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The usual installment of Howe's Metallurgy of Steel has to be held over this week.

CLOUD-REFLECTED SIGNALS.

Some interesting experiments have lately been made at Cape Town in transmitting messages by flashing electric lights upon the clouds at night. The signals are read like those of the heliograph, and besides being available at night the system has the advantage over the heliograph of not requiring high stations. The terminals may be below each other's horizon, while the heliograph requires considerable altitude, strong light, and clear air for successful operation over long distances. Under proper atmospheric conditions messages were transmitted from a vessel forty miles off shore to the land in the experiments referred to. For ships at sea and for military purposes on land the system of cloud-reflected flash signals may prove of much use, though it cannot be relied on except under suitable conditions.

THE BRANCH OFFICE OF THE GEOLOGICAL SURVEY AT DENVER.

It is reported that the branch office of the U. S. Geological Survey at Denver is to be re-established this summer, and that an amendment will be added to the Survey appropriation bill prescribing that an increased proportion of its work shall be devoted to the mining interests

of the West. As it may not be generally understood what a branch office means, it should be explained that it implies independent field-work, the permanent or temporary storage of specimens, samples, maps, reports, etc., and the local analyzing of rocks, testing by physical methods, assaying and microscopical study, instead of referring this secondary work to a central office. It might naturally be imagined that such work could be more economically and expeditiously performed at a main office, where are provided all the facilities and apparatus, and that a large selected corps of specialists could handle it to better advantage than in a smaller establishment. But in practical effect, it has been demonstrated that the loss of time and the additional traveling expenses outweigh the theoretical advantages of centralization. Every large field party must have some sort of local headquarters in any event, so that calling such a point a branch office is merely a phrase, after all. The Geological Survey, in covering all the country instead of limiting itself to the territories, has necessarily gravitated toward the East; but its work in the Far West is most valued, and Major Powell, the Director, does wisely in not curtailing it.

THE MARKET FOR AMERICAN MACHINERY IN SOUTH AFRICA.

There is a movement on foot at Barberton, South Africa, to have the gold and diamond mining interests appropriately represented at the Paris exposition of 1889. This would be of interest to American visitors, as there are now so many of our countrymen at work in those fields. A private letter just received from a correspondent at Barberton says that thus far the methods and appliances in use there are not up to the best modern practice, and that while there is undoubtedly much gold in the new districts little has been done besides "gophering." The main drawbacks are the scarcity of fuel and water at the mines. If a tramway is built from a mine to its mill at the water, there is not enough fuel to supply the locomotives. A scheme is proposed to put up a 100-stamp mill at the Sheba mine and drive it by electricity generated at a waterfall ten miles distant. Another plan is to build a tramway, using electric engines, deriving their power from the same point. Our correspondent believes American manufacturers of electrical and mining machinery have a good field in South Africa, and in fact many important orders have come to them from this distant land, through the ENGINEERING AND MINING JOURNAL, which has a considerable circulation there. The superiority of American mining machinery, and the unrivaled results attained here in both mining and metallurgy, have turned the attention of the whole world this way, and, as a consequence, American engineers and American mining and metallurgical practice are becoming common and deservedly popular in the Australasian colonies, in China, in various parts of South America, and in other distant lands.

UTILIZING NIAGARA.

There have been so many false alarms about utilizing the wasted water power of Niagara Falls, that one hesitates to accept rumors of new propositions as likely to be carried out. The latest one which appears to have any backing, though not altogether an original idea, is to tap the Niagara River at some distance above the Falls by means of a tunnel driven along the side of the river. The water would be distributed by means of lateral underground conduits to turbines placed on the bank below the Falls. These could give power direct to mills, factories, etc., and by electrical transmission furnish light and power to Buffalo and neighboring towns. It is claimed that by adopting this system the scenery will not be disfigured, and that the amount of water drawn off will not appreciably lessen the quantity flowing over the Falls. It has always been a source of wonder to those who have studied the ground that some plan has not long ago been adopted which would meet the engineering requirements without impairing the grandeur of Niagara. The first attempts were certainly not in the right line, the small power taken off by the paper mills, etc., being accompanied by a disproportionate injury.

Niagara is not to be measured by hundreds of thousands of horsepower and millions of money, it is true; but the visitor's first impression is a vivid realization of the amount of waste perpetually going on, which might be avoided. The State and the country can afford to pay a good deal to keep up the show, but surely there is margin enough, without reducing Niagara to the condition of some of the smaller falls where the water is turned on from a dam for the gratification of tourists who can afford the luxury.

Electrical transmission of power, which was thought not many years ago to be a mere dream of the cranks, is now shown to be of practical, economical utility. It has been adopted successfully in so many places and under such different conditions that it is reasonable to forecast a great future for it. So far as is known at present, it is the most promising mode of utilizing the natural forces, such as winds, currents, tides, and terrestrial electricity.

THE ALASKAN MINING BUBBLES.

The exposure of the Nowell bubbles, including the Boston Alaska Mining Company, the Alaska Union Company, and other schemes, which we made in the ENGINEERING AND MINING JOURNAL, March 10th, has greatly interfered with the plans of the bubble blowers, and has correspondingly infuriated them. Many proposing investors have drawn back, and the floating at half a million or a million dollars the unproven claims that cost only a few thousand dollars does not progress quite as rapidly or smoothly as it did while the promoters could keep the facts in the case from publication.

We have recently received letters from Alaska fully confirming what we had stated, though, as is our custom, we had investigated the matter thoroughly before publishing our exposure, and neither Mr. NOWELL nor any of his co-operators has questioned or can disprove our statements.

Our correspondents say :

"From the ENGINEERING AND MINING JOURNAL of March 10th I see that you are already in possession of facts worth knowing about the Alaska Union M. and M. Company. Fearlessly exposing mining frauds as you do is, I think, one of the main causes of the success your JOURNAL has met with, for through it stockjobbing is crushed, and legitimate mining is benefited. I hope that parties here who are trying to work *à la Nowell* will take a timely warning, and that you may not be called on again to expose 'Alaskan Bubbles'. Your remarks concerning 'wildcat' schemes from here are only too true. It appears that a Mr. Thomas S. Nowell, of Boston, George and Frank Nowell, of Alaska, bonded a group of claims. The amount stated \$10,000, but it was learned subsequently that less had been paid; and they organized the Alaska Union M. and M. Company. What Thomas S. Nowell may know about mining, I can not say; George Nowell has been several years in Alaska, keeping a 'gin mill'; Frank Nowell is a common miner, who could not even hold down a \$3 per day job at the Treadwell mines. Thomas S. was elected President; George, General Manager; and Frank Nowell, Superintendent and Expert—he showed his good judgment by buying some claims for \$30,000 without even seeing them.

"As to the properties, they were examined when yet open for location, and stringers of quartz were found, but no gold in them. A number of persons (names given, Editor E. & M. J.) went over the ground several times and had a number of assays made, but found no gold.

"Other schemes of the same kind are being floated, but are of less magnitude. As a general statement, you may say for the benefit of your readers, that no Alaskan stocks that are offered have any proven value (the Treadwell or Alaska Milling and Mining Company's stock is not for sale), and all the schemes on properties, mines, or prospects, as they may be called, which are claimed as extensions or adjoining the famous Treadwell lode on Douglas Island, ought to be thoroughly investigated before any money is spent on them. Alaska has some good properties, and when developed they will prove excellent investments; but undeveloped properties ought not to be sold or offered to the public as valuable mines."

We need only add to the statement that our correspondents are both well informed and reliable, and that all our information confirms our conviction that the statements on which parties have been induced to invest in the Nowell bubbles were such that Mr. NOWELL might be induced to refund the money he has received, as indeed he has already done in some cases.

ARE WE TO HAVE AN AMERICAN TYPE OF ARCHITECTURE?

An illustration given in a contemporary of the new State capitol at Austin, Texas, suggests some, perhaps trite, remarks on a time-worn topic. This building is a recent addition to the long list of public edifices which have been copied in miniature from the national capital. It is rather late to criticize that remarkable production—a building facing the wrong way toward the city, made up of unrelated parts, as Di Cesnola's friends would say, according to the exigencies of growth in number of "statesmen" and in routine business, so that the original design is lost. The Washington capitol has a dome which is held together by a forest of girder and truss work, in open defiance of the "lamp of truth," and however appropriate in a temple or a Christian church as representing the vault of heaven, it can hardly be supposed to carry much significance to the minds of the majority of the present occupants. The central limestone portion has been painted to match the marble wings, and the latter have been sand-scraped to match the paint, with not very satisfactory results. The wings have been braced up by the new marble terracing, which gives an apparent added height to the mass, so that viewed by moonlight from below it is really impressive as a jumbo of architecture. But when the six hundred odd feet of length and the three hundred odd feet of height are neglected, and the building is considered simply on its merits as represented in a patent agent's or engraver's advertisement, it is at once shown that the lines are trivial, and the whole design, as improved, incongruous. Why then, should almost every state and territory copy this gigantic absurdity in modeling its public buildings? People who use the railroads see dozens of ridiculous copies scattered broadcast over the country. Every county court-house, to say nothing of the state capitols, is a feeble copy of a design whose effect depends solely upon mass, and becomes insignificant when repeated on a small scale.

Turning now to the educational buildings, it will be noticed that most of the older ones are also parodies on the capitol, with a small cupola taking the place of the dome. Some of the newer ones in the West are also constructed on the time-honored model; otherwise they run toward the stained-glass and æsthetic extreme.

In private dwellings we have no distinctive American types, except the red brick, marble-step and trimmed, green-shuttered Philadelphia pattern; the two-chimneyed, false-wall, arched-transom, Baltimore style; or the

high-stoop, brownstone-veneered New York sort. All the newer houses are reproductions or compilations of European schools. A California railroad magnate builds a gigantic French chateau in wood, a Chicago distiller modestly dwells in an Italian villa, the seashore cottager tarries in a Swiss chalet, the suburban grocer inhabits a Norman castle, and the New Yorker, who economizes by keeping a winter house in Washington, turns his affections toward grotesque Queen Ann and Eastlake caricatures. All this in a few years will look very odd, just as do the Greek temples in which good Americans of one and two generations back delighted themselves.

The most sensible of our new buildings are the great office structures. They embody no distinctive architectural style; but they are, as a rule, substantial, well heated, lighted and ventilated, generally fire-proof, so far as inside risks are concerned, and are better fitted with elevators and other conveniences than foreign buildings of the same class.

The country has been very prosperous of late, and there are countless of the new rich who wish to distinguish themselves by affecting high art dwellings. But the models chosen keep in fashion only a few years, and the latest European copies will go out of mode as surely as the horse-hair, veneered furniture, the what-not cabinets and the camphor aroma of our grandmothers, or the blue plaques and repoussé armor of our aunts.

It is by no means desirable that all the buildings of a country should be patterned on one design like so many canal boats; but it would be a relief to see once in a while something original which is not fantastic. When the craze for ornamental architecture has subsided, as it surely will, we may expect to see buildings planned with some regard for their purpose, and as in the case of the large new office hives a less flimsy system of construction than would have passed muster a few years back. If a pronounced and lasting American type is ever developed it will be in the direction of practical utility and adaptation of means to ends, thus following the bent of mind which has shown itself in machine designing.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Formation of Coal-Seams.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have read with pleasure the letter of your correspondent, Mr. E. O. Nathurst, in your issue of the 17th of March last, being a reply to my article on the above question, as appearing in your paper of February 25th, 1888. With your kind permission I should like to say a word or two in answer to that gentleman's very sensible and cautiously expressed letter.

First, my paper appears to have given readers the impression that I am one who accepts the "drift" origin of coal-seams. At present I am not disposed to uphold any particular theory, because I maintain that until more facts and more minute observations have been accumulated by competent observers in the field, no completely satisfactory explanation can be given of them. All that I intended to assert was, that what evidence we so far possessed was strongly *against* the commonly received opinion that coal-beds are buried forests of timber-trees that grew on the spot. I am entirely of the same opinion as your correspondent in regard to the question of earthy sediment, which must have been carried along with the floating vegetation, supposing coal seams had been drifted matter. In many of our English seams we find the remains of *stigmæria*, also of *sigillaria* and *lepidodendron*.

These fossils are found completely embedded in, or forming part of, true and first-class pit-coals, and can be very frequently detected by the trained eye when viewing blocks of coal on their laminated surfaces.

As Mr. Nathurst inclines to the *peat-like growth* for coal-beds, will he kindly give us his explanation of the phenomenon of *lamination* in coal, which I can not make out that he gives in this letter. As to erect fossil tree-stems in coal, my view of them is that instead of contributing to form the seam in which they occur, they must be looked upon rather as interruptions in the continuity of the coal. They would seem, in fact, to be accidental, and I am pleased to find Mr. Nathurst agrees with me here. We, however, seem to differ upon the *stigmæria* question. Can your correspondent satisfy himself that the so-called *stigmæria* (roots) in underclays were once attached to trees *in situ*? If he can, it would seem to me that this fossil must be preserved in a much more complete form in the North American underbeds than it is in England. Now, sir, this is a very important point in this connection; because if it can be shown that the underclay *stigmæria* are, or were once connected with the overlying bed of coal, the *growth in situ* or *timber-tree* theorists have a very strong argument in their favor. The position I have taken up, is that they can not do this, and that they have not yet satisfactorily explained the laminæ of coal-beds.

If those who are competent to make observations in the mines would only give their minds to it a little, a vast amount of valuable facts would soon be collected. I am, sir, yours very respectfully,

W. S. GRESLEY, F. G. S.

The Great California Dam.—The completion of the great Sweetwater dam and National City (Cal.) water-works was formally observed April 19th. The dam is solid masonry built across Sweetwater Valley in order to form a large reservoir for the purpose of storing water for the dry season. The dam is ninety feet high from the base of the gorge, and is claimed to be by twenty feet the highest dam in the United States. The area of the reservoir is 750 acres. The cost of the dam is \$800,000.

THE ORIGIN OF THE LEADVILLE DEPOSITS.—II.

In our review of Mr. Emmons's report on the Leadville district, published April 7th, we left for further consideration his conclusion that the metallic contents of the ore-deposits in and near the Leadville limestone came from above, and mainly from the neighboring eruptive rocks. This proposition we now purpose to examine, so far as the limitations of space will permit.

With regard to the sources from which metallic ore-deposits are derived, Mr. Emmons makes some very just introductory observations. He points out that, since the crude theory of injection in fusion has been abandoned, there is no longer any very wide and clear distinction between the opposing schools: The agency of water as a solvent, and the concomitant activity of heat and pressure are generally admitted as factors in the problem; and what remains to be settled is rather the special history of each individual deposit than a formula which will cover all deposits. Of the solutions causing metallic minerals, Mr. Emmons admits that there are both upward and downward currents, but remarks that such movement is not necessarily vertical in either direction, but will take its immediate direction from the character of the rock-mass through which it is passing. Hence the question, whether ore-bodies have been deposited by upward, downward or lateral currents, however important it may be to the miners of a given district, has less bearing upon the general theory than many have attributed to it.

Mr. Emmons makes, moreover, a distinction between the immediate and the ultimate source of an ore-deposit. The latter, he says, "is as much a purely speculative matter as the nebular hypothesis;" and to the former he confines his discussion. Without denying that in some instances the usual vague statement that the ore "came from below" may possibly be true, he thinks that it is generally inadequate, and rather a safe expression of ignorance than the outcome of careful study of geological conditions. With regard to the Leadville deposits, he pronounces it untenable, except as to their "ultimate source." For this opinion he gives the following grounds.

1. These deposits were formed under at least 10,000 feet of rock, and an unknown depth of sea-water. If they had been deposited from hot ascending solutions, as the result of a relief of pressure, the bulk of the deposit, he says, would have been found in the upper part of the rock-mass, where the pressure was least, instead of at the base. We confess that this argument does not convince us. In the first place, it is not at all clear that solutions in crevices of the rocks at any given depth are under a pressure measured by the full weight of the rock column above them. In the second place, it is not relief from pressure alone that may have been the occasion of deposition. Where chemical reactions, for instance, or physical processes analogous to filtration, have produced the deposit, it is natural to suppose that it will be found in greatest abundance in that part which it first entered of the rock-mass presenting the chemical and physical conditions of deposition.

2. As the sedimentary beds traversed by the mineral solutions were horizontal and comparatively undisturbed, Mr. Emmons thinks that if the currents had been ascending, the process of deposition should have acted from the lower surface upward, instead of from the upper surface downward, as is the case in the blue limestone, which carries the larger proportion of the Leadville deposits. This is, perhaps, a too sweeping statement as to the blue limestone. In the chrysolite mine, as Mr. Rolker has pointed out (*Trans. A. I. M. E., XIV., 292*), large areas of "dolomite sand," the remnants of the former limestone, now mostly replaced with the characteristic iron oxide of the ore-deposit, are found in the roof, never in the floor, of the deposit. Mr. Rolker pertinently asks whether, in case of a deposition from above, it would not be natural to suppose that the dolomite in the plane of contact with the overlying porphyry would be the first to be dissolved and replaced. On the other hand, Mr. Emmons is supported by numerous exposures elsewhere in the Leadville mines, where the mass of the limestone has not been replaced, and where the ore-bodies along the contact extend downward into the limestone. We think the solution of this contradiction lies in the admitted fact that wherever the solutions come from, they followed preferably if not universally, contact-planes between the two rocks named. In the Chrysolite ground, they may have followed the plane between the lime and the porphyry below it—for in this locality there was an upper layer of the lime, separated from the lower bed by porphyry. From this plane it ate into the overlying lime upwards, as from the upper contact-plane in other cases it ate into the limestone downward. But, as Mr. Emmons has so justly observed, the words up and down have no great importance as to such purely local action. The real question is, Did the mineral solutions reach the planes which guided them, by downward percolation through the overlying eruptive rock, from which they gathered their mineral contents, or did they reach those planes from deeper sources by ascending currents? That they percolated upward in a manner similar to the downward percolation of his hypothesis, only in the opposite direction, no one asserts. But what they did after reaching the contact-planes and crevices which are admitted to have been their channels, has little bearing upon the question, where they came from. The evidence of the blue limestone is therefore not conclusive.

3. Finally, Mr. Emmons cites a negative proof, in the fact that there is no evidence, thus far, of channels extending downwards, through which the ascending solutions might have ascended. There are dikes, it is true; but he finds no indication that they furnished channels for such currents. This must be granted; although, on the other hand, Mr. Rolker declares (and we understand Mr. Emmons to admit) that the dikes are in some way connected with the form and richness of the ore-bodies. The relation is not clearly understood, but there is little doubt that it exists; and Mr. Emmons's hypothesis must make a place for it.

In any event, such negative proof as this must not be rested on too heavily. We remember meeting, many years ago, a very intelligent naturalist, who, with few books and no scientific associates had acquired by patient study a wonderful knowledge of the minerals, plants and animals of the wild region in which he lived. During several days we took lessons from him as from a learned teacher. But one day he surprised us by confessing that there was one thing that puzzled him more than any thing else, namely, the question, how the solutions got

into a geode, to deposit their successive layers of agate, chalcedony, amethyst, etc. He wanted to know whether any theory on that subject had ever been propounded, adding that he had split open hundreds of geodes without ever once finding the least sign of a place of infiltration. We could only exhort him to go on splitting, and assure him that some day he would discover what he sought, and would be no longer a new King George, perplexed at a mineral dumpling. Certainly we did not tell him that, since he had found no channel, the waters must have come through the pores of the shell! Nor would Mr. Emmons have told him that.

Whether the Leadville deposits were formed "from below" or not, it is not surprising that channels for ascending currents have not yet been found. If they exist, they need not be many in number, nor under the present mines. Indeed, it would be more likely that they should be fissures under the mountain range to the east. But the accidental discovery, any day, of one such channel "to the deep," would make sad work with Mr. Emmons's whole theory.

For we think that the grounds he urges do not justify, at best, any thing more than the assertion of a possible origin by downward leaching through the eruptive rocks. His analyses show minute traces of lead, gold and silver, etc., in the porphyry. Other analysts have found none—perhaps using less delicate methods. Here also we have but a bare possibility.

The unstained condition of large areas of the porphyry, overlying the ore in both Fryer Hill and Iron Hill, makes it hard to believe that this rock has been leached in any way consistent with the observed results. The occurrence of ore in lower horizons here and there, with unaltered limestone between it and the porphyry, is another fact, difficult to handle under this hypothesis; and finally, the large bodies of porphyry with no iron or ore-deposits under them furnish a similar objection. There may be local explanations for all these phenomena. But, unexplained, they stand in the way of Mr. Emmons's theory. That he is perfectly aware of the difficulties of the case, and far from believing that he has reached its final solution, however confident he may be that he has indicated the probable direction in which it lies, the following extracts (pp. 583, 584) will show:

"In the present state of explorations in this region, it is impossible to trace with any degree of certainty the processes of original ore-deposition. The most that could be hoped for was to indicate the possible methods by which the deposition might have taken place, and to weigh the probabilities afforded by ascertained facts in favor of one or the other of these methods. The foregoing reasons seem to favor the probability that the ores may have been derived, in part at least, from one or more of the bodies of porphyry which occur in the region; and the above figures show that the small percentages of the metals still existing in these rocks might furnish an adequate amount of material to form the known ore-bodies.

