on the 3d inst., accomplishing his journey from Southampton, England, thither, in 24 days.

Patent Claims.

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

75,603.—MINER-LAMP.—George W. Tremble, Bloomsburg, Pa., assignor to himself, E. Hughes, and Wesley Buckel, same place.

1 claim providing the tube or spout of a mining and furnace-lamp with a feed-device for the wick, substantially as described.

75,703.—TUYERE.—John W. Rogers, Decatur, Ill.

1 claim, 1. The upper portion, A, of the tuyere, constructed as described, and having the blast-openings arranged thereon substantially as set forth.

2. The pot-shaped under portion of the tuyere, having the weighted valves, j m, arranged upon it, as and for the purpose herein described and represented.

75,708.—WELL-DRILL.—Henry M. Stow, San Francisco, Cal.

1 claim, in combination with a drill stock in two parts as described, moveable cutters, operated by wedge-shaped tenons, to enlarge the hole formed by the drill, substantially as above shown and described.

On-dit about Minerals, &c.

☞ The New Orleans papers contain accounts of the sinking of gas wells in various parts of that city. The *Crescent* of the 7th inst. says: The gas wells show no signs of decreasing in interest or in the flow of combustible vapor. The gas at Knight's place on Gravier street is burning brighter than ever. Numerous other wells have been and are being sunk, and invariably with the same result, and at an average depth of forty-one feet. One tube in the vicinity of St. Mary's Market, and another in the Shakspeare foundry on Girod street, give a flow producing a clear, brilliant flame. The latter, when first lit, shot up a flame to a height of ten or fifteen feet. This matter is becoming worthy of attention.

☞ The production of coal is greatly extending in the Zollverein. In 1860, the extraction amounted to 12,347,828 tons; in 1861, to 14,333,048 tons; in 1862 to 15,576,278 tons; in 1863 to 16,906,708 tons; in 1864 to 19,408,982 tons; and in 1865 to 21,794,705 tons. The figures for 1866 and 1867 are not yet to hand, but it will be seen that in the six years ending 1865 an uninterrupted progress was effected.

☞ The total quantity of gold exported from Melbonrne last year was 1,733,422 ounces, of which 289,809 ounces were transhipments from New Zealand. The total export during the previous year amounted to 1,835,011 ounces, of which 351,786 ounces were the produce of New Zealand.

☞ A correspondent of the *Reading Daily Eagle* says that extensive works are now being erected about one mile west of Tamaqua, Schuylkill county, by Fergus G. Farquhar, of Pottsville, for the purpose of utilizing anthracite coal dirt by solidifying it into blocks for burning.

☞ A Correspondent of the Geauga, Ohio, *Democrat* says that Genoa, a small place thirteen miles from Toledo, turns out from thirteen lime kilns 20,000 bushels of lime per week.

☞ Coal was discovered lately on Mr. Hayes's farm, eight miles from Fremont, Nebraska, and they had dug to the depth of twenty-seven feet and had not got through the vein.

☞ The new rolling mill of the Philadelphia & Reading Railroad Co., under the superintendence of W. E. C. Cox, Esq., commenced operations a few days since.

☞ Messrs. Lawrence & Barry's rolling mill, at Spuyten Duyvel, Westchester county, N. Y., was entirely destroyed by fire on the 18th inst. Loss, $65,000.

☞ The Baltimore & Ohio Railroad Co. are about to erect a rolling mill at Cumberland, Md.

☞ Birdsboro, Pa., is to have a new rolling mill and nail factory that will cost $150,000.

All Sorts.

☞ Steam boilers are weakened by long working, and the owners are uncertain as to what pressure they can resist. Few are possessed of a hydraulic pump by which they can be tested; but Mr. Robinson, an American Engineer, gives a method by which a boiler can be tested by any working engineer. He completely fills the boiler with water up to the throttle and safety valves, and makes everything tight, leaving only the pressure gauge open. He then puts a fire under; the water slowly expands, and the pressure is of course shown on the gauge. If there is a weak place, it will give way long before the water reaches the boiling temperature, and no sudden or dangerous explosion will happen. If no rupture takes place, the pressure shown on the gauge will teach up to what point the boiler may be safely worked. Engineers will, no doubt, give us their opinion of this mode of testing an old boiler.

☞ A new heating apparatus has been invented for the passenger cars of the Reading railroad, and recently introduced. It consists of a box stove protected by means of a case, constructed of galvanized iron, which surrounds it, and which is securely fastened beneath the car. A tube for the conduction of heated air is placed inside. The arrangement is such that an equal amount of heat is delivered to all parts of the car, and so equal is the distribution, that the temperature at the roof is never more than two degrees hotter than at the floor. The fire can be steadily maintained without fresh coal for seven hours, and can be run from Philadelphia to Pottsville without attention, the stove being supplied with coal previous to departure. Beneath each seat is a horizontal tube connected with a hot-air chamber running along the side of the car, which supplies sufficient heat and also serves for the purpose of foot rests.—[Reading Gazette.

☞ The St. Johns (N. B.) *News*, says: "A trial of skill between English and American telegraph operators recently took place, the object being to ascertain which is the most expeditious method. So far, we have tidings only of results on this side. The trial over the wires of the Western Telegraph Company, from Washington to Cape Breton, a distance of about 13,000 miles, was very satisfactory. Ninety-four messages, averaging twenty words each, were transmitted over a single wire in an hour. Better time, has, however, been made on shorter circuits. On the same night twenty-three messages were sent from Plaister Cove, Cape Breton, to New Orleans, a distance of two thousand seven hundred miles, in thirty minutes.

☞ A correspondent of the Sacramento (Cal.) *Bee*, writes as follows: "Europe boasts of its iron road over the Alps, through the Benner pass, at an elevation of 4,770 feet, but that sinks into significance before the 7,042 feet surmounted by the California locomotive. We can boast with pride, that California runs the highest railroad in the world—and this is done daily, hardly attracting attention here, while in other parts of the world it is the theme of wonder and astonishment."

☞ The past winter has been one of the severest ever known, both in this and other countries. In Algiers the suffering has been very great. In Russia, as we learn from a letter in a Paris paper, the cold has been intense. Coachmen were frozen upon their seats, the gas refused to burn, and the dogs howled most piteously. Men on horseback went through the streets of St. Petersburg and Moscow carrying aid to the unfortunate, and the nobility distributed hot tea in front of their palaces.

☞ The Chester, (Ill.) *Clarion* says: Above the mouth of the Okaw river, on the bluff, J. M. Christian recently found the largest nautilus on record. It is seven feet long, two feet wide and nine inches in thickness. He now has it in his possession. It is two feet four inches longer, four inches wider, and about two inches thicker than the largest one in the State geological cabinet at Springfield.

☞ One of the most recent patents is for a watch case that is dust proof and water proof. The inventor washes the outside of watches having this improvement, and leaves them in a pail of water over night, without injuring them.

☞ A company has been chartered by the N. Jersey Legislature to build a Pneumatic railway from Newark to Jersey City, along the line of one of the railroads now in operation. The tube is to be of wood and three feet in diameter.

☞ Messrs. Cooper & Yarnell, builders, of Philadelphia, are now erecting a hotel at Kane, near Erie, Pa., in which thick, strong paper is used to form the walls and ceilings in lieu of lath and plaster.

☞ A tunnel, nine hundred feet long, through solid rock, at Dunleith, for an approach of the Illinois Central railroad to Dubuque bridge, has been commenced.

☞ Of iron the world used about 21,280,000,000 pounds, or 20 pounds per head, estimating the population of the world at one thousand millions.

☞ A Sheboyganer has invented a method for heading and unheading barrels filled with liquids, without loosening the hoops.

☞ It is stated that the Mount Cenis Summit railway is expected to be opened for regular traffic on the 1st May next.

☞ The White Mountain elevated railroad will be completed this year, in time for visitors to make use of it.

☞ A new volcano has been discovered in the moon—inaccessible to tourists at present.

Special Notices.

The New York Steam Engine Company.

This company have now some large and convenient rooms at 126 and 128 Chambers street, having removed from their former place of business on Pearl street, New York city. The systematic arrangement of tools and machinery attracts immediate attention on entering the building. At the right hand side of a room, nearly 100 feet by 50 feet in size, may be seen a number of lathes, chucks, and some small planers; in the centre, are arranged a goodly array of planers, all different sizes, and some milling machines; whilst on the left there are more lathes and miscellaneous tools. In a recess off this room is a compartment for the offices, thus affording facilities for general supervision and accommodation for customers. It seems to be the aim of this company to furnish first-class tools, and those machines we examined displayed simplicity, good material, and correct workmanship. The attention of Mr. George Place (of the firm of G. & C. Place,) is unremittingly given to the patrons of the company.

India Rubber Pens.