"* * * It is possible that in future years, when mine-workings shall have been extended over areas where the ore-horizon exists at considerable depths below the surface, and other eruptive channels have been found and critically examined, evidence may be obtained that ore-solutions have ascended along these channels from below. Such evidence will not, however, necessarily preclude the derivation of part of the metals from the country-rocks; and at present that derivation is the only one which has the support of actual, though somewhat indirect, proof."

Such moderation and candor as these statements exhibit go far to inspire confidence in the judgment of their author. They assure us that he is incapable of mis-stating the facts which favor, or withholding the facts which do not favor, the theory to which he inclines. We are glad that so conscientious and intelligent an observer is at work in this most important field; and while we may not share all his opinions, we do not hesitate to say that no American geologist has made contributions of greater value to the science of ore-deposits.

We leave the subject for the present with one further observation. It is possible that the problem of the Leadville formations may never be solved in the Leadville mines. No doubt a good deal more will be learned about it—some important developments not contained, we think, in Mr. Emmons's report are described in the papers of Messrs. Freeland and Rolker in Vol. XIII. of the *Transactions* of the Institute of Mining Engineers. Yet it may always remain debatable, whether the material of these deposits was gathered by surface-waters percolating by gravity through the overlying and neighboring eruptive rocks, or came from deeper sources. But other mining districts, furnishing ores of similar mineralogical character, may lend a victorious degree of probability to one or the other hypothesis. We think, for instance, that one clear case of the occurrence of ores like those of Leadville, deposited by currents ascending from "the deep," would suggest with almost conclusive force the same explanation for the Leadville deposits. We hope Mr. Emmons will visit and carefully study the Madonna and other mines in Chaffee County, Colorado. In the Madonna, he will find limestone and quartzite, but, so far as we recollect, no mass of porphyry to which he can refer the origin of the ore-bodies. It seems to us that he will be obliged either to postulate the former existence of an overlying porphyry, now gone through denudation, or to admit the probable deep-seated origin of the deposit. In any event, his views on that district would be interesting and valuable, and could scarcely fail to have some bearing on the Leadville problem.

Electrical Transmission of Power in Italy.—The factory at Oerlikon (Switzerland) has entered into negotiations with a large Milan firm to erect an installation capable of transmitting 250 horse-power a distance of about 600 yards, with a guaranteed yield of 78 per cent. The motive power is to be furnished by turbines driving two Oerlikon dynamos, the current being transmitted to the two motors in the factory by three wires, as at Kriegstettin.

A New Projectile.—The Spanish correspondent of the *Progres Militaire* reports that General Pando, who has been experimenting for some time, has invented a new projectile, which will probably be applicable to guns up to 24 centimeters. The principle of the new shells depends upon the reaction of two substances, both liquid, or one liquid and the other solid; which, separated, are harmless, but which, being brought together by the shock of the projectile striking against any object, cause a violent explosion. Although General Pando keeps the nature of his explosive secret, several substances are known which act in the manner described, and this property has been made use of in the "land torpedoes" of the Italians at Massowah, in Hart's explosive cartridges, and in some mining powders used in this country.

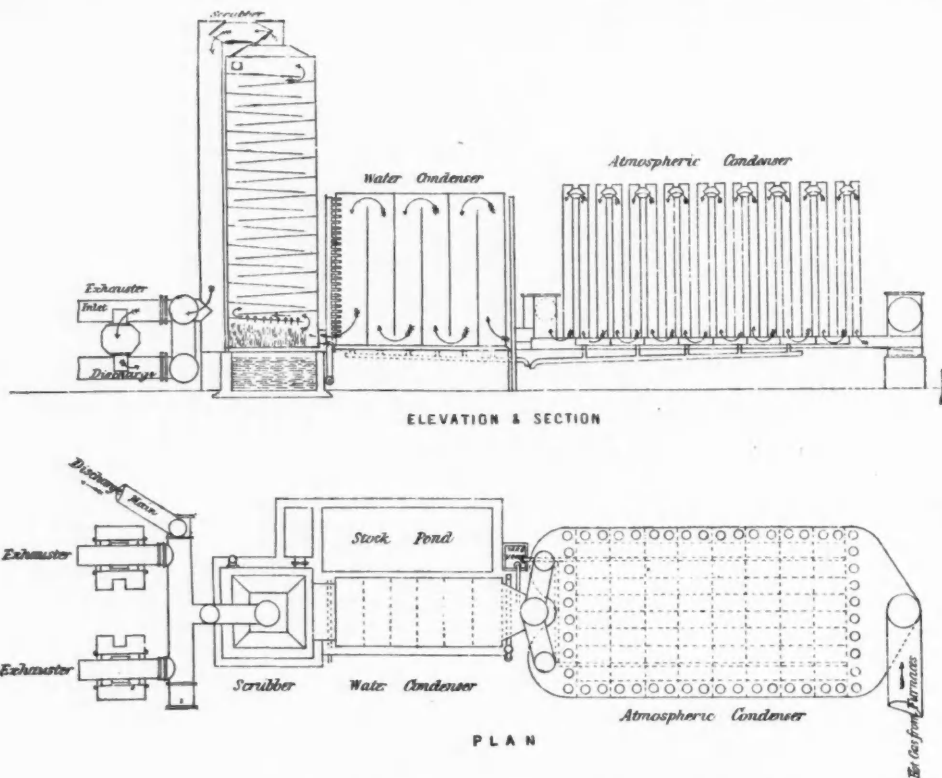
RECOVERY OF AMMONIA AND TAR FROM BLAST-FURNACE GASES.—I.

Some methods and appliances which have been introduced abroad, and especially in Scotland, for the recovery of ammonia and tar from blast-furnace gases will be of interest to furnace men using raw coal in this country. Mr. William Jones contributed a detailed description of the leading processes to the *Journal of the (British) Iron and Steel Institute*, No. 2, 1885, from which we reproduce the accompanying plates; and he has recently furnished the *ENGINEERING AND MINING JOURNAL* with additional particulars, bringing the subject up to date. These will be presented in a future issue.

The Scotch splint, used raw, contains about 40 per cent volatile matter, of which from 28 to 35 per cent are tar, gas, etc. The fixed carbon runs from 50 to 55 per cent. A peculiarity is the high percentage of nitrogen, which averages 1.35 per cent. This would give, per ton, theoretically, 152.8 pounds of commercial ammonium sulphate, containing 24 per cent of ammonia. In blast-furnace practice it is said that from 17 to 20 per cent of the nitrogen is evolved as ammonia at 600 degrees to 700 degrees F. The Scotch furnaces fed with raw coal give about 230,000 cubic feet of gas at 500 degrees F., equivalent to 125,000 cubic feet at 60 degrees F., plus the vapor from 300 to 450 pounds of water per long ton of coal. Each ton of coal yields from 120 to 220 pounds of tar, given off at this high temperature partly as vapor and partly held in suspension. There is also much dust carried in the furnace gases, and this necessitates a special arrangement of flues.

The leading types of methods of recovering ammonia and tar from furnace gases may be grouped under two heads:

- I. Methods depending on condensation or cooling of the gas:
 - a. The Alexander and McCosh or Gartsherrie process.
 - b. The Dempster process.
 - c. The Henderson process.



Alexander and M'Cosh Process, Gartsherrie.

- II. Methods depending on the use of acids without the cooling of the gas:
 - d. The Neilson or Summerlee process.
 - e. The Addie or Langloan process.

Taking up these methods in the order above stated:

The Alexander and McCosh Process.—This, practically the pioneer system, consists in condensing and cooling the gas and subsequent washing of the cold gas in towers or scrubbers. The general arrangement of plant is shown in the cut. At the time Mr. Jones's paper appeared there were three gigantic plants worked on this system.

The Dempster Process.—The apparatus is similar to that generally used in gas-works for the recovery of by-products, but it is so modified as to be especially adapted to the requirements of blast-furnaces. By giving a large flue area and a slow current the dust is settled out. The gases first pass through the ammonia still; then through iron primary washers; then into an atmospheric condenser consisting of 100 malleable iron pipes 40 feet long by 20 inches in diameter, the arrangement of which in sets allows of cleaning, or, if required, scraping, one set of pipes at a time without stopping work. The gases are then drawn through exhausters consisting of four Root blowers in the plant described; then to four sets of Livesay washers working in pairs. Next the gases enter scrubbers, four in number, 100 feet high and 12 feet in diameter, the scrubbers being used alternately, the last one of the series being fed with clean water. Between the scrubbers and the boilers where the gases are burned is a tank acting as a water seal, to guard against explosions.

The Henderson Process.—The plant described by Mr. Jones treated 20,000,000 cubic feet of gas per 24 hours, this being the supply from two furnaces consuming 50 tons of coal in that time. It consisted of (1) a primary washer and cooler; (2) a steam jet exhauster; (3) a slow-speed water condenser; (4) a washer or scrubber.

The Neilson or Summerlee Process.—The principle on which this process is based is the absorption of the ammonia in the furnace gases by dilute sulphuric acid. At the Summerlee works the plant consisted of four closed-top furnaces, 70 feet high, with the usual cup-and-cone charger, and three open-mouth furnaces. These fed into twelve scrubbers, 6 by 6 feet and 20 feet high, made of cast-iron plates fitted with hard-burned fire-clay tiles arranged in checkerwork. The scrubbers were worked in pairs. The gases were taken at 500 degrees F. at the top of the first scrubber, and are washed down by a stream of water, the temperature being thus at once reduced to 140 degrees F. This primary cooling of the hot furnace gas is of great importance, as it saves the lead-lined second scrubber from the damage which would follow from excessive expansion and contraction, and the washing with plain water also takes out most of the potash and soda salts. The lead lining of the second scrubber is eight pounds per square foot. A descending stream of dilute sulphuric acid takes out the ammonia and any other base which may be present. The exit gas is about 135 degrees F. and has been deprived of from 25 to 30 per cent of tar which it originally contained. The dilute sulphuric acid falls into a cistern below the scrubber and is then blown by compressed air into a tank standing above the scrubber and redistributed. The water scrubbers catch most of the tar and also, as above stated, most of the potash salts, but not all. The gas is finally drawn from the scrubber by a Schiele fan and is burned under the boilers and stills.

(TO BE CONTINUED.)

MINERAL RESOURCES OF VENEZUELA.

Written for the *Engineering and Mining Journal* by Charles Bullman, M. E.

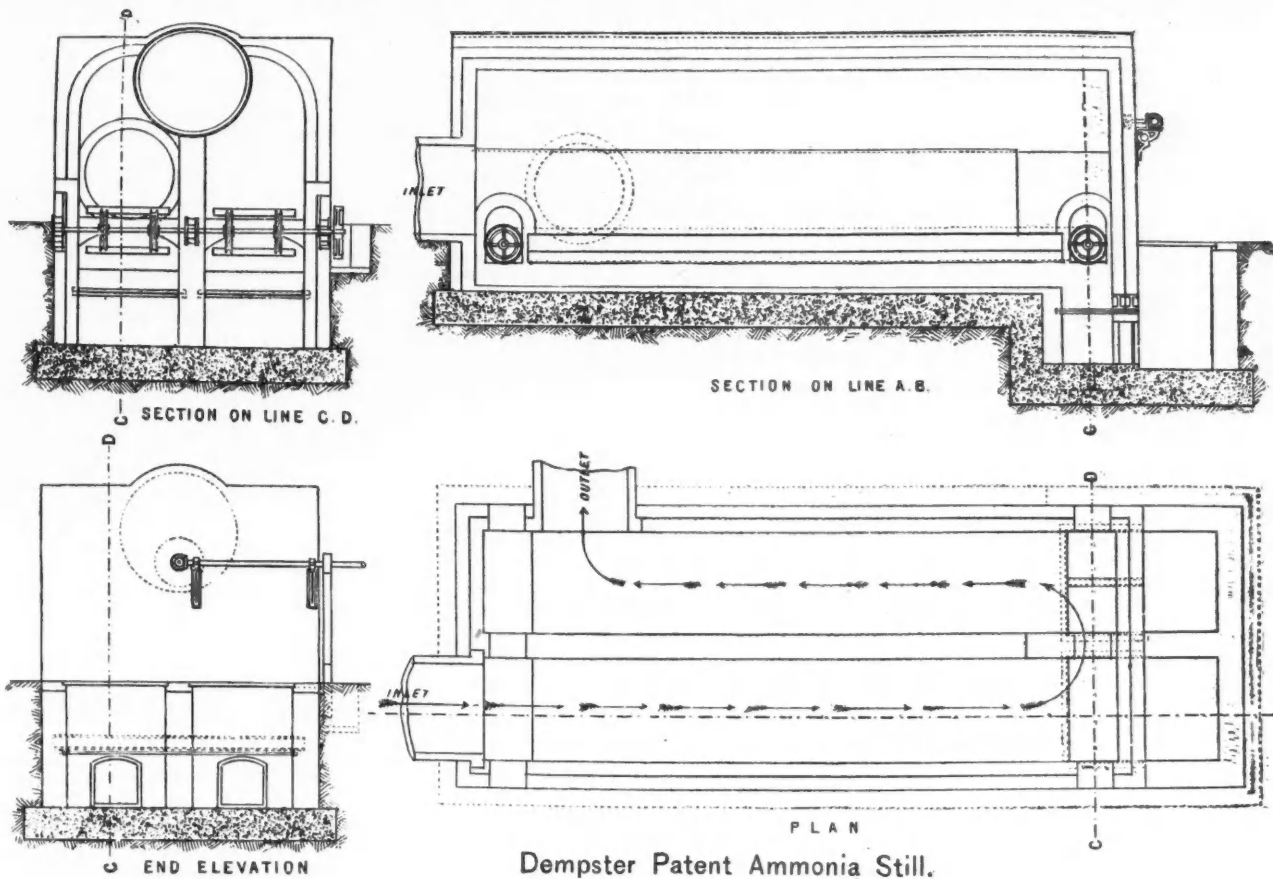
The mineral resources of Venezuela are not only great but varied, and include deposits of gold, silver, copper, iron, lead, antimony, coal,

asphalt, and petroleum, but, with the exception of those of gold, copper, and iron, none are worked.

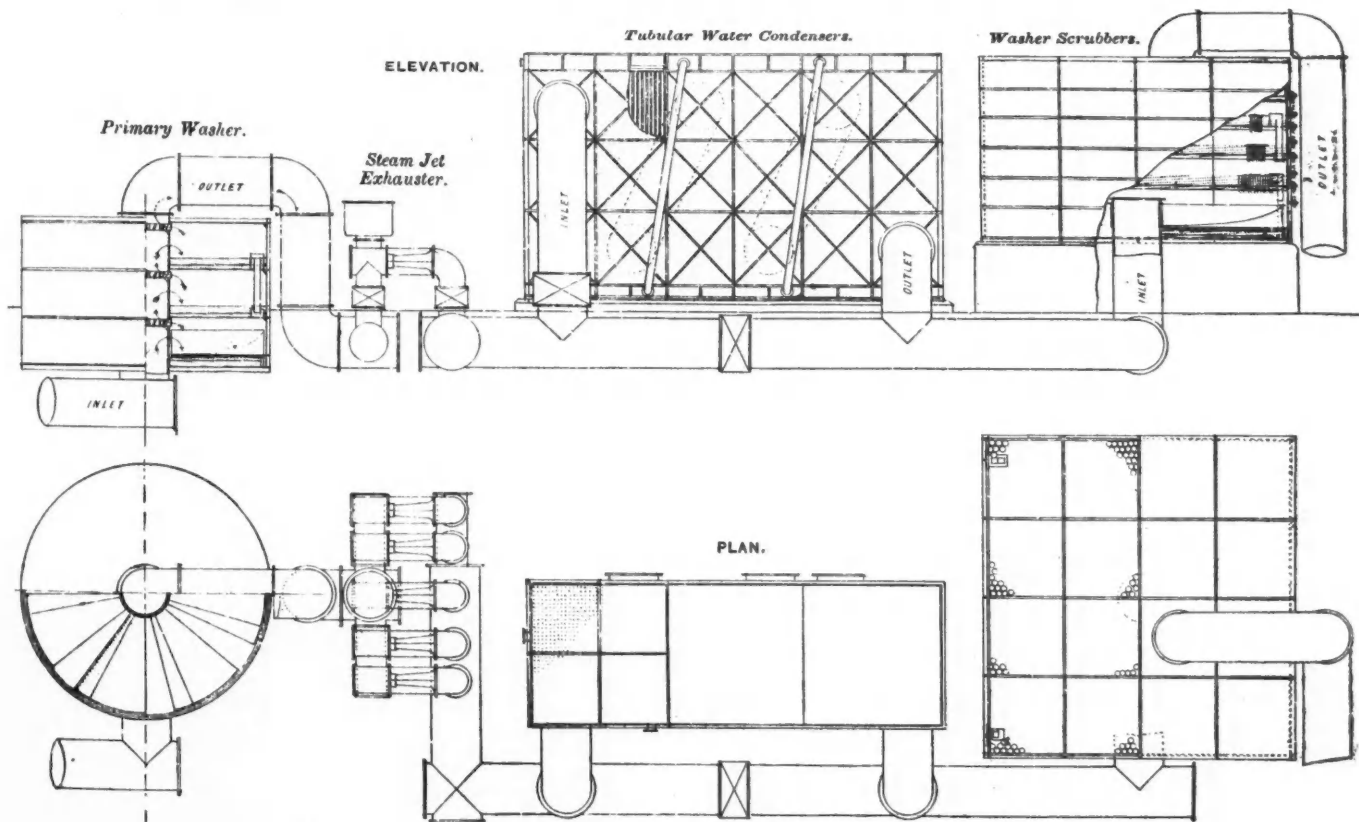
Many reasons may be given for this state of affairs, such as the indifference of the people themselves to the development of mines, the scarcity of skilled labor, etc., but a more important reason is to be found in the opinion everywhere prevalent, that South American republics are very unstable affairs, and that they show but slight regard to *meum* and *tuum* when their interests are anyway involved. This opinion has caused many an investor to refrain from embarking in very meritorious enterprises: but of late people have begun to see that this opinion is not exactly true, and led on by the richness of the field, have slowly and with extreme caution sought investments in Venezuela and elsewhere.

It is perfectly true that Venezuela formerly was much disturbed by internal dissensions, but in the latter half of the nineteenth century family quarrels have been extremely rare, the Federal Government having shown its strength by crushing rebellion as soon as shown. I was in Venezuela at the time of Pulgar's attempt to revolutionize the country and seize the Presidency, and was surprised to see how little it affected business. Every thing went on much the same as usual, and in a very short time Pulgar was a fugitive and the insurrection at an end. In no country could it have been done more quietly or expeditiously. Of late American capitalists have sought investments in this country with most gratifying results, and it is to be hoped that others will follow their example. The English already have much capital invested, and are taking every advantage to increase their hold on the country; in fact, they even seek to claim the ownership of a good part of it, but it is to be hoped that this question will be amicably settled by arbitration and a disastrous war be avoided.

The most celebrated of the mining districts of Venezuela is that known as El Caratal in the territory of the Yuruari, the most noted of its



Dempster Patent Ammonia Still.



Henderson Process.

mines being El Callao, about 40 per cent of the gross yield of which has been paid out in dividends.

The mines of this district may be classified as 1st, fissure veins; 2d, shallow placers; 3d, deep placers.

The veins are well defined and in general very much decomposed, often requiring no blasting to a considerable depth; the country-rock is gneiss with mica and hornblende schist, rocks belonging to the earliest geological formation. The decomposed part is called cascajo. At places there are outcrops of felstone, but whether intrusive or interbedded has not yet been determined. At El Callao this felstone forms the walls of the veins, while other veins, as El Potosi, are inclosed in the gneiss and schists. According to Stevens, the veins of this district are of two systems, viz., those having a strike N.E.-S.W. [and those having an east and west strike,

The two kinds of placer deposits found here are, like those of California, of different ages, the shallow placers being produced by the disintegration and re-deposition of the older deep placers. In many places, upon removing the top soil, a ferruginous earth is found, which upon washing yields gold; this earth is called "tierra de flor" or "moco de hierro." It is for working this class of deposit that barrancos are granted. This moco de hierro is of sedimentary formation undoubtedly produced by the disintegration and denudation of the older crystalline rocks; it is frequently hard and compact, cemented together, forming a conglomerate which, when broken up and washed, gives limonite and magnetic iron sand, quartz, schist and clay. In several localities it stands out clearly defined, having the appearance of a cliff, showing plainly that part of the material composing it has been further disintegrated and washed away to again be deposited lower

down. These secondary deposits are richer than the first, owing to their being more concentrated.

The territory of the Yuruari is by no means the only one in Venezuela that contains gold, only, owing to its richness, it has received more attention. Gold has been found in various streams in the neighborhood of Valencia, in quartz veins throughout the States of Carabobo and Lara; also associated with stibnite. This latter is one of the finest antimony ores I know of, being free from arsenic and iron. Analyses of a sample from the outcrop, where it is entirely changed into oxide, gave antimony tetroxide, 93.01; water, 7.89; gold, 1 oz. to the ton. This percentage of oxide corresponds to 72.54 per cent of metallic antimony, and is consequently a very valuable ore; but up to the present time it has not been worked.

Next to gold in importance comes copper, the mines of Bolivar being celebrated for their yield. The company working them is English, and the product in the shape of ore and regulus is sent to Swansea. Other mines are known in the States of Carabobo, Lara, and Los Andes, and some have been partially worked; but, owing to the heavy cost of transportation to the port of shipment, they have generally proved failures. The Esperanza mine, started by native capital, may be cited as an interesting example. The ore of this mine is a chalcopryite, but decomposed to a considerable depth, containing from 20 to 25 per cent of copper. The ore was to be shipped to England from Rio Cabullo, distant about 65 miles from the mine. Part of the way the ore could be carted, but for a considerable distance mules and burros had to be used.

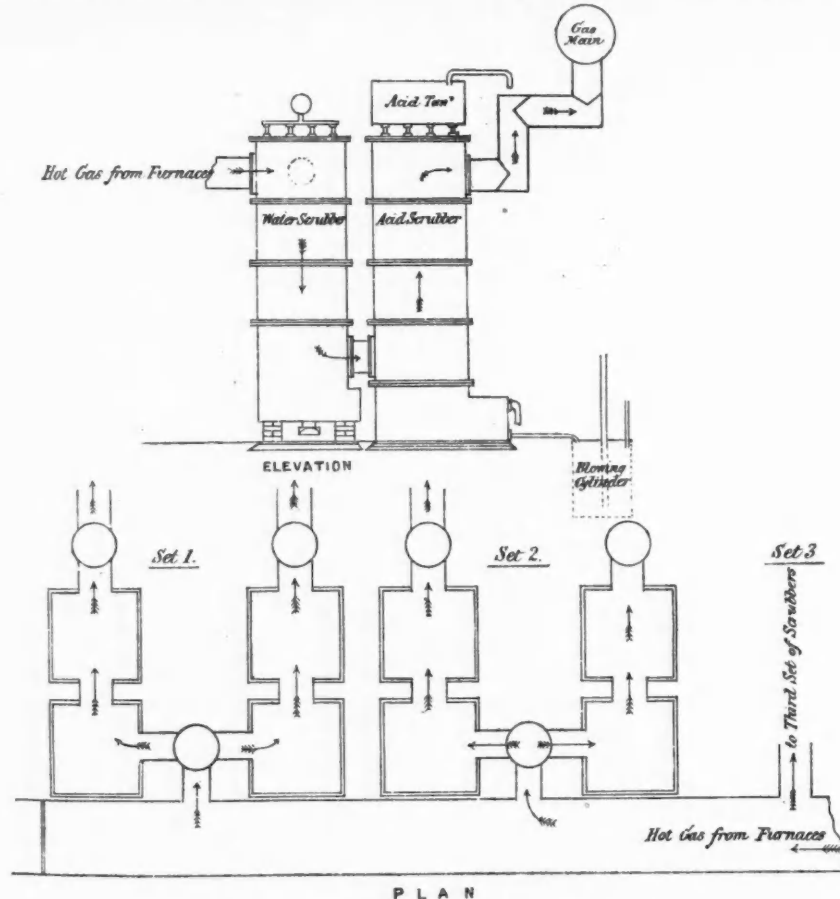
SILVER-LEAD MINING AND SMELTING IN BURMA.

Mr. E. J. Jones, of the Geological Survey of India, has been reporting to his government on the minerals of Burma, and we take the following extract from *The Indian Engineer*, which publishes his report on the Bawnin lead mines, situated in the Shan Hills:

Bawnin is a small village in the neighborhood of Kyauktat, near Pwehla. About one and a half miles to the northeast of the village there is a valley among the hills; the bottom of this valley is filled with a red clay, the rocks of the surrounding hills consisting of limestone. In clefts in the limestone and below the red clay occurs a yellow somewhat calcareous clay, in which the argentiferous galena is contained. The ore is said to occur in blocks and fragments, varying in size from three feet across to the size of a pea. I was unable to enter the mines.

The larger lumps, which are of too great a size to be readily carried out of the mine, are broken up and brought out with the smaller lumps and the clay in which they occur, and the whole is washed by means of water, which leaves the heavier fragments of ore behind. The ore is then collected in baskets and removed to one of the smelting-houses in the neighborhood. The ore is said always to occur in this manner, imbedded in the yellow clay; and when it occurs in a cleft or fissure of the rock, the walls of the cavity are frequently lined with crystalline calcite.

When the ore occurs in a fissure of the rock, a passage is driven along in the clay between the walls of the fissure, which is usually very tortuous and irregular in its course. The mouth of one of these tunnels which I



NEILSON OR SUMMERLEE PROCESS.

(For description, see page 340).

It was soon found out that this would not pay, and it was then resolved to smelt the ore at the mine and ship regulus only. The remaining part of the capital was then expended in the erection of furnaces. It was calculated that the surrounding forests would furnish the necessary fuel at a very low price, but upon trial it was found to be very expensive, and this in connection with a further increase of freights caused them to abandon the work. As there is no lack of water in this region the introduction of wet concentration would enable many mines of this class to pay very fair dividends.

There is but one iron mine working in Venezuela, namely, that at Manoa. It is owned by an American company of that name. This mine has been opened recently, and, owing to its advantageous situation, is likely to prove a most valuable property. The ore is specular hematite and the deposit of great extent. Vessels can approach close to the island and anchor in seven fathoms of water.

These are all the mines at present worked in Venezuela. The coal of Barcelona is of very good quality and of great extent, a single seam having been followed along its outcrop for a distance of six miles. A concession was granted to a French company for the working of these deposits, but, after going to considerable expense, an experienced engineer from the United States having been engaged to prospect with the diamond drill, the scheme was for some reason or other abandoned.

Large deposits of asphalt have been discovered in the delta of the Orinoco, and petroleum of a superior quality is found at Tachira, but with neither the one nor the other has any thing been done as yet.

In view of the general attention given to Venezuelan affairs at present a translation of the most important of the laws governing the location and working of mines in that country may prove of interest to readers of the ENGINEERING AND MINING JOURNAL and to capitalists in general.

saw was about three feet high and two feet wide, and running towards the northwest at about 45 degrees, though just beyond the entrance it gets narrower and steeper. The whole length of the passage is said to be 300 cubits. When the ore occurs below the red clay in the bottom of the valley, square shafts, inclined at about 70 degrees, are dug through the red clay, and steps cut till the yellow clay is reached, which is said to be at a depth varying from 50 to 150 cubits. Chambers as large as the fear of subsidence of the roof will allow are then excavated in the ore-bearing clay, that which is removed being carried to the surface. When it is considered too dangerous to remove any more clay, the place is abandoned and a new shaft put down at a short distance off. Frequently, if not always, one chamber communicates with the air by means of at least two shafts.

SMELTING AND REFINING.

Two baskets full of the ore are smelted at a time, the first operation being carried out in a small blast-furnace heated with a charcoal fire.

The blast is produced by means of a pair of bamboo bellows, which deliver the air through a pair of earthenware tuyeres at the back of the furnace. There is also an opening below in front, through which the molten lead is manipulated, and which can be closed at the pleasure of the operator. The lumps of ore without previous calcination are put into the furnace with charcoal, and ore and charcoal are added from time to time, and the molten lead drops down into a hollow below, from which it is ladled out into molds. A large proportion of lead remains in the dark-colored glassy slag which is produced, and no steps appear to be taken to recover this, and the only use that is made of the slag is as glass for the manufacture of ornaments. I did not see this furnace working, but gathered the information through my interpreter from the smelter.

The operation of reducing the two baskets full occupies a whole day, and the result is 10 hemispherical pigs of metal averaging about 16 lbs. each in weight.

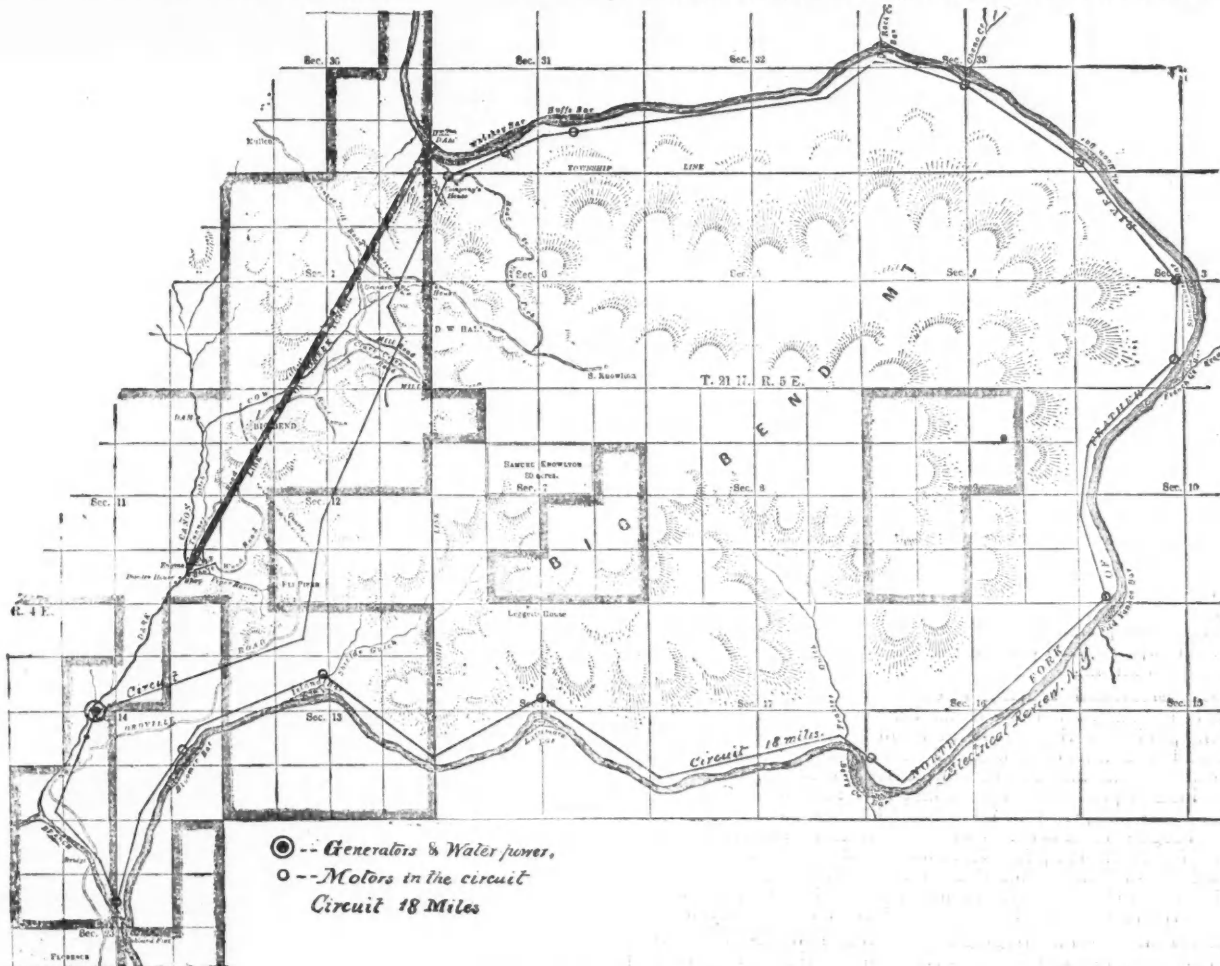
These pigs are then removed to a hut close by, where they undergo the operation of cupellation. The furnace used consists of a basin-shaped cavity in which the molten lead lies, over which the fire of logs of charcoal is supported, so that the heating is by radiation from above. The furnace is closed in at the sides, back, and top, and there is no chimney. In front there are two openings, one a large one just above the surface of the molten lead, and a smaller one above, through which the fire is manipulated.

When the lead is all melted it oxidizes, and the litharge is drawn off by thrusting an iron rod through the lower opening and rotating it in the litharge, which clings to it, and by repeating the operation a ball of litharge is collected on the end of the rod, which is knocked off and a fresh one collected. This operation is repeated till most of the lead has been removed, when charcoal ashes are thrown in to absorb the remainder of the litharge formed, and the fire is kept up till a button of silver is formed. The button which I obtained, and which was said to be the result of the cupellation of 10 pigs, weighs nearly five tolas, and the usual result is said to be from four to six tolas.

ELECTRIC TRANSMISSION OF POWER AT THE BIG BEND TUNNEL.

The river beds of California in early days yielded rich returns wherever they could be worked. One stretch which was especially promising is the Big Bend of the Feather River in Butte County; but this could not be touched by the older methods of working, by wing dams, etc., as there is a flow of about 100,000 miner's inches, increased in the rainy season, and passing for fourteen miles through a gorge flanked by precipitous walls 1000 to 1500 feet high. Through this natural sluice is drained the wash from hundreds of square miles of a rich auriferous country.

Under the leadership of Dr. R. V. Pierce, of Buffalo, a company was organized in 1881 to purchase the beds and banks of the Feather River along this bend from the government and from numerous claimants. After securing a title work was begun on a cut-off tunnel which has been carried to successful completion. Following the dark line across the base of the horseshoe, as shown in the illustration, the tunnel has been driven two and one-third miles through solid rock. Its cross section is 12 x 16 feet. It has been fully tested and found to be capable of carrying the water of the Feather River throughout the whole of the dry season, or from seven to nine months per year. The flow is directed into the tunnel by a heavy dam built just below the head of the bend.



THE BIG BEND TUNNEL.

There are two furnaces, built together side by side, which are used alternately. Below the furnace is an opening through which the bed of the furnace can be broken up and removed when it becomes saturated with litharge.

This operation is also said to last about one day; but as there is very little draught owing to the absence of chimney, the products of combustion being carried off through the upper opening, there must be a considerable waste of time.

The silver is not refined any more, but sold in buttons, the price being, according to my informant, eight annas per tola of rough silver.

The balls of litharge obtained are taken back to the blast-furnace in which the first operation is performed, and there reduced again by the help of a charcoal fire in the same manner as in the first operation. No provision is in any case made for condensation of the lead fumes, and the loss, both in lead and silver, must be very great. The resulting lead in ten jugs probably weighs about 120 pounds. I was told 400 viss, but as only 10 are formed, and the one I obtained only weighs 18 pounds, this is manifestly absurd, and the error probably resulted from the interpreter's very limited knowledge of English. The total profit to the furnace proprietor, who does not work himself but employs a smelter, is said to be about 4 rupees per every two baskets of ore smelted.

Compressed Air in Paris.—Mr. Victor Popp gave in a lecture at the French Physical Society the following data concerning the use of compressed air in Paris as a motive power: The canalization for the distribution of this power to small factories, etc., has already reached a length of 50 kilometers. The engines at the central station have 3000 horse-power and a pressure of 6 kilogrammes is given to the customers. The consumption of coal is 50 tons a day, and about 95,000 cubic meters of air are compressed daily.

After turning off the water through the tunnel in the late fall of 1887 only one month remained in which tests could be made of the river bed. To a certain extent rich returns were obtained, but an unforeseen obstacle was found in the alternate flat reaches and rapids in the bottom. Many reaches were covered by bodies of water left after the river had been turned into the tunnel; while the bars acted as partial dams, holding back water which slowly seeped through the gravel, leaving long stretches of dead water, some a quarter of a mile long, and effectually preventing mining to the bed rock where they occurred.

To overcome this difficulty the water was taken from the tail of the tunnel by a canal running two miles down the cañon, where a fall of 300 feet was had. The company here built a flume and put in turbines, which with the volume of water and the head available have enormous power. But they are so far removed from the nearest points on the river bend that transmission of power by belts or compressed air would entail great loss. Electrical transmission will therefore be resorted to.

The Sprague Electric Motor Company, after exhaustive tests at their works, have demonstrated the feasibility of erecting a line of conductors, 18 miles in length, extending completely around the bend. The current will be generated by dynamos driven by the turbines referred to, and will be tapped at fourteen points along the line, furnishing power to Sprague motors, pumps, derricks, tramways, etc. The Sprague system, as applied at Richmond, Va., in working a short line of electric railway, supplies from 1 to 15 horse-power to 40 individual moving points along a line of 14 miles, and is thus shown to be applicable to the requirements of the Big Bend project. The only alternative would be the use of steam engines distributed along the bend; but these would be costly in maintenance and liable to danger from freshets—to say nothing of the labor and cost of setting up and removing each season. On the other hand, the electric motors are portable,

can supply power at any angle, have a considerable play from each station, and it is said can be easily run by ordinary miners without previous training. This fresh application of electrical transmission of power will be watched with much interest by mining men. There is also a large field in mill work and underground haulage and lighting which electricity is sure to occupy in the near future.

GOLD, SILVER AND LEAD IMPORTS FROM MEXICO IN 1887.

The following statement has been prepared by A. Kaplan, of the custom house force at El Paso, Texas, and published by the El Paso Times, showing the imports of gold and silver coin, bullion and ore into the United States through the ports of entry of this customs district during the calendar year 1887:

	Value.
El Paso, Tex.—Gold coin, foreign.....	\$579,814
" bars and bullion.....	156,483
Silver coin, foreign.....	7,434,044
" bars and bullion.....	1,687,515
ore, 45,078 tons.....	2,891,536
Deming, N. M.—Silver ore, 311 tons.....	29,512
Tucson, Ariz.—Silver ore, 101 tons.....	7,156
Tombstone, Ariz.—Silver ore, 111 tons.....	23,475
Nogales, Ariz.—Gold coin, foreign.....	960
" bars and bullion.....	133,446
ore, 6 tons.....	145
Silver coin, foreign.....	185,440
" bars and bullion.....	449,091
ore, 4565 tons.....	323,688
Total.....	\$13,992,305
Total—Gold coin, foreign.....	589,774
" bars and bullion.....	289,929
ore, 6 tons.....	145
Silver coin, foreign.....	7,619,484
" bars and bullion.....	2,136,606
ores, 50,166 tons.....	3,275,367
Grand total gold and silver.....	\$13,992,305

Mr. Kaplan does not give any information as to the quantity of lead imported in this way, but the silver ores from Mexico are generally believed to have averaged about 26 per cent in lead, making a total of about 13,000 tons of lead. In addition to this some silver-lead ore has been imported through Louisiana ports.

Slag Fertilizers.—The manufacture of basic slag manure is proceeding steadily, and a much larger market might be found for steel-works' waste if greater quantities could be readily ground. The Staffordshire Steel Company have now three grinding mills at work turning out 200 tons per week, and the heavy stock which was laid in during the autumn months is now going off rapidly to the order of London fertilizing contractors. The selling price to the local agriculturists is 40s. to 45s. per ton, as against 55s. or 60s., which has to be paid for phosphates.

Electric Coal Mining Machine.—A new coal mining company, known as the Electric Motor Company, which has a patent for mining by electricity, will establish a plant at Phillipsburg, Pa., for the mining of an area of 10 miles. The plant, as a whole, is to consist of a central dynamo, conducting wires, coal-cutting machine, electric lamps, and motor attachments for hanging the mine cars. The inventors claim, as an advantage in favor of their coal cutters, that a single machine will not weigh more than 500 pounds. According to estimates, which, it is claimed, are made upon actual tests, the new device will considerably reduce the expenses of mining.

An Austrian Electrical Testing Laboratory.—An electrical laboratory is about to be constructed in Vienna for the purpose of carrying out tests for the public of the power and efficiency of dynamos, the candle-power and economical working of arc and incandescent lamps, electro-chemical measurements, the calibration of measuring instruments, the working of primary and secondary batteries, etc. The fees to be paid for these various operations have been determined: For testing a dynamo the charge is from 30f. to 100f., according to the dimensions of the machine; for an arc lamp it is from 30f. to 40f.; for an incandescent lamp 20f. to 30f., and for the calibration of measuring apparatus 6'25f. to 40f. The *Electrical Engineer* says profits of the undertaking are to be divided between the technological museum and the laboratory staff.