Many a writer of the old school still adheres to the venerable quill, in spite of its spluttering nib and crooked stem, because neither steel nor gold affords the same soft elasticity, if we may coin a phrase to express that peculiar quality, the possession of which has been the death of many a worthy gray goose. We have ourselves oscillated for years between the three styles that divide the world between them, without finding anywhere that combination of the durability of gold with the elasticity of the quill which would be, we think, the *ne plus ultra* of pens. Have we found it? It is too early to be sure; but, faith, at this moment we do feel that this diamond pointed India rubber pen from Prentice's (104 Broadway) is about the thing. Try it, ye veteran quill-drivers, and vex the gray goose no more!

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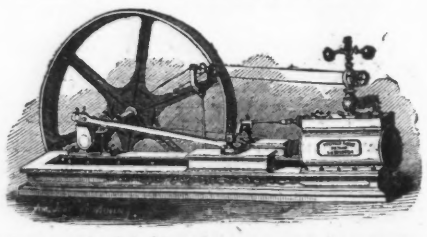

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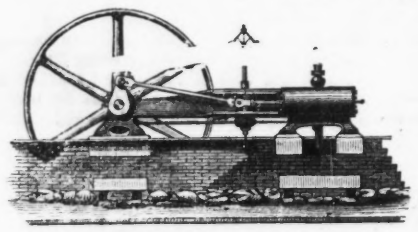

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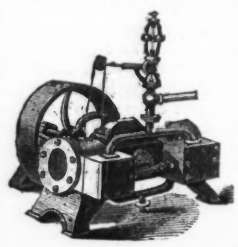

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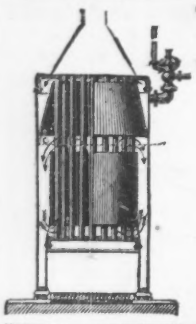

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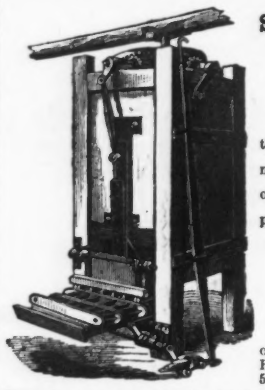

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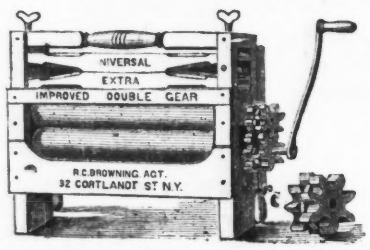

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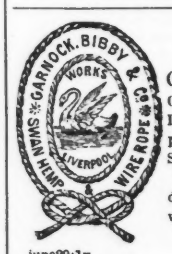

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PUBLICATIONS.

PROSPECTUS.

EL CORREO HISPANO-AMERICANO;

A Journal of Commerce, Agriculture, Mining, Mechanics, Railway Enterprise, &c., especially devoted to the interests of the Spanish American States, issued the 1st, 10th and 20th of Every Month.

The much-to-be-regretted absence of adequate commercial intercourse between the Northern and Southern continents of America is mainly to be attributed to two causes. The first of these is the lack of proper information, among the industrial and agricultural classes of the Spanish American Republics, concerning the facilities and advantages offered by the manufactures of the United States; and the second is the entire absence of direct communication between the producers of this, and the consumers of those nations; while those who are really aware of the favorable opportunities here offered are deterred from availing themselves of such advantages by the fact that the expense of importations is not infrequently tripled or quadrupled by the passage of merchandise through three or four hands before reaching its final destination. England and France have commanded hitherto the markets of South America for all kinds of manufactures, while the United States, excelling in almost every department, and offering in addition the inducement of low prices, have enjoyed but a small share of the trade. Few manufacturers in this country are aware of the vast extent and profitable nature of this commerce; but the conviction of this fact is rapidly making itself felt; and there is urgent inquiry for the proper means turning this tide, which now flows to Europe, towards the shores of Northern Continent. The possible acquisition by the United States, at remote day, of an important foothold among the Spanish American islands gives the subject at the present time great additional importance. Our naval supremacy in those regions should be accompanied by the commercial supremacy which it is chiefly useful to defend.

The best and surest means to this end is to furnish the Spanish American consumer with full and accurate information regarding the commerce, manufactures, mechanical arts, mining, metallurgy, railways, &c., of this country, setting forth in these departments our superiority to the nations of the Old World, and explaining the advantages offered in our markets.

Our conviction of the usefulness of such a step, based upon long and careful examination of the subject, and thorough personal acquaintance with each one of the Republics in question, their resources, interests and requirements, has received, of late, additional confirmation from communications addressed to us, as Publishers of the AMERICAN JOURNAL OF MINING, by prominent and influential citizens of Mexico and the other Hispano-American Republics, pointing out the expediency of either translating our Journal into Spanish, or publishing a periodical in that language for circulation in those countries. These gentlemen have urged us to put the plan into immediate execution, and promised us their influence and personal support.