Cave Under a Lake.—While digging for a well at Tully, N. Y., on the 9th inst., the bottom suddenly fell out of the well at a time when, fortunately, all the men were in places of safety. There was left in the bottom of the shallow well a broad hole leading into utter darkness, apparently of unfathomable depth. In a short time an exploring party was formed, ropes and windlasses were procured, and several daring men were lowered to the bottom. It was found that the bottomless well led into a cave, whose bottom was about 40 feet below the well. The explorers went over the cave with torches and lanterns, and found it to be about a mile long. It extends directly under a lake, but it is entirely dry, no water whatever having been found. A number of stone columns and some fine stalactites and stalagmites were found, with fossil formations.

Production of Sulphur in Sicily.—The French *Bulletin du Ministre des Travaux Publics* says: "The total quantity of sulphur contained in the Sicilian mines before workings were commenced is estimated at 65,000,000 tons. The quantity produced from 1831 to 1835 is stated to be 8,353,091 tons, and previous to this period about 2,000,000 tons, making a total of 10,353,091. When it is considered that, to obtain this quantity, about 15,000,000 tons were turned over (as generally a third is lost in the treatment), it results that the quantity still available is 50,000,000 tons, and supposing that the average production should be maintained at about the same proportion as in past years, the Sicilian mines may continue to be worked for another century." The exports of brimstone from Sicily in 1887 were 312,446 metric tons.

Street Railway Construction in 1887.—The new track laid in the United States, and the cost of improvements made in 1887, were as follows: New England, 97 miles, \$642,000; Middle States, 312 miles, \$2,960,000; Southern States, 362 miles, \$1,512,000; Western States and territories, 309 miles, \$1,709,000; Pacific States, no returns of new mileage, \$642,000. Canada has built 18 miles; total cost of improvements, \$136,000. The total new mileage for the year was 1198 miles, and cost of improvements, \$3,601,000. Returns have been made of estimated work for 1888, a summary of which shows 1112 miles to be built at an estimated cost of \$9,784,000; 2634 new cars to be bought at an estimated cost of \$1,854,000; 21,570 new horses to be added, at an estimated cost of

\$1,799,200. The aggregate cost of the estimated work for 1888 is \$15,331,000.

Developing the Coal Mines in the Argentine Republic.—The legislative assembly of the Argentine Republic, in order to encourage the development of the coal mining industry, has approved a proposal made by a private company by which the government guarantees to the company undertaking to work the coal mines of Rioja an interest of 5 per cent on the capital invested for fifteen years; the company to invest a capital of \$2,000,000, the guarantee of the government to begin from the day that the railway connection is established or from the day when actual work begins in the mines. If the work at the mines is stopped for four months the government guarantee is withdrawn. If the company's profit reaches 10 per cent of the capital invested all the surplus profit is to be paid to the government until all the guarantee disbursement made by the government has been paid back, together with 5 per cent yearly interest on it.

Electric Welding and Melting.—The Dresdner Bank is stated to have acquired the right of working the German patents for the invention of MM. N. de Benardes and St. Olszewski, of St. Petersburg, while the firm of Rothschild, of Paris, is reported to have acquired the exclusive right of working the patents for France, Belgium, Spain, Italy and Austria. The invention referred to relates to a method of working metals by the direct application of an electric current, and more especially of forming alloys by the same means. The results obtained are stated to be remarkable, it being an easy thing to intimately commingle all manner of metals, even those least fusible, without the admixture of any substance save solder, and to effect this not only between homogeneous, but also heterogeneous metals, alloying, e. g., copper with both wrought and cast-iron, nickel with iron, lead with iron, aluminium with platinum, etc. The preliminary trials that have taken place at St. Petersburg and at Creil, near Paris, are said to have turned out most successfully.

Great Waterfalls.—According to a recent calculation, the highest waterfalls in the world are the three Krimbs Falls, in the Upper Pringau; these falls have a total height of 1148 feet. The three falls next in height are found in Scandinavia—the Verme Foss, in Romsdal, 984 feet; the Vettis Foss, on the Sogne Fjord, 853 feet; the Rjukan Foss, in Telemarken, 804 feet. With a decrease in height of 213 feet, the three Velino Falls, 591 feet, near Zerni (the birthplace of Tacitus), follow next in order, and they are succeeded by the three Tessa Falls, in the Val Formazza, 541 feet. The Gastein Falls, in the Gastein Valley, 469 feet, rank between the Skjaggedal Foss, in the Hardanger Fjord, 424 feet, and the Boring Foss, in the same fjord. If the width of the falls is taken into consideration, the most imposing are those of the Victoria Falls of the Zambezi, which are 394 feet high, with a width of 8200 feet. A long way behind these falls come the Niagara Falls, 177 feet high and 1968 feet wide.

Chloride of Nitrogen.—Dr. Gottermann, of the University of Göttingen, Germany, has enrolled himself among the heroes of chemistry. Chloride of nitrogen (NCl₃), discovered in 1812 by Dulong, is one of the most terrible explosives known to science. It has always been supposed that its elements were in the proportion now proved beyond doubt, but no one dared attempt to confirm it. Dulong himself, whose discovery was accidental, suffered the loss of an eye and three fingers, and since that nothing more positive has been learned about it. Dr. Gottermann, in the prosecution of his examination, was compelled to wear especially prepared gloves, protect his eyes with thick glasses, and the greater part of his body with two very thick window panes, from behind which he watched the substance. No accident happened, and he was able to prove, after a protracted analysis, drying, etc., that the formula NCl₃ is correct—one atom of nitrogen to three of chlorine. He further observed that NCl₃ does not explode in the dark or twilight, but a ray of sunlight will cause almost instant explosion. This knowledge will enable chemists to handle the substance with comparative impunity.

The New Geological Map of Europe.—The *American Geologist* for April contains a statement from Dr. Persifer Frazer, concerning the subscriptions thus far received in the United States to the new geological map of Europe, now preparing under the direction of the International Congress of Geologists. A private letter Dr. Frazer, making still further additions to the list, enables us to say that 89 copies have been subscribed for. As we have fully explained before, this is a new map, and will have the highest value geographically, as well as geologically, being prepared from the latest data, published and unpublished. It is to appear in 49 sheets, each of which is to be about 19 x 21 inches, so that the whole map put together will be about 11 feet high by 12 feet wide. The fact that the geological formations are to be represented according to the color-scheme provisionally recommended by the International Congress is really a minor matter, although so much has been said about it. The universal conventional use of certain colors to represent certain formations would undoubtedly be convenient if practicable, and we think it is practicable. In our opinion, it will also have a happy effect upon the progress of geographical science throughout the world. But the use of any particular set of colors does not specially affect the value of a given map. If this use of colors on the new map of Europe were its only distinctive feature; that is, if it were but an old map recolored as an experiment, it would be valuable chiefly to the few experts competent to criticize it in that respect; and if the experiment proved unsuccessful, the map would lose its value, as compared with previous maps colored differently. But as a complete result and original work, compiled with care under high authority, it is of the highest value to every student of geology, and therefore it ought at least to find a place in every institution where such students are educated.

As we have repeatedly informed our readers, 100 copies have been allotted to the United States at the subscription price of 100 francs per copy. Institutions and societies receive it free of duty. The duty payable by individual subscribers will probably be about \$5. Subscriptions may be sent to Dr. Persifer Frazer, Secretary of the American Committee, 201 South Fifth street, Philadelphia.

Manufacture of China in Limoges.—In a recent U. S. Consular report Mr. Walter T. Griffin furnishes the following interesting information: China is selling at a lower rate now than it has been for many

years in Limoges, the reasons being that the price of labor has decreased 10 per cent in the last five years; machinery has in many instances replaced hand labor; and one class of workmen, the saucer makers, has entirely disappeared since the strike of 1883. The rates of interest and insurance greatly favor the manufacturer. The price of coal and wood is lower than in previous years, the former costs from 25 to 35 francs per ton, delivered at the factory; the price for the latter is from 10 to 12 francs a stère, which is about one-third of a cord. The year 1887 shows a decided increase in the production of china; there was a steady decline from 1882 to 1886. The following table, carefully compiled, shows the decline and rise in the manufacture of china at Limoges and vicinity since 1882, which gives 1945 furnaces, *i. e.*, the number of firings or bakings in 1887, against 1851 for 1886, when the minimum was reached. The increase last year was nearly 100 furnaces, amounting to half a million francs.

	Coal furnaces.	Wood furnaces.	Total.
1882.....	2,599	507	3,106
1883.....	2,239	544	2,783
1884.....	1,895	448	2,343
1885.....	1,590	335	1,925
1886.....	1,528	323	1,851
1887.....	1,621	324	1,945

From these statistics it will be noticed that some manufacturers burn wood, although it is more expensive than coal. The reason of this is, that they think the sulphurous fumes from the coal injure the color of the china. Few colors have yet been discovered that will resist the gases of coal, so wood is used exclusively to heat the "mouffles," the furnaces where the paintings are fired. Limoges china is in demand all over the world, but by far the greatest share goes to the United States. The production last year amounted to over 8,000,000 francs, nearly one half of which was exported to our country. Freight charges are, from Limoges to the United States, from 83 to 120 francs per ton. The exporters as a rule speak hopefully of business and report better prospects this year than they have for a number of years.

LIMOGES, France, March 5, 1888.

BOOKS AND MAPS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another part of the Journal.]

Statistics of the American and Foreign Iron Trades for 1887—Annual Statistical Report of the American Iron and Steel Association. By James M. Swank, General Manager. Published by the American Iron and Steel Association. Philadelphia, Pa. 1888. Pages 64 and Index. Price \$2.

Pennsylvania Geological Survey Annual Report, 1886—Part III., with an Atlas—Also Atlas Western Middle Anthracite Field, Part II. A. A., and Atlas Bucks and Montgomery Counties, C. 7. Published by the Board of Commissioners Second Geological Survey of Pennsylvania. Philadelphia, Pa. 1887.

Notes for a History of Lead and an Inquiry into the Development of the Manufacture of White Lead and Lead Oxides. Compiled by William H. Pulsifer. St. Louis. Published by D. Van Nostrand. New York, 1888. Pages 389 and Index. Price, \$4.

New Standard Map of the United States and the World. Published by Leveck & Leveck, New York City. Mounted, varnished, ready for hanging up. Reversible. Size 43 x 65 in. Price, \$3.

Exploration of Tierra del Fuego. A lecture delivered at the Argentine Geographical Institute, March 5th, 1887, by Julius Popper, C. E. Published by L. Jacobsen & Co., Buenos Ayres, S. A. For sale by B. Westerman & Co., New York. Pages, 47 and map. Price 50 cents.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

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

- PATENTS GRANTED MAY 1ST, 1888.
- 381,913. Pipe-Coupling. John Davis, Allegheny Pa.
 - 381,916. Pipe-Coupling. Solomon R. Dresser, Bradford, Pa.
 - 381,966. Pipe-Coupling. John Story, Castle Shannon, Pa.
 - 381,967. Caustic-Soda Steam-Engine. Audley H. Stow, Baltimore, Md.
 - 381,968 and 381,969. Electro-Magnetic Motor. Nikola Tesla, New York, N. Y., Assignor of one half to Charles F. Peck, Englewood, N. J.
 - 381,970. System of Electrical Distribution. Nikola Tesla, New York, N. Y., Assignor of one half to Charles F. Peck, Englewood, N. J.
 - 381,996. Apparatus for Causticizing Soda etc. George W. Hammond, Boston, Mass.
 - 382,003. Hydraulic Valve. Milton B. Kiker, McKees Rocks, Pa.
 - 382,008. Steam or Gas Motor Engine. Benjamin C. Pole, Camden, N. J.
 - 382,017. Rolling-Mill for Making Tubes. Stephen P. M. Tasker, Philadelphia, Pa.
 - 382,026. Turbine Water-Wheel. Nathan F. Burnham, York, Pa.
 - 382,031. Air-Brake. Theron S. E. Dixon, Chicago, Ill., Assignor of one half to Lyssander Hill, same place.
 - 382,035. Rolling-Mill. Joseph Fawell and James Hemphill, Pittsburg, Pa.
 - 382,057. Drive-Chain. Edward Schenck, Columbus, Ohio, Assignor to the Lechner Manufacturing Company, same place.
 - 382,061. Steam-Boiler. George S. Strong, New York, N. Y.
 - 382,070. Process of Manufacturing Orange Mineral and Red Lead. Arthur C. Bradley, Brooklyn, N. Y.
 - 382,076. Device for Mixing Gas and Air. Edward B. Denny, Newark, N. J.
 - 382,094. Metallic Ceiling. William R. Kinnear, Columbus, Ohio
 - 382,098. Apparatus for Preparing Secondary Battery Plates. Albert F. Madden, Newark, N. J., Assignor to the Electrical Accumulator Company, of New York.
 - 382,107. Pipe-Coupling. John G. Pfister, Buffalo, N. Y.
 - 382,109. Furnace Bridge-Wall. Thomas Reese, Jr., Erie, Pa.
 - 382,119. Fan for Ventilating Purposes. John Stewart, Newark, N. J.
 - 382,135. Process of Manufacturing the Oxides of Readily Oxidizable Metals for Paints, etc. Arthur C. Bradley, Brooklyn, N. Y.
 - 382,140. Steam-Foiler Indicator. Lucius D. Copeland, Camden, N. J.
 - 382,142. Pipe-Riveting Machine. George Cumming, San Francisco, Cal., Assignor of one half to Francis Smith, same place.
 - 382,145. Piston Water-Meter. Frank W. Dick, Glasgow, County of Lanark, Scotland.
 - 382,147. Appliance for Cleaning Pipe-Coils. Frederick Farrar, Brooklyn, N. Y.
 - 382,151. Sheet-Metal Joint. R. Elmer Goodrich, New Haven, Conn., Assignor of one half to Clark B. Bryan, same place.
 - 382,161. Miner's Safety Lamp. Andrew Howat, Manchester, County of Lancaster, England.
 - 382,168. Valve Gear. Henry Lechtenberg, Quincy, Ill.
 - 382,172. Apparatus for Testing Pipes. George W. Lutz, Wheeling, W. Va., Assignor of one half to John S. Trimble, same place.
 - 382,183. Apparatus for Producing Metals by Means of Electrolysis. Johannes Omholt, Gössnitz, Saxe-Altenburg, Germany. Assignor to Chemische Fabrik Gössnitz, Bottiger E. Seidler, same place.
 - 382,187. Rod-Packing. Frank Pinch, Sidney, Assignor to the Excelsior Metallic Packing Company, Middletown, N. Y.
 - 382,196. Furnace for Reducing Aluminum. Frederick J. Seymour, Findlay, Ohio.
 - 382,197. Method of Obtaining Alumina from Clay. Frederick J. Seymour, Findlay, Ohio, Assignor to the American Aluminum Company, Detroit, Mich.

- 382,198. Purification and Alloying of Copper. Frederick J. Seymour, Findlay, Ohio, Assignor to the American Aluminum Company, Detroit, Mich.
- 382,209. Rotary Engine. Avery W. Billings and William G. Billings, Larned, Assignors of one third to Arthur T. Billings, Jetmore, Kan.
- 382,223. Shell for Explosives. James W. Graydon, Washington, D. C., Assignor, by mesne assignments, to the Graydon Dynamite Projectile Cartridge and High Explosive Company, same place.
- 382,224, 382,225. High Explosive Shell. James W. Graydon, Washington, D. C., Assignor to the Graydon Dynamite Projectile Cartridge and High Explosive Company, same place.
- 382,226. Shell. James W. Graydon, Washington, D. C., Assignor, by mesne assignments, to the Graydon Dynamite Projectile Cartridge and High Explosive Company, same place.
- 382,227. Contact-Fuse for Projectiles. James W. Graydon, Washington, D. C., Assignor, by mesne assignments, to the Graydon Dynamite Projectile Cartridge and High Explosive Company, same place.
- 382,228. Method of Preparing Explosives for Use. James W. Graydon, Washington, D. C., Assignor, by mesne assignments, to the Graydon Dynamite Projectile Cartridge and High Explosive Company, same place.
- 382,229. Explosive Charge. James W. Graydon, Washington, D. C., Assignor to the Graydon Dynamite Projectile Cartridge and High Explosive Company, same place.
- 382,231. Electric Igniting Apparatus. Léon Hen and Rudolphe Weinmann, Brussels, Belgium.
- 382,266. Apparatus for Testing Pipes. George W. Lutz, Wheeling, W. Va., said Dillon Assignor, by mesne assignments, to John S. Trimble, same place.
- 382,273. Method of Obtaining Alumina from Clay. Frederick J. Seymour, Findlay, Ohio.
- 382,277. Machine for Corrugating and Edging Sheet Metal. Emil R. Starch, Corning, N. Y., Assignor to Victor Haischer and Bertha Starch, both of same place.
- 382,279. Electro-Magnetic Motor. Nikola Tesla, New York, N. Y., Assignor of one half to Charles F. Peck, Englewood, N. J.
- 382,280 and 382,281. Electrical Transmission of Power. Nikola Tesla, New York, N. Y.
- 382,282. Method of Converting and Distributing Electric Currents. Nikola Tesla, New York, N. Y.

REISSUE.

- 10,926. Friction-Clutch. William R. Havens, Denver, Colo., Assignor to the Eclipse Wind Engine Company, Beloit, Wis.

PATENTS GRANTED MAY 8TH, 1888.

- 382,300. Packing for Balanced Valves. Hiram G. Hamett, Troy, N. Y.
- 382,301. Tank-Supply Regulating Valve. Peter Hansen, Chicago, Ill.
- 382,307. Portable Crane. John A. Huth, Bayard, Ohio.
- 382,309. Steam Engine. William K. Kight, Keeners, Mo., Assignor of one fifth to J. A. Bohnert, same place.
- 382,319. Apparatus for Making Sheet Metal. Edwin Norton and John G. Hodgson, Maywood, Assignors to said Edwin Norton and Oliver W. Norton, Chicago, Ill.
- 382,321. Manufacture of Sheet Metal. Edwin Norton and John G. Hodgson, Maywood, Assignors to said Edwin Norton and Oliver W. Norton, Chicago, Ill.
- 382,334. Adjustable Packing for Stuffing-Boxes. Peter Thacher, Miles H. Morris and William D. Morris, Chicago, Ill., Assignors, by direct and mesne assignments, to A. C. Calkins, trustee, same place.
- 382,335. Alternating-Current Dynamo-Electrical Machine. Elihu Thomson, Lynn, Mass., Assignor to the Thomson-Houston Electric Company, of Connecticut.
- 382,336. Alternating-Current Regulator. Elihu Thomson, Lynn, Mass.
- 382,357. Manufacture of Sheet-Iron. Isaac W. Craig, Camden, Ohio.
- 382,378. Plate for Storage-Batteries. Charles D. P. Gibson, New York, N. Y.
- 382,364. Pulverizer. Augustus Jamison, Elizabeth, N. J., Assignor of one half to William A. Lotzimer, New York, N. Y.
- 382,371. Apparatus for the Manufacture of Gas. Arthur G. Meeze, Redhill, County of Surrey, England.
- 382,372. Process of Manufacturing Gas from Oil and Steam. Arthur G. Meeze, Redhill, County of Surrey, England.
- 382,373. Process of Making Coal-Gas. Arthur G. Meeze, Redhill, County of Surrey, England.
- 382,374. Process of Manufacturing Gas. Arthur G. Meeze, Redhill, County of Surrey, England.
- 382,375. Apparatus for the Manufacture of Gas. Arthur G. Meeze, Redhill, County of Surrey, England.
- 382,376. Hydraulic Cement. John Murphy, Columbus, Ohio.
- 382,380. Hydraulic Apparatus for Raising Water, etc. Howard D. Pearsall, London, England.
- 382,389. Cylinder for Hydraulic Motors. William Ross, Troy, N. Y.
- 382,409. Compound Rail. Edward G. Chamberlain, San Jose, Costa Rica, Central America.
- 382,415. System of Electrical Distribution. Thomas A. Edison, Llewellyn Park, N. J.
- 382,423. Ore-Washer. Arthur Hendey, Denver, Colo., Assignor to Christian Wahl Milwaukee, Wis., and Louis Wahl, Chicago, Ill.
- 382,427. Ingot-Forming Apparatus. John Illingworth, Newark, N. J.
- 382,433. Sluicer and Settler. Thomas H. Minter, Winfield, Colo.
- 382,436. Hoisting Machine. Friedrich H. A. Peters, Detroit, Mich.
- 382,447. Process of Coating Iron and Steel with Rustless Oxide. William T. Wells, Hackensack, N. J.
- 382,452. Pipe-Welding Apparatus. Thomas J. Bray, Wheeling, W. Va., Assignor of one-half to the Riverside Iron Works, same place.
- 382,453. Mechanism for the Manufacture of Pipe. Thomas J. Bray, Wheeling, W. Va., Assignor of one-half to the Riverside Iron Works, same place.
- 382,454. Mechanism for the Manufacture of Angular Tubes. Thomas J. Bray, Wheeling, W. Va., Assignor of one-half to the Riverside Iron Works, same place.
- 382,468. Stop-Valve. Thomas Haley, Boston, Mass.
- 382,469. Stop-Valve. John Hawthorn, New Mills, County of Chester, and Sidney Moorhouse, Stalybridge, County of Lancaster, England.
- 382,479. Steam Engine. Hippolyte Lecouteux and Emile Guerinier, Paris, France.
- 382,483. Electric Motor for Railway Cars. William M. McDougall, East Orange, N. J.
- 382,489. Apportioning Furnace-Draft for Batteries of Steam Boilers. Nat. W. Pratt, Brooklyn, N. Y.
- 382,490. Method of Apportioning Furnace-Draft for Batteries of Steam Boilers. Nat. W. Pratt, Brooklyn, N. Y.
- 382,492. Reel for Wire-Rod Mills. Henry Roberts, Pittsburg, Pa.
- 382,500. Well-Drilling Machine. Christian Weber, Oak Glen, Ill.
- 382,505. Process of Obtaining Alumina. Karl J. Bayer, St. Petersburg, Russia.
- 382,508. Removing Impurities from Steam-Boilers. Joseph Binks, Chicago, Ill.
- 382,514. Pipe-Coupling. John Davis, Allegheny, Pa.
- 382,524. Valve. Almon M. Granger, Glenwood, Mass., Assignor to the Volker & Felthousen Manufacturing Company, Buffalo, N. Y.
- 382,528. Stone-Channeling Machine. Josephus F. Holloway, New York, N. Y.
- 382,547. Steam-Engine. Frederic C. Morton, Chelsea, Mass.
- 382,551. Making Sodium Carbonates by Sulphides of the Alkaline Earths. Edward W. Farnell and James Simpson, Liverpool, County of Lancaster, England.
- 382,554. Detachable-Link Chain. Reuben F. Redick and Joseph H. Redick, Spencer-ville, Ohio.
- 382,556. Spring-Motor. Alfred H. Saunders, Brooklyn, N. Y.
- 382,564. Valve for Steam-Engines. Frank L. Smith, Holton, Mich., Assignor of one half to William S. Clark, same place.
- 382,576. Ore-Concentrator. Jesse White, Silver Cliff, Colo.
- 382,577. Apparatus for Controlling the Speed of Steam-Engines. Richard Wilby, Mirfield, County of York, England.
- 382,578. Valve Mechanism for Engine. Stephen Wilcox, Brooklyn, N. Y.
- 382,589. Electric Motor. George F. Card, Covington, Ky., Assignor to the George F. Card Manufacturing Company, same place.
- 382,632. Wire-Nail Machine. William F. Bancroft and Harley A. Stone, Worcester, Mass.; said Stone Assignor of one half his right to said Bancroft.
- 382,633. Metal Mold. Charles S. Bell, Hillsborough, Ohio.
- 382,635. Elevated Tramway for Hoisting and Conveying Machines. Alexander E. Brown, Cleveland, Ohio.
- 382,638. Chain Conveyor for Handling Coal. James M. Dodge, Philadelphia, Pa.
- 382,643. Safety-Valve. William R. Fox, Grand Rapids, Mich.
- 382,650. Wire-Draving Die. John B. Jenkins, Pittsburg, Assignor of one half to D. S. Carroll, Allegheny City, Pa.
- 382,653. Clamping Device for Cross-Beams of Planers. George L. Marble, Fitchburg, Mass., Assignor to the Fitchburg Machine Works, same place.
- 382,655. Check-Valve. Harry C. Montgomery, Cleveland, Ohio.
- 382,657. Steam-Boiler. Joseph A. Mumford, Hantsport, Nova Scotia, Canada.

PERSONAL.

Mr. E. J. Severson, for some time connected with the Burton mines in the Gogebic District, has tendered his resignation.

Mr. John Birkinbine, engineer, is in Duluth, Minn., at the instance of the parties who propose building a steel plant there.

Prof. W. B. Potter, of St. Louis, is now in Idaho to examine and report upon the Baltimore mine, preparatory to sale.

Mr. William Ward, of Niles, O., has been appointed superintendent of the mills of the Hubbard Iron Company, at Hubbard, O.

Mr. Barry Searle, chemist, who was located at Hurley, Wis., for some time, intends establishing a laboratory at Knoxville, Tenn.

President Agassiz and General Manager Whiting, of the Calumet & Hecla Mining Company, left Boston for the mine on the 8th inst.

Professor Ames H. Worthen, who held the position of State Geologist of Illinois for the past thirty years, died at Warsaw, Ill., on the 6th inst.

Mr. William M. Bunker, editor and proprietor of the *Daily Report* of San Francisco, Cal., is visiting New York for the first time in twenty odd years.

Mr. E. H. Botsford, late Secretary of the Coke Exchange, Connellsville, Pa., has been appointed Traveling Agent for the Connellsville Coke and Iron Company.

The phosphate commission, composed of the Commissioner of Agriculture, Col. A. P. Butler, Mr. E. L. Roche, phosphate inspector, and Messrs. B. F. Crayton, John Lawton and J. S. Porcher, are now on their annual tour of inspection of the marine mining of phosphate in South Carolina.

Dr. J. Magin, mining engineer, who some time ago organized here the El Chontaduro Mining Company, a private corporation, to work gold placers near Cali, on the Cauca, Colombia, has returned from the mines which have now commenced washing, and will, it is expected, prove very successful. Dr. Magin also visited many of the Tolima mines. He expects to remain in the city for some time.

The date of the annual convention of the American Society of Civil Engineers, at Milwaukee, Wis., will be the last week in June. Arrangements as to transportation are in progress with the Passenger Associations and Committees, whereby it is expected that a rate of one and one-third full fare will be made for the round trip from all points on the lines of the roads represented by such association.

The Ontario government has appointed the following gentlemen to constitute a commission to inquire into the nature and extent of the mineral resources of Ontario and the best means of promoting their development: John Charlton, M. P., Chairman; Robert Bell, LL.D., M.D., C.M., F.G.S., Assistant Director of the Dominion Geological Survey; Wm. Hamilton Merritt, F.G.S., Assoc. Royal School of Mines, etc., Mining Engineer, Toronto; William Coe, proprietor of iron mines, Madoc; Archibald Blue, Deputy Minister of Agriculture, Secretary of the Commission.

The Rev. Dr. Frederick Augustus Porter Barnard has resigned the presidency of the Faculty of Columbia College. Although President Barnard had been hindered for some time in the discharge of his duties by ill health, his final resignation was not expected so soon. President Barnard has occupied the position which he has now resigned for nearly a quarter of a century, having received his appointment in 1864. Under his administration the college has prospered wonderfully, and the general feeling was expressed by members of the Board of Trustees yesterday that the choice of a fitting successor would be no easy task. President Barnard was born in Sheffield, Mass., in 1809, is a graduate of Yale, and had filled, previous to his coming to Columbia, several important positions as an educator. In 1837 he was Professor of Mathematics and Natural Philosophy at the University of Alabama, and in 1848 became Professor of Chemistry there. In 1854 he took orders in the Protestant Episcopal Church, the same year becoming Professor of Mathematics and Astronomy in the University of Mississippi. It 1856 he was elected President of that University.

FURNACE, MILL, AND FACTORY.

The Edgar Thomson Steel-Works, Braddock, Pa., were started on double turn on the 7th inst.

The new rolling-mill of F. H. De Vonde Leben, at Bessemer, Ala., will be making iron in about sixty days.

It is reported that New York and Connecticut capitalists are to erect a copper smelting and refining plant at Milford, Conn.

Mr. Thornley has been appointed receiver of the Iowa Iron-Works, of Dubuque, Iowa, and will continue the operation of the plant.

Jones & Laughlins, Limited, of the American Iron-Works, Pittsburg, Pa., are making large shipments of angle iron to Salt Lake City, Utah.

The Rebecca blast-furnace and Isabella No. 1, at Kittanning, Pa., are now being relined. Both furnaces will be ready to be started up in about a month.

The Vulcan Furnace Company, which operated the charcoal furnace at Newberry, Luce County, Mich., has been succeeded by the Newberry Furnace Company.

The resignation of P. H. Miller as assignee of Graff, Bennett & Co., at Pittsburg, Pa., has been accepted by the Court of Common Pleas, No. 2, and Hon. John H. Bailey has been appointed in his place.

The property known as the Colwell Iron-Works, New York, was sold on the 9th inst., under a decree of the Supreme Court in the suit of Sarah J. Willett against Augustus N. Colwell and others. Noah Davis was the referee.

It is rumored that the Baldwin Locomotive Works will likely be removed from Philadelphia to Harrisburg, Pa. The company has been considering this vicinity as a site for the great works, and is said to regard it favorably.

The Pittsburg Steel Casting Company, Pittsburg, Pa., advise us that they are shipping one car-load of Hall's patent roller shells to Australia, and making another car-load for Utah, making in all five car-loads of these shells they have furnished.

The North Chicago Rolling-Mill Company, Chicago, Ill., expect to start its North Chicago mill on steel beams on the 14th. It will be able to furnish from 6 to 12 inch beams at first, but will shortly make up to 15 inches. It will not make channels or angles at present.

The Westinghouse Electric Company, Pittsburg, Pa., is reported to have just purchased from a member of the British Parliament the right for the United States in a patent for an improvement in electric lighting, by the use of which the incandescent light can be made as powerful and brilliant as the arc light.

Only four pig-iron furnaces in the Mahoning Valley, Ohio, are out of blast, one stack of Andrews Bros. & Company, at Haselton, one stack of Andrews & Hitchcock at Hubbard, the Thomas furnace in Niles and the Himrod furnace at Youngstown. It is stated that considerable pig-iron and merchant bar is being shipped from the valley to Chicago.

The Coatesville Iron Company, at Coatesville, Pa., was unable to meet the interest on its \$70,000 of bonds, a majority of which is held by Andrew Williams, of Plattsburg, N. Y., and on May 1 the sheriff levied on the company's mills there and at Laurel on a writ issued by G. H. Warner, of French Creek, for several thousand dollars' worth of blooms.

The Beckett & McDowell Manufacturing Company has just let contract for the building of a new brick erection shop at Arlington, N. J., which is to be fitted up with the latest and most improved machinery for the handling of heavy work, including a Yale & Towne overhead traveling crane. Their new foundry just completed is now in full operation.

The employes of Carnegie, Phipps & Co., Pittsburg, Pa., received a circular letter on the 5th inst., offering to receive the savings of the men and to pay six per cent on all deposits. Single accounts are to be limited to \$2000. The firm also offers to lend money to the men on mortgages. It is stated that within the last four years, Mr. Carnegie has lent \$200,000 to his workmen in Braddock alone.

The eight of the large welding furnaces composing the lap-weld department of the National Tube-Works Company, at McKeesport, Pa., is now in operation. One more furnace makes up the mill, but it is being modeled for electric welding, and is virtually out of use. The average output of these furnaces for 24 hours can be placed at 85 tons each, to 40 tons of a year ago.

The Chester Foundry and Machine Company, of Chester, Pa., has secured the exclusive right to manufacture the well-known three-cylinder Brotherhood engines for the United States, and has fitted up one of its departments with special tools for this work. The department, it is stated, is under the supervision of a man from Brotherhood shops in England, and the engines will be fully up to the standard of those of English make.

It is announced that the charcoal blast-furnace at Iron River, Mich., operated by the Gogebic Furnace Company, will go out of blast on June 1 for an indefinite period. The furnace has been quite a regular consumer of Menominee ore for nearly a year. The chances are that the furnace will be sold. Some time since, when the old company became financially embarrassed, the furnace was bonded for quite a large amount. The holders of the bonds, whose interests appear to conflict with those of the stockholders, are credited with a determination to foreclose.

The Duluth Iron and Steel Company has begun the construction of a blast-furnace at Duluth, Minn. The plans for this plant have been prepared by Mr. John Birkenbine, the engineer of the company, and embrace a twin blast-furnace plant. The furnaces are to be 16 x 75 feet, each equipped with three regenerative hot-blast stoves. There will be 20 boilers and three blowing engines. The blowing engines, condensers, pumps, electric light plant and hoisting engines will all be placed in one building. Raw coal will be brought to the works by water during the navigation season, and coke will be made on the ground. As the ores will be brought either by rail or water, the charge will be made at the stock-house level and elevated by inclined planes to the tunnel heads of the furnaces. The build-

ings for the twin plant will be erected at once, but the contracts for the ironwork and machinery of but one furnace will be let at present.

The new firm of Benjamin Atha & Co. was incorporated in Newark, N. J., on the 9th inst., with a capital of \$750,000, in 700 shares, of which Mr. Atha holds 7100. The other incorporators are John H. and Robert F. Ballantine, brewers; William Clark and George H. Hughes. In connection with the new steel company, the Atha Tool Company was incorporated with a capital of \$100,000, Mr. Atha retaining 960 shares. The new company will operate the works on the Passaic as well as the newly acquired plant in Jersey City, and Mr. John Illingworth, who was bought out by his partner, Mr. Atha, will start at once to build a new steel works, with a capital equal to that of the Atha company. Both of the concerns will have process advantages, which are said to be so great as to enable them to compete with any manufacturers in the world. We referred to the old company in our last issue.

CONTRACTING NOTES.

Machinery and supplies wanted. See page xiv.

Contracts open will be found on page xix. New contracts this week: No. 880, Sewer Construction; No. 881, System of Sewers; No. 882, Sewer Construction; No. 883, Water-Works; No. 884, Iron Bridge; No. 885, Water Works; No. 886, Stone and Pipe; No. 887, Stone Retention; No. 888, Cable Railway; No. 889, Sewers; No. 890, Coal; No. 891, Mint Supplies; No. 892, Work on Croton Aqueduct.

The following bids were received for the purchase of the coal tar produced at the several gas-works at Philadelphia, Pa., for a three years' contract. No bids were received from any chemical works outside of the city of Philadelphia: Mr. Ehret, Jr., & Co. bid for all the tar for one year 20 cents per ton of coal carbonized, and for three years 21½ cents a ton. Joseph W. Stellwagen's Son bid 23¼ cents a ton for three years.

The bids received by the Aqueduct Commission, New York, for the construction of the pipe line connection between the gatehouse of the new aqueduct at 135th street and the reservoir in Central Park, were as follows: W. S. Coleman & Co., \$1,155,295; Miles Tierney, \$1,069,545; William E. Dean, \$1,053,172.25; Matthew Baird, \$1,040,475, and O'Brien & Clark, \$1,030,215. The bidders all belong in New York. The contracts will be awarded May 16th.

The Department of Public Works of New York received the following bids for lighting the city until April 30th, 1889: For electric lighting, the Brush, United States and East River Companies bids were 35 cents per lamp per night; Mount Morris, 17½ to 40 cents on streets, 50 cents in Mount Morris Park, and 60 cents on Harlem Bridge; North New York Electric Lighting Company, 35 cents; West Side Electric Lighting Company, 29 cents; Ball Electric Illuminating Company, 27½ cents. The bid of the North New York Electric Construction Company was withdrawn. The North New York Electric Lighting Company offered lights of 750 candle-power at 32 cents per lamp per night, 16 candle-power incandescent lights for \$25.50 per year, and 30 candle-power for \$36 per year. The required strength of the electric arc lights is 1000 candle-power. This is the second time that electric light bids have been submitted. Those received a month ago were declared to be too high for the appropriation. The present bids are generally lower.

The following contracts to gas companies were awarded: The Equitable Company, \$12 per annum a lamp, and the Mutual and Consolidated \$17.50 each. The Central Company the twenty-third ward for \$28 per lamp a year, and the Northern Company the twenty-fourth ward for \$29.

The bid of the New York & New Jersey Globe Company for lighting Woodlawn Heights by naphtha for \$25 per lamp a year was laid over pending the disposition of a bill now in the Legislature forbidding the use of naphtha lamps.

The awards will be made next week.

GENERAL MINING NEWS.

ALASKA.

THE YUKON REGION.

A special correspondent writes us from Douglas, Alaska, April 20th, as follows:

The interior of Alaska along the Yukon River is attracting a good deal of attention. A small number of miners have gone there for several years, and with a few exceptions all have come out with gold, some having several thousands in dust, while others had only a few hundred. Last season coarse gold was found on the forty-mile creek which enters the Yukon about 120 miles below Fort Reliance from the west. Some miners made as high as \$100 per day. A good many men remained in the interior during the winter. This spring about 150 have left for that region. Gold is said to exist in nearly every stream, but as the season is short and the trip out a long and tedious one, placers paying \$8 to \$10 per day do not pay and are considered poor. It is thought that the Canadian government will build a road over Chilcoot Pass, as part of the mineral is found on Canadian soil. To judge from the reports and the fact that most of those who have been there will go there again, and always return with gold dust, that country may furnish a good deal of gold yet. About \$50,000 in dust was brought out last fall. Several reports have come here for some years past of fabulously rich black sand in the vicinity of Yakutat

Bay. A party of miners went out there in open boats from Juneau a few years ago, found black sand, some gold, but not rich. Last fall remarkably rich sand was brought from there, assaying several hundred dollars per ton. This discovery has created quite an excitement. Several small crafts left Sitka for that place, and a small schooner having thirteen miners aboard left here some six weeks ago. More are ready to go, and expect to get there in the steamer Leo, which is expected to make a trip to the northwest soon. News from there is anxiously looked for.

CALIFORNIA.

NEVADA COUNTY.

BRUNSWICK GOLD MINING COMPANY.—Mr. George Fletcher, Managing Director, writes, under date of May 1st: Every thing progressing favorably. The west drift towards the Idaho ground is improving in appearance, showing a white formation between the walls, which is an indication of the near approach of ore. The east drift is being gradually drained by ditch in bottom of level we are now cutting. This shows a fine lode all the way along. Will have it all drained next week.

CENTRAL AMERICA.

HONDURAS.

HONDURAS MINING COMPANY.—The company paid the New York State Treasurer \$1000 on the 10th inst. for the privilege of increasing its capital from \$1,200,000 to \$2,000,000.

COLORADO.

CLEAR CREEK COUNTY.

BERTHA MINING COMPANY.—The tunnel belonging to this company, which has been under way for a long time, is fast approaching the objective point, the Northwest lode, which, it is claimed, is in from where they started 1050 feet. They are now in 900 feet.

PITKIN COUNTY.

ASPEN.—Dr. Henry Paul, of Idaho Springs, has been appointed manager of the Aspen mine, the litigation over which has been settled, as already mentioned in our last issue. It will take about a month to get the mine in complete working order. Two hundred men will probably then be employed, and the output will run up to 200 tons or more per day. The ore reserves now exposed will keep the management busy shipping while the work of development is being pushed forward.

The ore shipments from Aspen for the week ended the 4th inst., amounted to 1833 tons. Of this 1225 tons went to Denver, 266 tons to Leadville and 342 tons to Pueblo.

PUEBLO COUNTY.

DENVER SMELTING AND REFINING COMPANY.—The company will purchase immediately, for the construction of works at Pueblo, the following materials: A good quality of sandstone in sizes suitable for first-class rubble masonry, and in quantity amounting to 1400 cubic yards. Also about 2,000,000 common brick, well burned and hard, and of the best quality.

SAN JUAN COUNTY.

ASPEN.—This mine, two miles from Silverton, began shipping ore on the 4th inst. It is one of the oldest mines in Southern Colorado, but it has not shipped any ore for over a year, owing to a long tunnel being run to cut the vein at a greater depth. Although the tunnel is not yet completed, a large quantity of ore has been taken out this winter from the old workings.

SAN MIGUEL COUNTY.

SAN MIGUEL GOLD PLACERS COMPANY.—Mr. E. S. Nettleton, president of this company, has just visited the company's property in Southwestern Colorado. He reports the property equal to his expectations. He states that pipes and giants are now being put in to work one of the bars. The project is one requiring capital for proper development, but with the necessary improvements good profits should result. The bars are numerous and Mr. Nettleton states that they will average over 50 cents per cubic yard, and that the water supply and fall is sufficient to assure economical and effective work.

DAKOTA.

CUSTER COUNTY.

Work has begun on the properties bonded by Dr. S. H. Emmens, to which we referred in our issue of April 28th. Local papers state that it appears to be the intention of the company to develop the property as rapidly as possible so as to ascertain fully the value of the mine before the return of Dr. Emmens, which will be in June.

LAWRENCE COUNTY.

AMERICAN TIN MINING COMPANY.—Work at the Tin Mountain mill still lags, waiting for instructions from Chicago. The method of concentration thus far pursued has proved so far from being a success that it is now expected that a few tons of ore from the Tin Mountain dump will be sent to the school of mines at Rapid City to be tested by the Hartz jigs, with which the recent successful test of First Find ore was made.