We have therefore resolved upon the issue of "EL CORREO HISPANO-AMERICANO," for the purposes set forth above; and we feel assured that the nature of the Journal itself, together with the facilities we possess for its publication, and the patronage already spontaneously offered and secured, will render it not only the best medium of publicity for the manufactures of the United States, but one which cannot be superseded in point of universal circulation, efficiency of advertising, and economy of terms.

It will at once be evident, that the "CORREO HISPANO-AMERICANO" will not, like newspapers in general, depend upon partisan or political beliefs for its popularity. Politics having no place in its columns, it will have no rivals, will be free from all shackles of party spirit or interest, and will be welcomed in all circles and by all classes as a real friend, the bearer of useful information on matters of vital interest to all. Hence, it cannot come into competition with political journals of the day.

Besides the matters of value to the Spanish American reader already enumerated, the CORREO will contain the most complete market reports, including the prices of all crude and manufactured materials in the production, exchange, or consumption of which its subscribers are interested. As the day of publication coincides with the sailing of the Pacific Mail Steamer, these reports, corrected to the last moment before going to press, will afford the very latest information which can be obtained, surpassing, in this respect, all other periodical bulletins of prices current.

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Need we mention the benefit advertisers will derive also from the considerable circulation the "CORREO" will have in the United States? This we deem superfinous, and so, shall add no more to the incontestable advantages already enumerated.

We hope our friends and the industrial community generally will make all possible dispatch in handing in their advertisements, for the time is now short for translation, &c., before the publication of the first number, January 10th, 1868.

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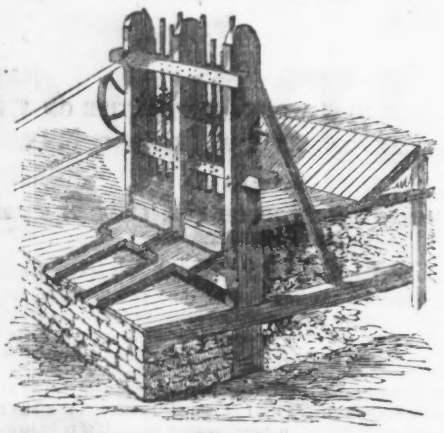

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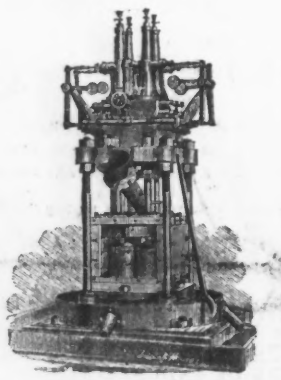

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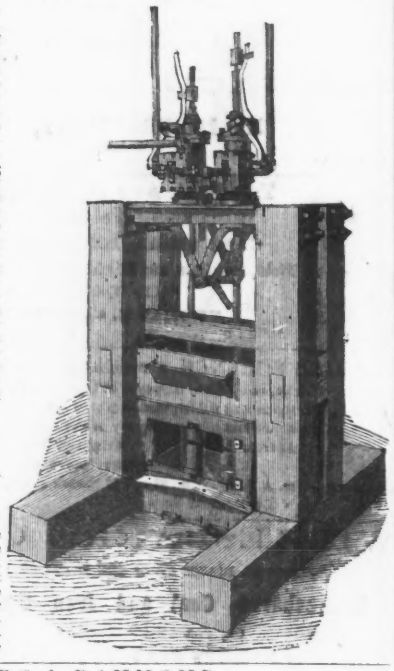

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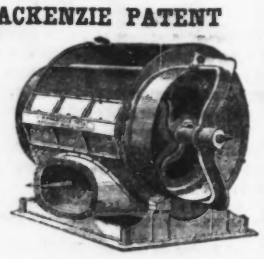

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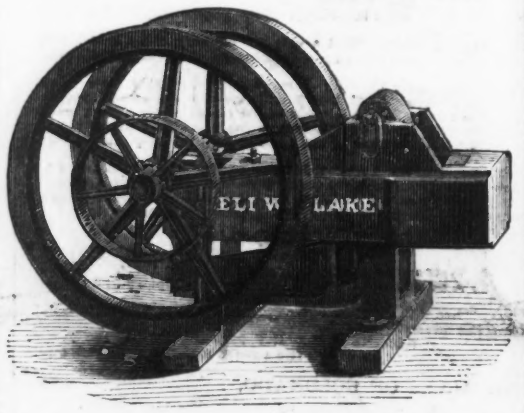

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