BUXTON MINING COMPANY.—Operations have been resumed at this property, which has been lying idle during the winter. Ore is being taken out and will now continue through the season.

DEADWOOD SMELTING COMPANY.—Mr. R. D. Clark, who is to erect the reduction works at Deadwood, is now at that place making the necessary arrangements. It will take from ninety to one hundred days to get the reduction works in running order. Mr. Clark has been appointed superintendent, and given full charge. The plant will cost \$100,000, and sufficient power will be put in to enlarge the capacity from sixty to eighty tons per day. Next year, if the narrow gauge railroad is completed to the mines, the plant will be enlarged again.

PENNINGTON COUNTY.

ARNEY PEAK TIN MINING COMPANY.—The bond

on the California group, owned by Everly and Wheelock, held by this company, expired on the 3d inst. and was renewed, and will now run until the latter part of July. The Rapid City Journal says that a rumor that a visit would soon be made by some of the most interested parties to the land involved in the big tin deal could not be verified.

ILLINOIS.

DE WITT COUNTY.

Natural gas was struck at Hallsville at a depth of 120 feet while boring for water.

PERRY COUNTY.

The works of the St. John Coal Mine and Salt Works at Du Quoin were destroyed by fire on the 5th inst.

MICHIGAN.

ROPES GOLD AND SILVER MINING COMPANY.—The production for April will be about \$4200. The new mill has not yet been started, delay having been occasioned by the lack of necessary parts of machinery.

COPPER MINES.

CALUMET & HECLA MINING COMPANY.—Through the courtesy of the editor of the *Calumet and Red Jacket News* we are favored with advance proofs of the following paragraph which appears in the *News* today, 11th: "However strange it may seem in opening up Calumet No. 5 shaft, it was found that ice to the depth of nearly thirty feet had accumulated at its mouth the full size of the shaft. By Tuesday morning this was all cleared away, when Capt. William Daniell, accompanied by six others, was lowered in the skip to the twentieth level, the second level holed in this shaft, the tenth being the first. Both the tenth and twentieth levels have doors, which were closed, but the openings around them were large enough to cause a current in the shaft, but as the air below the twentieth level was bad, it is supposed that the water had risen above the next level, viz., the twenty-fifth, which had, of course, stopped all draught between the surface and that level. The adventurous party proceeded along the twentieth level towards No. 4 shaft for about 200 feet, but could not proceed further as the gas was too strong. It should be remembered that gas was still being sent down in large volumes.

TAMARACK MINING COMPANY.—The new head of stamps has been set up in the Tamarack stamp-mill, and will be completed next week.

TAMARACK, JUNIOR, MINING COMPANY.—No. 1 shaft has got to work sinking in the rock, drilling having begun last week. The shaft now is twenty-five feet down from the surface. Snow and water have interfered somewhat with workings in the No. 2 shaft.

IRON MINES.

ANVIL MINING COMPANY.—The company has contracted to deliver 20,000 tons of ore this season, and a contract has been made with the Johns Bros. to take out the ore on the first, second, and third levels in No. 1 shaft at a stated price per ton. In getting out the ore the contractors will pursue the filling-in or caving system. This is practically the first attempt to carry out this system on the Gogebic Range.

BESSEMER CONSOLIDATED MINING COMPANY.—Only about thirty miners are now employed on this company's properties.

COLBY.—The powder house at this mine at Bessemer blew up on the morning of the 8th inst., killing two men and probably fatally wounding five. The engine-room burned to the ground.

MITCHELL.—At this mine 100 men have been laid off, and one shaft only is being worked, owing to the failure to make sales of ore at Cleveland.

PABST MINING COMPANY.—Captain W. W. Stevens is authority for the statement that this company has contracted to deliver 40,000 tons of ore this season at a remunerative price, and 40,000 tons additional if the owners see fit. The force at the mine will shortly be increased.

SAGINAW.—This mine, which has been idle for four years, has been leased by a syndicate of Detroit capitalists, and will be at once actively worked.

MONTANA.

LEWIS & CLARKE COUNTY.

MONTANA COMPANY, LIMITED.—The report for 1887 shows that eleven dividends were paid since December 1st, 1882, aggregating £380,307, to which should be added £33,000 declared, but not payable until April 14th. During 1887, 75,005 tons of ore were crushed, and the gross yield was \$2,040,674, as compared with \$1,712,914 for the year previous. The dividends for 1887 amounted to £181,500, as compared with £140,250 for 1886. Appended to the report of the directors is the statement of General Manages Bayliss, which shows that of the total production for the year \$517,357 resulted from the treating of low-grade ores in the new 60-stamp mill, the total cost of which structure was but \$143,346.

SILVER BOW COUNTY.

Contracts were let in Butte on the 5th inst. for the erection of a large smelter and concentrator by the Hon. W. A. Clark. The capacity of the new plant will be 300 tons a day. This will be the largest works in Montana outside of the Anaconda.

NEVADA

ELKO COUNTY.

EUREKA COUNTY.

EUREKA CONSOLIDATED MINING COMPANY.—Reduction works have been started up. Two furnaces are running on ore. One calcining pan is operating in the refinery, and the entire plant will shortly be running full blast.

HUMBOLDT COUNTY.

ADELAIDE COPPER COMPANY.—We are officially advised that this company, to which we referred in our issue of April 14th, expected to blow in its furnace by the 10th inst. Operations were begun but a short time ago—two and a half months—and since then the company has erected an entire plant. There is now already ore enough delivered at the furnace to more

than pay for the cost of the whole outfit. It is stated that the output of the mine far exceeds the company's expectations, giving assurance of dividends in the near future.

STOREY COUNTY—COMSTOCK LODGE.

CONFIDENCE MINING COMPANY.—The bullion shipments for April amounted to \$181,088.74.

CONSOLIDATED IMPERIAL MINING COMPANY.—At the annual meeting of this company, held in San Francisco on the 3d inst., the only important point raised was regarding the distribution of the 435,369 shares of capital stock in the treasury. The number of directors was reduced from seven to five, after the filing of the necessary papers. A resolution was then adopted ordering a distribution of 6¼ shares of the 435,369 shares of capital stock now in the treasury to the holder of each and every share of outstanding stock. The board of directors were authorized to sell the remaining 1140¼ shares at their discretion. The following directors, constituting the old management of the mine, were elected for the ensuing year—A. K. P. Harmon, president; James Newlands, vice-president; J. H. Dobinson, J. P. Martin and Maurice Schmitt, C. L. McCoy was appointed secretary and W. E. Sharon superintendent. The secretary's financial statement shows a present cash balance on hand of \$8038.08.

CROWN POINT MINING COMPANY.—The development on the 600 level is said to show a fine body of fair grade ore.

SUTRO TUNNEL COMPANY.—The report of the company for the year ending March 1st, 1888, shows receipts from royalties as \$237,258. Of this amount \$193,855 was from the Con. California & Virginia Company. Total receipts, \$268,147; running expenses, \$88,573; extra expenses, \$30,483; total expenses, \$119,056; leaving net income, \$147,091. Paid by receiver on account of McCalmont mortgage, \$118,947; cash on hand, \$30,144. The statement of the proposed settlement of the McCalmont mortgage shows amount due January 1st, 1888, \$979,569; interest to April 1st, \$6705; total due April 1st, \$985,264. Payments on account, \$51,865; balance due April 1st, 1888, under settlement, \$933,399. Total amount paid over by receiver from March 13th, 1886, to March 16th, 1888, \$310,000.

PENNSYLVANIA.

COAL.

CENTRALIA.—This colliery at Centralia, to which we referred in our issue of April 21st, and which has been idle the past three weeks, has resumed operations. Arrangements are now being made to pump the water out of the old slope known as the Freck mines. The slope was abandoned ten or twelve years ago, and allowed to fill with water.

LEHIGH & WILKES-BARRE COAL COMPANY.—The Stanton mine, owned by this company, has been flooded by the breaking down of the machinery. The damage to the mine will doubtless be serious.

PENNSYLVANIA RAILROAD COMPANY.—The Lykens Colliery, eight miles west of Tower City, is on fire and it is feared that the slope will have to be filled with water before it can be extinguished.

NATURAL GAS.

BRIDGEWATER GAS COMPANY.—This company has just leased all of the gas wells belonging to the Economite Society, for a term of one year, beginning on the 1st inst. The lease includes some four or five good wells, which will be connected with the Bridgewater mains as soon as the necessary pipe line can be laid.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to May 5th.

	1887.	1887.
	Gallons.	Gallons.
From Boston.....	878,764	1,718,010
Philadelphia.....	37,322,180	44,822,755
Baltimore.....	965,514	2,292,587
Perth Amboy.....	6896,487	5,156,220
New York.....	116,203,233	119,955,900

Total exports .. 162,266,178 173,945,472

VENANGO UNION OIL COMPANY.—A special meeting of the stockholders was held at Pittsburgh this week for the purpose of dissolution and final distribution of any money in the hands of the treasurer to and among such parties as were entitled to receive the same.

SOUTH CAROLINA.

The following shipments of land phosphate rock from Charleston during April are reported by Mr. Paul C. Trenholm:

	1887.		1888.	
	Crude.	Ground.	Crude.	Ground.
	Tons.	Tons.	Tons.	Tons.
To domestic ports.....	9,775	810	22,998	200
To foreign ports.....	100	.....	130	.....
Total.....	9,875	810	23,128	200

LANCASTER COUNTY.

HAILE GOLD MINING COMPANY.—We are officially advised that the successful working of the Haile mine concentrates is now an established fact. The first ton was chlorinated on the 25th ult. The chlorination works for 8 tons daily are nearly completed. They were built by Mr. Adolf Thies, who is now the general manager of the company.

UTAH.

The bullion receipts at Salt Lake City for the four months of 1888, according to the *Tribune*, amounted to \$1,120,112.80. This exclusive of ore receipts and not including producers which make no reports save annually.

SALT LAKE COUNTY.

ECLIPSE MINING COMPANY.—The hoisting works, supplies, lodging and boarding-house, shops, etc., of this mine, at Little Cottonwood, near Alta, were burned on the 2d inst. New York parties are interested in this property.

SUMMIT COUNTY.

DAILY MINING COMPANY.—The production for April

was \$42,448.09 from ore sales; of bullion, \$66,592.15; approximate total, \$109,040.24.

ONTARIO SILVER MINING COMPANY.—The Russell leaching process is being experimented with thoroughly at the Ontario mills, at Park City, so far with satisfactory results.

WEST VIRGINIA.

WHEELING NATURAL GAS COMPANY.—At a meeting of this company the following board of directors was elected: Wm. Flinn, J. M. Guffey, R. C. Elliott, C. B. McLean, Henry Fisher, John H. Hobbs, Chas. W. Brockmeyer, T. H. Given, C. L. Magee, J. N. Neeb, L. H. Williams. The report presented showed that the company is in an excellent condition.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 11.

Production Anthracite Coal for week ended May 5th, and year from January 1st:

Tons of 2240 lbs.	1888.		1887.
	Week.	Year.	Year.
P & Read RR. Co.	150,304	1,622,811	2,565,153
Cent. R. R. of N. J.	104,123	1,606,322	1,590,984
L. V. RR. Co.	130,313	1,771,261	2,429,030
D. & W. RR. Co.	84,638	2,253,835	1,770,112
D. & H. Canal Co.	61,106	1,516,340	1,328,255
Penna. RR.	64,592	1,415,108	1,040,210
Penna. Coal Co.	32,283	492,960	464,929
Total	6,7359	10,678,637	11,188,673

Increase	1,667	510,036
Decrease		

* Report not received.
The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:
1883 9,647,799 | 1885 8,419,413
1884 9,182,295 | 1886 10,252,779

Production Bituminous Coal for week ended May 5th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

	1888.		1887.
	Week.	Year.	Year.
Phila. & Erie RR.	23,079	199	199
*Cumberland, Md.	65,873	1,157,901	910,632
Barclay, Pa.	4,228	63,753	80,601
Broad Top, Pa.			
H. & Broad Top RR.	3,933	139,326	141,430
Clearfield Region, Pa.			
Snow Shoe	1,494	64,505	64,505
Karhans (Keating)	1,297	61,144	68,452
Yrone & Clearfield	63,387	1,248,151	1,102,838
Tipton	1,650	19,784	
Alleghany Region, Pa.			
Gallitzin & Mountain	14,858	330,001	299,478
Pochontas Flat Top Coal.			
Norfolk & West RR.	37,776	553,569	404,716
Kanawha Region, W. Va.			
Ches. & Ohio RR.	46,941	657,464	540,998
Total	241,437	4,307,213	3,613,959

* Tons of 2240 lbs.

WESTERN SHIPMENTS.			
	Week.	Year.	1887.
Pittsburg Region, Pa.			
West Penn RR.	8,100	139,344	115,526
Southwest Penn. RR.	1,635	36,674	57,450
Pennsylvania RR.	5,597	100,003	82,892
Westmoreland Region, Pa.			
Pennsylvania RR.	38,705	610,989	545,710
Monongahela Region, Pa.			
Pennsylvania RR.	9,221	113,040	121,741
Total	63,258	1,000,050	923,219

Grand total 304,695 5,307,263 4,537,178
Production of coke on line of Pennsylvania RR. for week ending May 5th, and year from January 1st, in tons of 2000 pounds: Week, 79,556 tons; year, 1,334,703 tons; to corresponding date in 1887, 1,497,117 tons.

Anthracite.

The coal market is in a better condition than it has been for some weeks past. This, no doubt, is due partly to the fact that the weather has been unusually cold, and domestic requirements have called for more coal than was expected at this season. But it is also certain that the course of the companies in maintaining their prices, even though they did little or no business, has had its effect, and confidence has been restored where demoralization was threatened. When the market is dull and the demand very light, the individual operators, who always cut prices, can supply the urgent requirements and give a good tone to the market. As the demand increases beyond what these producers can supply, some coal has to be bought from the stronger holders, and so gradually the tone improves. At the present moment the demand exceeds the capacity of the cutting producers, and the companies are able to find a market for some coal at full rates. The individual operators have not, however, increased their rates during the week, but they find the market stronger and more active, and probably will do so in a short time, and bring their prices nearer to the companies' circulars.

The extreme dullness in every department of the iron trade certainly has a depressing effect upon collateral industries, and the coal trade feels the effect of this, even beyond the range of the furnace coal market. This has more effect in the bituminous than in the anthracite market, but dullness in one is reflected in the other, and though the anthracite companies are manfully holding the prices where they started them, and are piling up a good deal of coal, it would be folly in them to think of making any advance in their prices while the present condition of affairs exists. It is not necessary to advance prices in order to convince purchasers that the companies intend to stick to their quotations, and the fact that they started out too high should induce them to keep up the present quotations longer than, perhaps, would otherwise have been found necessary. The general condition of trade

is not such as to warrant a high coal market during, at least, the first half of this year.

We continue our quotations of last week as follows: Broken, \$3.75; Egg, \$4; Stove and Chestnut, \$4.25; Pea, \$3 to \$3.30 for free burning coals, f.o.b. Actual prices obtained by individual operators or their agents may be quoted as follows: Broken and Egg, \$3.50 and upward; Stove and Chestnut, \$3.75 and upward; Pea, \$2.70 to \$2.90 and upward, f.o.b. for free burning coals.

The Western market for anthracite is showing great activity. Lake ports are mostly open now, and there is an active demand from all points. This, no doubt, will greatly relieve the Eastern market, and it has already had its effect in lessening the pressure upon this market by the surplus of coal, which was forced here during the past few months.

The Philadelphia & Reading Coal and Iron Company has completed arrangements for an additional shipping depot at Port Liberty, Communipaw, N. J.

Bituminous.

The bituminous coal trade is in a far less satisfactory condition than the anthracite. It is true that it is nominally managed in accordance with an associated expression as to the needs of the trade, and it was supposed that the prices named would be maintained; but it is certain that they have been cut very seriously, and coal is offered at a marked decline from the circular rates.

The few contracts which have been placed have all been at lower prices than the nominal \$2.60 f.o.b., and in some cases very comfortably away below this price. This fact is just as true of the highest grade of Cumberland coal as of those of other districts, though the Cumberland producers, perhaps, say a little more loudly than the others that they live up to their circulars. As a consequence of this state of affairs very few large contracts have been closed. A good many consumers who usually make contracts at this season are holding back and buying cargo lots to carry them along, expecting that they will be able to buy at lower rates by and by. Unless a change comes over the policy of the Bituminous Seaboard Association consumers probably will get their coal cheaper than they do now.

We commend to the Cumberland, the Clearfield, and the Virginia producers the course followed by the anthracite companies in holding firmly to their circulars, even though they sell but little coal. It is only in this way that confidence can be maintained or restored, and the effect of a break in prices would certainly be disastrous to many of the soft coal producers.

We continue to quote nominally \$2.50 f.o.b. at the shipping ports.

Boston.

May 10.

[From our Special Correspondent.]

The market for anthracite coal in Boston is looking rather better than when I last wrote; that is to say, the wholesale market is. The retail movement, though better than usual at this time, is naturally quite small. Owing to our cold and very backward spring, as much coal has been burned in April as is usually consumed in March, and the result is that stocks in retail yards have been drawn down more closely than usual. The consequence is that there is now a pretty good inquiry, and if the wholesale market holds steady a good trade ought to come from Eastern dealers. The companies hold firmly to former f.o.b. prices at New York, but individual operators are still offering considerable amounts of coal at from ten to fifteen cents below the market, more particularly stove coal. Very much would seem to depend upon the degree of wisdom and good faith shown by the companies in curtailing production. That the market will not suffer from this cause is confidently asserted, but it is yet too early to show whether it will or not.

The feeling in bituminous coal circles is not very buoyant. Nobody has the temerity to talk of higher prices for bituminous f.o.b., and the general query is whether the present nominal range of \$2.50 to \$2.60 can be maintained. No large contracts are reported. There seems to be some disposition to buy cargo lots for the present rather than make contracts.

The rates of freight retard the buying movement somewhat, as they are unexpectedly high for this time of year, compared with the last few seasons. There is considerable discussion as to whether the shipping and trade situation is such that coastwise freights are to take a higher level than last year. Many craft usually in the coal carrying trade at this time are engaged in other lines of freighting.

We quote, exclusive of discharging: New York, 75 @ 80c.; Philadelphia, 95c. @ \$1.10; Baltimore, \$1.10 @ \$1.15; Newport News and Norfolk, 95c. @ \$1.10; Richmond, \$1.15 @ \$1.25.

Retail trade is dull, but quite good for the season. We quote reduced prices as follows, 2000 pounds to the ton, delivered: Stove, \$6; Egg, \$5.75; Broken, \$5.50; Nut, \$6; Franklin, \$7.25; Lehigh, Egg, \$6.25; Broken, \$6; Bituminous (on the wharf), \$4.25.

Buffalo.

May 10.

[From our Special Correspondent.]

There are no incidents to record in the coal trade other than what are mentioned in connection with lake freights and kindred topics.

The Straits of Mackinaw were visited with a heavy gale, and as a result the fleet of vessels bound east and west commenced moving at 7 o'clock in the morning of May 4th, and no obstruction has been reported since. The situation of affairs in St. Mary's River precludes navigation, according to last accounts, but vessels may be enabled to pass at any time. Of course, until this occurs, Lake Superior is practically sealed, and the Duluth vessels must bide their time coming down and going up. Later news says that vessels have arrived up at the Sault Canal, but the exit to

Lake Superior is blocked with ice, precluding the passage of east-bound craft. Last Spring the first passage through the Straits was on April 24th, and the Sault Ste. Marie River opened May 3.

Vessels have arrived here from Lake Michigan ports quite freely, and business along the docks was and is pretty lively in consequence. Lake freights for coal remain firm at unchanged quotations, except a decline of 10c. to Toledo. Many of the craft wanted Duluth or Lake Superior cargoes, but as they were not plenty they had to be placed for other points. Some carriers tried to secure a small advance to Chicago and Milwaukee, but shippers stood their ground, and successfully secured all the tonnage wanted. This morning shippers can not get the tonnage wanted for Chicago, for the reason that vessel owners expect great difficulty in procuring grain cargoes for return freights, as the stocks and movement are extraordinarily light, and "the whole or nearly the whole of the corn in sight" is reported to be in the hands of a syndicate who will peddle it out according to their views of profit.

The expected trouble with the stevedores and others at Chicago did not come to a focus; wise counsels prevailed, the men accepting 12c. for unloading hard and 14c. for soft coal per ton, the price originally offered by the receivers.

The shipments of coal by lake from May 3d to 10th, both days included, 48,550 net tons, viz: 16,160 to Chicago, 8450 to Milwaukee, 16,800 to Duluth, 2700 to Racine, 150 to Bay City, 1900 to Sandusky, 2000 to Superior, and 390 tons bituminous to Port Colborne (a new departure, and perhaps the foreshadowing of a large trade to the Province of Ontario). Total shipments thus far this season, 107,809 net tons. The rates of freight were 75c. to Chicago and Milwaukee; 85c. to Racine, Kenosha, Sheboygan; 60c. to Duluth, Ashland and Washburn, 50c. to Sandusky, 35c. to Detroit, 25c. to Port Colborne; and 50c. to 40c. to Toledo.

The canals of the State opened to-day. Great trouble with the natural gas this morning. St. Paul's Cathedral burned, and many private buildings on fire through explosions of gas supposed to have been occasioned by the excessive pressure on the pipes.

Pittsburg.

May 10.

[From our Special Correspondent.]

Coal.—Navigation, so far as the shipments of coal are concerned, is suspended. The coal exports from January to May 1st amount to 52,529,000 bushels, the largest ever made for the same period; exceeding same time, 1887, 14,105,000 bushels, owing to the cut-throat policy. In the western and southern markets the coal men have made no money.

PRICE OF COAL PER 100 BUSBELS = 7000 LBS.			
First pool	\$4.75	Fourth pool	\$3.25
Second pool	4.25	Railroad coal	5.00
Third pool	3.75		

Coke.—The Connellsville dealers have not come to any satisfactory understanding in regard to the price of coke. There is an increased demand and larger shipments. The rates furnished may be changed at any time. We quote nominally as follows: Blast Furnace, f.o.b. at works, \$1; Foundries, \$1.15.

Freights.—New rates to Pittsburg, 80 cents per ton; Chicago, \$3; Springfield and Urbana, Ohio, \$2.75; Toledo, \$2.90; Cincinnati, \$2; Indianapolis, \$2; all valley points, \$1.50; East St. Louis, \$3.50; St. Louis, \$3.65. Other points same proportion.

FREIGHTS.

The latest actual charters to May 10th, per ton of 2240 pounds:

From Philadelphia to:—Alexandria, .85; Bath, Me., 1.05; Boston, 1.05; Charleston, .75; Charlestown, .90; Chelsea, .90 @ 1.00; Com. Pt., Mass., .95 @ 1.00; East Cambridge, .95; Fall River, .90 @ .95; Gloucester, 1.10; Lynn, 1.25; Marblehead, 1.05; Milton, 1.15; New York, .90; New Bedford, .90 @ .95; Newburyport, 1.20 @ 1.25; Norfolk, .55; Portland, 1.05; Portsmouth, Va., 1.15; Providence, .90 @ .95; Richmond, Va., .70; Salem, Mass., 1.05; Savannah, .80; Washington, .85; Wilmington, N. C., .90 @ .95.

From New York to:—Bath, Me., .75; Beverly, .75; Boston, .70; Bridgeport, Conn., .50; Cambridge, Mass., .70 @ .75; Cambridgeport, .70 @ .75; Charlestown, .70; Chelsea, .70; Com. Pt., Mass., .70; F. Boston, .70; E. Cambridge, .70 @ .75; E. Greenwich, R. I., .75; Fall River, .75; New Bedford, .80; Newburyport, .90; New Haven, .50; New London, .70; Newport, .75; Norwalk, Conn., .55; Portsmouth, N. H., .85; Providence, .75; Salem, .70 @ .75.

From Baltimore to:—Bangor, Me., 1.15 @ 1.20; Bath, 1.10 @ 1.15; Boston, 1.10; Bridgeport, Conn., .95 @ 1.00; Brooklyn, .90 @ .95; Charleston, .80 @ 1.00; Fall River, 1.00; Galveston, 3.00; New Bedford, .95; Newburyport, 1.30; New Haven, .95; New London, .95; New York, .90; Pawtucket, 1.10; Portland, 1.10; Portsmouth, N. H., 1.10 @ 1.15; Providence, .95; Richmond, Va., .70; Salem, Mass., 1.10; Savannah, .75 @ .80; Williamsburgh, N. Y., .90; Wilmington, N. C., 1.00 @ 1.10.

* And discharging, 3c. per bridge extra. † Alongside.

MARKETS.

NEW YORK, Friday Evening, May 11.

Prices of Silver per ounce troy.

May	Sterling exchange	London Pence.	N. Y. Cents.	May	Sterling exchange	London Pence.	N. Y. Cts.
5	4.88 1/2	42 1/2	92 3/4	9	4.88 1/2	42 1/2	92 1/4
7	4.88 1/2	42 1/2	92	10	4.88 1/2	*	92 3/4
8	4.88 1/2	42 1/2	92	11	4.88 1/2	42 1/2	92 3/4

* 42 3-16.

Secretary Fairchild has approved the design of the new twenty-dollar silver certificates, and the notes

will soon be put in circulation. The design includes a fine portrait of ex-Secretary Manning, supported by figures in relief representing "Labor" and "Prosperity."

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting advanced its rate for discount from 2 to 3 per cent. During the week the bank lost £685,000, and the proportion of its reserve to its liabilities was reduced from 37.27 to 36.08 per cent, against a decline from 48.28 to 46.86 per cent in the same week of last year, when its rate for discount was 2 per cent. The weekly statement of the Imperial Bank of Germany shows a specie gain of 11,860,000 marks.

THE NEW YORK METAL EXCHANGE COMPILES THE FOLLOWING MOVEMENT OF BONDED METALS, PORT OF NEW YORK, APRIL, 1888.

METALS.	Imports. April.	Exports. March.	Stocks. April 1.	Stocks. May 1.
Iron ore.....	1,422 tons	.....	.....	.....
Pig-iron.....	3,525 "	5 tons	1,988 tons	1,918 tons
Spiegel-iron.....	4,784 "	.....	2,192 "	2,192 "
Old rails.....	885 "	.....	16,477 "	15,818 "
Scrap-iron.....	515 "	.....	1,470 "	1,700 "
Scrap-steel.....	27 "	.....	611 "	611 "
Steel blooms and billets.....	1,188 "	.....	824 "	824 "
New st. rails.....	.....	28 tons	.....	.....
Steel wire rods.....	3,643 "	.....	.....	.....
Iron rods.....	764 "	.....	11,638 tons	10,887 tons
Iron bars, etc.....	328 "	23 tons	.....	.....
Iron beams.....	154 "	.....	.....	.....
Sheet iron.....	160 "	465 tons	1,676 "	1,676 tons
Steel sheets and plates.....	451 "	1 "	16 "	16 "
Cotton ties.....	.....	.....	592 "	592 "
Steel tires and forgings.....	425 "	.....	62 "	72 "
Steel hoops.....	512 "	.....	.....	98 "
Steel bars, etc.....	573 "	510 lbs.	98 "	.....
Tin plates.....	153,508 bxs.	.....	42,908 bxs.	41,092 bxs.
Taggers' ir'n.....	4,235 "	.....	.....	.....
Pig-tin.....	900 tons	.....	.....	.....
Copper ore.....	.....	1,860 tons	.....	.....
Copper mat.....	.....	3,779,580 lb.	.....	.....
Ingot cop.....	.....	.....	66,740 lbs.	69,204 lbs.
Copper (old).....	2,464 lbs.	.....	470 "	5,883 "
Brass (old).....	5,413 "	.....	.....	.....
Pie-lead.....	112 tons.	.....	2,746 tons	2,655 tons
Lead (old).....	.....	.....	468 lbs.	468 lbs.
Spelter.....	27 "	.....	47 tons	47 tons
Sheet-zinc.....	1 "	1,881 lbs.	11 "	11 "
Scrap-zinc.....	.....	.....	11,400 lbs.	13,400 lbs.
Antimony.....	224 cks.	.....	361 cks.	461 cks.
Nickel.....	35,980 lbs.	.....	1,672 lbs.	1,672 lbs.
Type metal.....	106 tons	.....	.....	.....

Copper.—This market has developed further strength during the past week, and a further advance in quotations has to be reported. It would seem that there is a standing order in the market (presumably on account of the syndicate) to buy up everything that may be offered at about 16.60 to 16.65 cents for delivery over the next two or three months. This is probably in connection with an intended sale by the syndicate to manufacturers, as to which negotiations are understood to have been going on for some time past, but apparently without success so far, the manufacturers hesitating to enter into contracts for their supplies at the price demanded. Our judgment of the condition of affairs is that it is perfectly futile to attempt to act independently of the syndicate, as every body must now recognize the fact that they are complete masters of the situation controlling, as they do, not only the entire output of the mining and smelting companies, but also almost the whole of the floating supplies, the quantity of copper now remaining in the hands of other parties being hardly worth taking into account. In this connection we may here refer to a circular recently issued by one of the metal brokers and which we consider misleading. It may sound very well to recommend consumers to leave the syndicate alone with its stocks of copper on its hands and to go to other sources for their supplies, but then the question arises, where are these other sources? The parties referred to advise that purchases should be made in Europe, apparently forgetting that the same conditions exist there as in this country. We sincerely sympathize with the sentiments contained in the circular referred to, but at the present time we see no means by which the course recommended can be put into practical operation.

In spite of the great collapse in tin the general condition of the copper market remains strong, and this is evidenced by the limited quantity that is offered in the open market. We therefore believe that the present level of prices will be maintained for some time to come, but a change must be looked for when the new sources of supply, now being developed, are able to bring their output into the market. A certain time must elapse, however, before this period arrives, and there is very little probability that the influences referred to can interfere with the operations of the syndicate before next year at the earliest. The "bear" sales to which we have alluded in previous reports, appear now to have come to an end, the operators on the "short" side being evidently alarmed by the condition of affairs in London, where a sharp advance has taken place on the "bears" in that market attempting to cover. The total transactions in our market during the week have amounted to about half a million pounds, and our market closes strong at the following quotations for Lake copper: Spot, 16.65c.; May, 16.70c.; June, 16.70c.; July, 16.70c.; August,

16.70c.; September, 16.65c.; October, 16.60c.; November, 16.60c.; December, 16.60c.

In London the past week has witnessed a sudden change in the somewhat monotonous quotations which have ruled for the past week or two, and from the causes previously alluded to a sharp advance in prices has taken place, Spot Chili Bars having sprung up to £82 7s. 6d., and futures from £75 up to £78.

The Nogales Record says the Boleo French Copper Company, at Santa Rosalia, Lower California, has just shipped a large quantity of copper for France, and will add 14 furnaces to its plant. The company employs 1000 men.

A correspondent explains as follows the producers side of the syndicate question. Like most other questions, it has another side also.

New York, May 10, 1888.

TO THE EDITOR OF THE ENGINEERING AND MINING JOURNAL:

It has of late been the fashion to abuse the French syndicate who have advanced the price of copper, and to talk about the United States paying tribute to France. A moment's consideration will show this is not a fact.

Our producers have sold their copper to the syndicate at a price which will average at least four cents a pound more than the price ruling last summer.

On our exports, say nearly fifty per cent of all we produce, this four cents is a bonus to us paid by the syndicate. Deducing such profits as the syndicate may make on the amount they re-sell in this country, the country at large will receive during the coming year at least three million dollars more net money for its export copper than it would have received if the syndicate had not taken hold. In the distribution of the profits at home an individual here and there may feel that he is not as well off as he would have been if the syndicate had kept out of the road, but the community as a community will be three million dollars per annum in pocket.

COPPER.

The following table, published by the Boston Transcript, shows how the production of the Boston & Montana Consolidated Copper and Silver Mining Company has increased, and gives the output of matte, percentage of refined copper in matte and amount of refined copper since the beginning of operations of the company:

Month.	Ore and matte. Pounds.	Per cent. fine copper.	Refined copper. Pounds.
September, 1887.....	369,495	57.15	221,719
October.....	494,100	59	256,119
November.....	502,103	63.88	320,741
December.....	1,053,755	61.4	640,453
Sept. 1 to Dec. 31.....	2,559,450	60.36	1,439,032
January, 1888.....	1,026,007	64.2	634,030
February.....	1,631,965	66	979,179
March.....	2,450,082	59.4	1,470,642
First quarter.....	5,108,054	61.6	3,083,860
Three weeks April.....	.....	.....	715,977
Jan. 1 to April 21, 1888.....	.....	.....	3,799,837
Sept. 1 to April 21, 1888.....	.....	.....	5,238,869

We may add to the Transcript's figures, from private information, that the whole April output will not vary much from 1,150,000 pounds fine copper, the falling off from March being due to delay in starting the Mountain View hoisting-works.

The cost of production in March was 5.79 cents per pound, and as the output increases it is expected that it will reach 5 cents per pound on the cars at the works. If we add 1 1/4 cents per pound for freights, 1 1/2 cents for refining, and possibly 1/4 @ 1/2 cent for commission and other expenses, we get a total of say 8 to 8 1/4 cents per pound as the cost in New York, when the works are in full operation.

When the Santa Rita and a few other mines are going the supply of copper will be kept up even if the French syndicate should go to pieces, of which there is not the least probability for a year or two yet.

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

To Liverpool—	Copper matte.	Lbs.	
By S. S. Richmond.....	Sacks	945	\$6,000
" Puertorriqueno.....	"	1,887	219,728
" The Queen.....	"	9,188	1,086,719
" Arabic.....	"	4,455	533,040
" Adriatic.....	Ebbs	115	112,823
" Adriatic.....	Sacks	2,772	325,290
To Liverpool—	Copper.		
By S. S. Th. Queen.....	Bbls	90	112,500
To Hamburg—			
By S. S. Toornuna.....	Casks	40	50,000
To Rotterdam—			
By S. S. P. Caland.....	Casks	71	135,000
To Havre—			
By S. S. La Bretagne.....	Pies	187	80,250
" La Champagne.....	Bbls	40	50,000
To Bordeaux—			
By S. S. Chateau Lafitte.....	Casks	70	87,500

Tin.—We have no new feature to report in this market during the week. The only business taking place is confined to a few lots of a retail character. As to the future course of the market it is exceedingly difficult to venture an opinion, but it appears to be the general impression that prices will not rise again for the present, but that the operators who have precipitated the collapse will wait until they have made satisfactory arrangements with the producers before they attempt to raise prices. In this way they hope to recover previous losses. Our closing quotations to-day are: Spot, 21.50; May, 19.75; June, 18; July, 18. London prices £80 for spot and futures.

Lead.—A further severe drop in prices has taken place in this market during the past week, owing to heavy deliveries not being satisfactorily taken up. In

all about 1000 tons have changed hands at prices ranging from 4.65 to 4.20, the latter being Thursday's closing quotations for May delivery. To-day's closing quotations are: Spot and May, 4.22 1/2; June, 4.22 1/2; July, 4.22 1/2.

Messrs. Everett & Post, of Chicago, telegraph to day as follows: The market is very flat and weak. Absence of buyers and sympathy with other metals is effecting a decline. Prices are nominally 4.20@4.25.

Messrs. John Wahl & Sons, of St. Louis, telegraph to-day as follows: Market is weak and on the down grade, in sympathy with the seaboard demoralization. Buyers, expecting a decline, are holding off and buy only for immediate wants.

Refined is nominally 4.12 1/2, and Common 4.00@4.05.

Spelter.—This market is also dull, and we quote Domestic 4.50 to 4.65; Foreign, 5.50 to 5.65.

Antimony.—Very quiet, with Cookson's quoted at 13 and Hallett's at 10 1/2 to 10 1/4.

Chemicals.—The market for the past week presents few noticeable features. Business in most lines has been dull and few changes have taken place in prices or the general tone of the market.

Carbonated soda ash 48% is easier than when we last wrote, owing to larger offerings for shipment on the other side; 1.22 1/2 @ 1.25 would now be accepted for future shipments. There is very little 48% on the spot, and though the jobbing sales have been small it is doubtful if small lots for immediate delivery could be procured for less than 1.35 @ 1.37.

There is little inquiry for high test and the quotation is nominal at 1.15 cents.

Caustic soda ash 48 per cent continues in good demand with limited supply. Small lots ex store bring 1.35 @ 1.37 1/2, while futures are quoted at 1.25 @ 1.27 1/2, according to position, etc. In high test nothing is doing in most cases, consumers preferring to causticize their own ash as wanted.

Caustic soda is dull and perhaps a trifle easier, owing to the dullness on the other side. There is no notable change in quotations since our last.

Refined alkali, 36 per cent, is dull and easier, most of the business transacted being of a jobbing character. The quotation of 1.15 is more or less nominal. 48 per cent alkali is in considerable demand in a jobbing way, but we hear of no large sales. The same may be said of 58 per cent goods, though the improvement in both grades since the settlement of the flint glass strike is marked.

English sal soda is dull, owing to the scarcity of goods for shipment and the high freights. These combined have raised holders' views considerably above what buyers are willing to pay, and the result is small sales. Small lots ex store are held at \$1.10 @ \$1.12 1/2, and nothing can be had for future delivery below 97 1/2 cents.

Bleaching powder continues very dull, as it is impossible for New York to compete with Boston in the present state of the market. Local consumers, obliged to supply current wants, are virtually the only buyers. The prices continue as in our last, nothing offering below 1.85c.

The acid market continues in the same position as at our last writing.

Acetic acid is moving fairly, though the business is mostly of a jobbing character. We note no change in quotations of 2 1/2 @ 2 1/2.

Sulphuric acid, 66 degrees, is fairly active outside the contract orders, and prices rule unchanged. Chamber acid is moving fairly to meet demand of consumers.

Oxalic acid is unchanged. The market is dull, and nothing outside of a jobbing business to meet consumers' passing requirements; 6 1/2 c. is the quoted price for large lots, and 7c. for smaller quantities.

The market for fertilizing chemicals is weakening a little, but this is no more than can be expected after an exceedingly active season. Most of the manufacturers are now fully supplied with raw material, and a gradual falling to the usual demand is now in order.

We continue to quote dried blood, high grade, 2.25 @ 2.30 per unit; low grade, 2.15 @ 2.20 per unit for ammonia. Taugke, high grade, \$21 @ \$21.50; low grade, \$18.50 @ \$19. Refuse bone, black, \$16 @ \$17 per ton. Ground steamed bones, \$25 @ \$27 per ton. Fish scrap, f.o.b. factory, \$25 per ton. Sulphate of ammonia, \$3.25 @ \$3.30 per cwt.

Muriate of potash is in very good demand. There is almost nothing obtainable on the spot, but the constant arrivals keep the market supplied. We continue to quote 1.80 for spot, 1.77 1/2 @ 1.80 for steamer arrivals, and 1.72 1/2 for future sail shipments.

Double manure salt is not attracting much attention and the quotations are more or less nominal. Kainit is not obtainable on the spot. June shipment is quoted \$8.75 @ \$9 per ton, according to quantity, etc.

Brimstone is very dull on the spot, but the market in futures is active, despite the high freight rates from Sicily. The stocks here are very light, but there is no demand. The quoted price is, \$19.50 per ton for thirds, and \$20.25 for seconds. Future shipments are offering at \$20 per ton for best seconds, and \$19 @ \$19.25 for fair.

Nitrate of soda is easier again owing to the recent arrival of 20,000 bags per the "Hampshire" and the "Landseer." Goods are now obtainable at 2c. from vessels in port. In futures very little is doing just at present, though there are free offerings for shipment at 1.95c.

The wholesale commission-house of William T. Coleman & Co., New York, have made an assignment for

the benefit of their creditors. Their assets are placed at from \$4,000,000 to \$4,500,000, and their liabilities at \$2,000,000. Among the assets of the firm is borax, valued, it is said, at \$2,000,000, the sale of which has been hindered by the announcement of the tariff bill placing borax on the free list. The firm feel confident that the resources are sufficient to more than meet all engagements. In consequence of this failure the following three assignments to A. L. Tubbs were filed at San Francisco on the 9th inst.: The Meriden Borax Company, the Harmony Borax Company, and the California Chemical Company. The property consists of borax land in Ingo and San Bernardino counties, Cal. In addition to these there is situated in Alameda County a manufacturing establishment known as the California Chemical-Works, where products of these borate fields were worked up. The properties are part of the assets of the house. The creditors of Mr. Coleman's firm in San Francisco consist of four banks and two individuals, and all these are amply secured against loss. It is reported, with the exception of the latter. An inventory will be completed in about two weeks.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 11.

There is no disguising the fact that the iron market is in a condition of weakness almost approaching demoralization of prices. Not a single quotation on the list, except for favorite brands of iron and for such articles whose prices are held by firm combinations of manufacturers, can be said to be firmly held. Prices are lower all around, and have still a downward tendency. In these circumstances buyers naturally hold off and the general market is nearly stagnant. It is the prevailing opinion that the bottom has not yet been reached. The effect of a further drop in prices will probably be shown in forcing some weak concerns to the wall. Happily, however, the elements of a general panic in any branch of the trade are lacking. The money market continues easy, and there has been no over-trading and no over-production. The decline in prices has been gradual, and has been foreseen. Prices will doubtless continue to settle gradually until consumers are satisfied that the bottom is reached. The general condition of trade being satisfactory, it is most unlikely that there will be any such permanent restriction in the demand for iron as to cause great disaster in the iron trade.

Southern and Western irons continue to be pressed on the market. Much complaint is made by Northern makers of unjust discrimination in favor of Southern and Western irons, which are freighted East at lower rates than Northern makes can obtain to the Western markets. Scotch pig is almost lifeless, with lower prices here and in Glasgow. Bessemer pig is weak, with foreign quoted lower and sales of domestic reported at weaker prices.

Steel rails are now quoted \$30.50@31.50 at East ern mills; \$31.50@32 at Pittsburg, and \$33 at Chicago, the last being relatively the lowest price. There have been no large recent sales, although there are several large inquiries on the market.

Old rails continue weak, with several sales reported, among them a lot of 500 tons Doubles at \$21.

The Eastern Nail Association has made no further progress towards restriction of production, and the nail market continues in its unsatisfactory condition. From the Annual Statistical Report of the American Iron and Steel Association for 1887, we extract the following: The statistics of iron and steel production in the United States in the last three years are summarized in the following table:

Table with 4 columns: Net tons of 2000 pounds (except nails), 1885, 1886, 1887. Rows include Pig iron, Bessemer steel ingots, Open-hearth steel rails, Open-hearth steel ingots, Open-hearth steel rails, Crucible steel ingots, Rolled iron, Iron rails, Pig scrap, and ore blooms, Kegs of cut nails.

The production of steel by all processes in Great Britain and the United States in 1887 was as follows, in gross tons:

Table with 3 columns: Great Britain, United States, Total. Rows include Ingots-gross tons, Bessemer steel, Open-hearth steel, Crucible steel, Other steel.

In 1886 the United States surpassed Great Britain in the production of steel by 197,832 gross tons, and in 1887 this leadership in production was maintained.

The total production of pig-iron in the United States in 1887 was 7,187,206 net tons, or 6,417,148 gross tons. The total production in 1886 was 6,365,328 net tons, or 5,688,329 gross tons. The increase in 1887 over 1886 was 733,819 gross tons, or about 13 per cent. The production in the first half of 1887 was 3,415,210 net tons, and in the second half it was 3,771,996 net tons, or 3,049,295 and 3,367,853 gross tons respectively.

Our production of pig-iron in 1887 was divided among the fuels used as follows, in net tons: Bituminous, 4,270,635 tons; anthracite and bituminous mixed, 1,919,640 tons; anthracite alone, 418,749 tons; charcoal, 578,182 tons. In the following table the production of pig-iron in the last three years,

exactly classified according to the fuel used, is given in net tons:

Table with 4 columns: Fuel used, 1885, 1886, 1887. Rows include Bituminous, Anthracite and coke, Anthracite alone, Charcoal.

Total.....4,529,869 6,365,328 7,187,206

Our production of iron ore in 1887 was larger than in 1886 or any previous year, amounting in round numbers to 11,300,000 gross tons, of which 4,660,652 gross tons were shipped from the Lake Superior region. The imports of iron ore amounted to 1,194,901 gross tons, against 1,039,433 gross tons in 1886. Our total consumption of iron ore in 1887 was about 12,500,000 tons.

The Old Plain Fence Wire Association, which went to pieces as the result chiefly of the Chicago failures in the barb wire trade last year, has been reorganized under the title of the Fence Wire Association, with G. T. Oliver, of Pittsburg, chairman, and R. H. Johnson, New York, secretary, the concerns in the association being: H. P. Nail Company, Cleveland; American Wire Company, Cleveland; Cleveland Rolling Mill Company, Cleveland; Hartman Steel Com-

pany, Beaver Falls, Pa.; Oliver & Roberts Wire Company, Pittsburg; Cambria Iron Company, Johnstown, Pa.; Stewart & Co., Easton, Pa.; J. A. Roeb- ling's Sons Co., Trenton, N. J.; J. Wool Griswold, Troy, N. Y.; Washburn & Moen Manufacturing Com- pany, Worcester, Mass.; St. Louis Wire Mill Com- pany, St. Louis.

The principal reason given for the formation of the association is that for this season, from January to July, the price of plain fence wire has averaged from \$3 to \$5 a ton lower than during the corresponding period of 1887, while the cost of wire rods has been about \$3 higher. It is reported that the basis of the agreement is very similar to that upon which the old association rested. The latter embraced an allotment of percentages, and on the basis of sworn monthly re- turns members were charged \$3 per ton of 2000 pounds on deliveries for the preceding month, and credited \$3 per ton of 2000 pounds on allotted per- centage of the total deliveries for that month.

Louisville.

May 8.

[Reported by HALL BROTHERS & Co.]

No changes of special moment have taken place since our last report. A number of inquiries have been re- ceived, and some negotiations are pending, while sev-

IMPORTATIONS AT NEW YORK DURING 3 DAYS ENDING MAY 5, AND FROM JAN. 1 TO SAME DATE.

Large table with multiple columns: Spelter, Tin Sheets, Pig Lead, Tin, Steel Sheets, Billets, Forgings, etc., Old Rails, Sheet Iron, Charcoal Iron, Iron Ore, Copper, Copper Matte, Bar-Iron, Steel & Iron Rods. Columns include Week, Year, Tons, Lbs., Casks, Boxes, and various company names.

WEEKLY REGISTER OF CURRENT QUOTATIONS.

CHEMICALS.

Table of chemical prices including Acetic Acid, Sulphuric Acid, Ammonia, and various salts and pigments.

Table of metal prices including Sal. American, Nitrate, Strontium, Sulphur, Flour, and various ores.

Table of building materials including Bricks, Jersays, Haverstraw, and various stones.

THE RARER METALS.

Table of rare metal prices including Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, and others.

METALS.

Table of metal prices including Aluminum, Copper, Lead, Tin, and Zinc.

IRON AND STEEL.

Table of iron and steel prices including American Pig-Iron, Scotch Pig, and various steel products.

Table of iron and steel prices including Glengarnock, Dalmellington, and Bessemer Pig.

Table of iron and steel prices including Cast-Iron Pipe, Wrought Iron Pipe, and various fittings.

Louisville Prices.

Table of Louisville prices including Hot Blast Irons, So. Coke, and various iron products.

Pittsburg Prices.

Table of Pittsburg prices including Coke or Bituminous Pig, Foundry No. 1, and various iron products.

Philadelphia Prices.

Table of Philadelphia prices including Foundry No. 1, Gray Forge, and various iron products.

Table of Plate Iron, Tank Iron, and other iron products.

STOCK MARKET QUOTATIONS

Table of stock market quotations for Baltimore, Md. and Birmingham, Ala.

Pittsburg, Pa.

Table of stock market quotations for Pittsburg, Pa. including various gas and oil companies.

Foreign Quotations.

Table of foreign quotations including London, April 28, and various international stock prices.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Name and Location of Company, Capital Stock, Shares, Assessments, Dividends. Includes entries for Adams, Alice, Amy & Silver, Argenta, etc.

g. Gold. s. Silver. L. Lead. C. Copper. * Non-assessable. + This company, as the Western, up to Dec. 10th, 1881, paid \$1,400,000. Non-assessable for three years. † The Deadwood previously paid \$275,000 in eleven dividends, and the Terra \$75,000. Previous to the consolidation in Aug., 1881, the California had paid \$31,320,000 in dividends, and the Con. Virginia, \$42,300,000. Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1875, the Copper Queen had paid \$1,350,000 in dividends.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, divided into Dividend-paying and Non-dividend-paying mines. Columns include Name and Location of Company, dates from May 5 to May 11, and Sales figures.

*Dealt in at the New York Stock Ex. Unlisted Securities. †Dealt in at the Metal Ex. ‡Assessment unpaid. Dividend shares sold, 15,500. Non-dividend shares sold, 90,500. Total New York, 106,000.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names, dates from May 4 to May 10, and sales figures.

* Ex dividend.

Boston: Dividend shares sold, 10,451.

Non-dividend shares sold, 16,438.

Total Boston, 26,889.

COAL STOCKS.

Table of Coal Stocks, listing company names, par values, and closing quotations from May 5 to May 11.

*Of the sales of this stock, 96,524 were in Philadelphia, and 463,880 in New York.

Total sales, 667,243.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing company names and closing quotations from May 4 to May 10.

* Ex-dividend.

eral round orders have been consummated during the past few days. Some consumers continue to anticipate their future wants, while other are not buying in advance. The demand, however, for the past week has been mainly for charcoal, foundry and mill irons, which have been in liberal supply. The best demand is perhaps for the better grades of car-wheel irons, which are not very plentiful and are held at full figures. Quotations will be found in our weekly register of prices.

Pittsburg. May 10.

[From our Special Correspondent.]

The condition of the iron market is still very unsatisfactory to the seller. It must, however, be pretty evident that prices have about touched bottom, and that further concessions are out of the question. Prices of certain irons are now below cost of production. That fact ought certainly to settle the question of lower prices. Rumors were current during the week that Southern Pig was being offered at a very low figure. After careful inquiry, we are satisfied that there was no truth in the report, that it was gotten up by interested parties to depress values; for instance, the freight from Birmingham, Alabama, to Pittsburg is \$5 per ton, from Chattanooga \$4.50, add to this the sellers' fees, would make the sum realized by the maker below \$10 per ton. The stock of iron in first hands is not large, sales being confined to limited amounts for current wants. The boom that was expected to make its appearance in the spring has been postponed for the present. It will probably be along, but no date has yet been decided on. The labor troubles are being adjusted slowly. The Knights of Labor are certainly losing the hold they formerly had. Some persons when they have a good thing fail to realize the fact until it is too late. This thing of looking only at one side of the question won't do. The idea of standing out for months, and then going to work under less favorable terms than was previously offered, shows that the workmen are not crowded with good advisers. A glance at what ground they have lost the last six months shows that there must be a radical change, and the sooner it is made the better for the men. On the 4th of January Gray Forge Pig sold at \$16.50 cash. Bessemer Pig, \$18.75@19 cash. Present prices, Gray Forge Pig, \$14.75 cash. Bessemer, \$16.25, with sales of other descriptions of iron in the same proportion.

The following sales will furnish the reader with a correct view of the situation as to values:

Coke and Coal Smelted Lake Ore.	
600 Tons No. 3 Bessemer	16.75 4 mo.
500 Tons Bessemer	16.75 cash.
400 Tons Gray Forge Neutral	15.00 cash.
350 Tons Gray Forge	15.25 4 mo.
250 Tons White and Mottled	15.75 4 mo.
100 Tons No. 1 Mill	15.00 cash.
200 Tons No. 2 Foundry	16.00 cash.
100 Tons No. 1 Foundry	17.25 cash.
175 Tons No. 2 Foundry, all Ore	16.75 4 mo.
125 Tons No. 1 Foundry, all Ore	17.50 4 mo.
100 Tons Gray Forge	15.25 4 mo.
Coke, Native Ore.	
300 Tons Gray Forge	14.90 cash.
100 Tons White	14.50 4 mo.
50 Tons Silvery	17.00 cash.
50 Tons No. 2 Foundry	16.00 cash.
25 Tons No. 1 Foundry	17.25 cash.
Steel Slabs and Billets.	
1000 Tons Billets at Works	29.00 cash.
1000 Tons Billets at Works	29.00 cash.
1000 Tons Billets at Works	29.00 cash.
1000 Tons Nail Slabs	27.75 cash.
500 Tons Billets	29.00 cash.
Muck Bar.	
500 Tons Neutral	27.00 cash.
400 Tons Neutral	26.75 cash.
Old Iron Rails.	
600 Tons American T's	22.00 cash.
200 Tons American T's	22.00 cash.

Philadelphia. May 10.

[From our Special Correspondent.]

The iron trade has been at a standstill for some days. Prices have declined in pig-iron from 50c. to \$1 per ton on certain makes, on account of reductions made in coal and freights. Similar action to be taken by two other companies will put the pig-iron industries of Eastern Pennsylvania on a solid footing for the present. The railway managers, it is given out, pretend to regard Western and Southern pig-iron competition in a serious light. So far very little iron has come this way, but then, just now consumers are not buying at any prices for forward requirements. Adding cost of delivery to harbor quotations, Alabama and Pennsylvania iron are about on a par. No large transactions have been closed in foreign material. Mills are gaining business for muck bars. Consumers are out and obliged to buy. Bar iron demand has also improved, and nails are selling more freely, but for actual requirements only. At the very low rates of week past skip iron orders have been placed in small lots. The pipe mills are running on small orders, and are unable to meet the views of large buyers. Plate and tank is, if any thing, lower than last week. Business has been disappointing, although there are specifications in hand calling for several hundred tons in all. No business has been done in a large way in merchant steel or in sheet iron.

Cast-iron contracts are now coming in, and there have been some favorable indications for architectural iron. The reports from the interior of the State this week point to a little more activity, as a result of exhausted stocks. Structural iron makers have booked a number of small orders at card rates, and have agents in negotiation for bridge plate for Eastern and Western work.

Steel rail transactions are for small lots, at old figures. There are larger requirements in sight than

supposed, and makers predict a good midsummer business.

There have been no sales of old rails, as holders are 50c. to \$1 per ton above buyers' views.

No sales of scrap, except two or three lots of choice have been made. Prices are weak on all, except selected lots. Quotations will be found in our weekly register of prices.

FINANCIAL.

NEW YORK, Friday Evening, May 11.

The mining share market shows no improvement and the prices continue on the downward move.

The Comstocks show the usual amount of business, with little change in price. Consolidated California & Virginia declined from \$13.50@11.38. Hale & Norcross from \$9@7.75. Ophir from \$8@7.75. Savage from \$5.38@5. Suro Tunnel shows a further decline, and went from 18@12c.

Among the Tuscarora shares, Navajo shows a decline from \$1.75 to \$1.50; North Belle Isle, from \$5.75 to \$4.25, and Tornado has gone down to 45c.

Eureka Consolidated sold at \$10.

The stock of the Shoshone Mining Company, of Idaho, was called for the first time on Thursday. Sales have been made at from 10@12c. Cleveland Tin was dealt in only at the beginning of the week at declining prices. It opened at \$1.25, going to 95c. on Monday. The last sale was made at \$1. Holyoke shows a few sales at 5c. Proustite was again actively dealt in, showing lower prices, going from \$1.40@1.20.

Kingston and Pembroke shows a few sales at from \$2.63@3.

Rappabannock continues to be neglected, selling at 12@14c.

Ontario remains at \$28.50. Horn-Silver shows a small business at from 85@90c.

At a meeting of the stockholders of the Security Mining and Milling Company, held at Boston on the 10th inst., it was decided to levy a voluntary assessment of 25 cents per share, for the purpose of raising money to further develop the company's property. The superintendent, Mr. C. H. Johnston, reported at the meeting that the main shaft is down 400 feet and is being pushed forward as rapidly as possible and with good prospects. He is now in the East to purchase machinery for work on the lower levels as well.

The readers of the ENGINEERING AND MINING JOURNAL will remember the warning we gave them when this stock was first offered. This stock was listed on the N. Y. Con. Stock and Petroleum Exchange February 10th, 1887, and on February 19th we said editorially "the whole thing as stated and as being floated is an utter humbug (though the mine may have a small value), and it can not fail to bring losses on those who invest in it, and discredit on legitimate mining." We also denounced this scheme in the ENGINEERING AND MINING JOURNAL, March 5th, 26th, April 30th, May 7th, and June 4th and 11th.

We believe those who have invested in good faith on the statements of the officers of the company can recover at law. The mine is almost worthless, and the money being spent to disprove Mr. Johnston's absurd theories is wasted.

A few sales of the stock were made at prices ranging from 17@25c. Denver City shows one sale this week at 20c.; of Silver Cliff a few at 11@7c.; Silver Cord at 55c.; Robinson at from 69@70c.; Little Pittsburg at from 21@25c.; Leadville at from 25@28c. Colorado Central declined from \$2.10@1.95. Bassick was quoted at 10@11c.

The stock of the Holywood Mining Company was first called on Monday last. The opening bid was 26c. The price has since advanced to 30c., some 5300 shares changing hands. The stock is held by the manipulators of Middle Bar and Amador, and in consequence of the attention directed to Hollywood, as predicted in our last issue, Middle Bar was almost entirely neglected, selling at from 44 to 46c., and Amador dropped from \$2.45 to \$2.

Plymouth Consolidated shows sales of 640 shares. The price opened on Monday at \$11, and closed to-day at \$10.

Brunswick, notwithstanding the good reports received from the mine, declined from 21@17c. Little attention is directed to the Bodie stocks. Bodie Consolidated declined from \$2.85 to \$2.45, and Bulwer, in consequence of an assessment, from 80 to 70. Standard dropped from \$2.75 to \$2.10, and Mono shows one sale at \$1.60.

Taylor Plumas has reached the bottom, selling at 1c., and Green Mountain at 3c.

Of the Quicksilver stocks Common records one sale at \$10.

Silver King, which has been firm at \$5 for several weeks, shows sales this week as low as \$4.80.

One thousand shares of the Silver Mining Company of Lake Valley sold at 34c. per share.

Deadwood-Terra, which has been neglected for several weeks past, was dealt in this week at from \$1.50 to \$1.60. Homestake opened at \$11.75 on Saturday and did not appear on the list again until to-day, when it sold at \$11.50. Caledonia was quoted at from \$2.15 to \$2.20.

Little interest is shown in El Cristo, which is quoted at from \$2.10@2.20. The policy of keeping visitors out of the mine naturally gives rise to many misgivings as to its value. It is certain that the dump does not show any large amount of ore, and there are rumors that the mine has been closed. It would be much better to allow disinterested experts to visit the mine and keep us advised as to what it contains.

The Stock Exchange has listed stock of the Mahoning Coal Railroad; common stock, \$1,878,000, and

preferred stock, \$400,000. This road is leased by the Lake Shore Company for 40 per cent of its gross earnings, the preferred stock carrying a guaranteed dividend of 5 per cent, payable semi annually.

Meetings.

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

Birmingham Mining and Manufacturing Co., Birmingham, Ala., May 16th, at eleven o'clock A.M.

Castle Creek Mining Company, No. 62 Broadway, Room 422, New York City, May 28th, from one to two o'clock.

Cleveland Iron Mining Company, Cleveland, O., May 23d, at 11 o'clock A.M.

Columbus & Hocking Coal and Iron Company, Columbus, Ohio, May 16th.

Estrella del Norte Mining Company, No. 3 Broad street, Room 62, New York City, May 22d, at ten o'clock A.M.

Leadville Consolidated Mining Company, No. 1 Broadway, New York City, May 21st, at one o'clock P.M.

Nenth Gold Mining Company, Idaho Springs, Colo., May 21st.

Pennsylvania Coal Co., Dunmore, Lackawanna Co., Pa., June 12th, from eleven to twelve o'clock A.M.

Silver Cord Combination Mining Company, Iron Hill, Leadville, Colo., May 15th, at ten o'clock A.M.

St. Joseph Lead Company, No. 55 Liberty street, Room 39, New York City, May 17th, at eleven o'clock A.M.

Stewart Mining Company, Salt Lake City, Utah, June 4th, at one o'clock P.M.

Tennessee Coal, Iron and Railroad Company, No. 8 Noel Block, Church street, Nashville, Tenn., June 28th. Special meeting to consider the issuance of \$1,000,000 of preferred stock, the proceeds of which are to be applied (1) to the purchase of \$800,000 of the common stock, which is to be retired; (2) to the completion of improvements now under construction, and (3) to supply working capital.

The Blue Iron Mining Company, Marquette, Mich., May 15th, at two o'clock P.M.

Dividends.

Colorado Central Consolidated Mining Company, of Colorado, has declared a dividend, No. 22, of five cents per share, or \$13,750, payable June 11th at the Farmers' Loan and Trust Company, No. 22 William street, New York City.

Confidence Silver Mining Company, of Nevada, has declared a dividend, No. 1, of two dollars per share, or \$49,920, payable May 10th, in San Francisco.

Consolidated California & Virginia Mining Company, of Nevada, has declared a dividend, No. 17, of fifty cents per share, or \$108,000, payable May 10th, in San Francisco.

Consolidated Imperial Mining Company, of Nevada, has declared a stock dividend at the rate of six and three quarter shares for every share now outstanding, payable immediately.

Pennsylvania Railroad Company has declared a semi-annual dividend of two and one half per cent, payable May 29th.

Philadelphia (Natural Gas) Company has declared a dividend, No. 31, of one per cent, or \$75,000, payable May 25th, in Pittsburg.

Assessments.

COMPANY.	No.	When levied.	D'l'ng't in office.	Day of sale.	Am't per share.
Anna, Dak.	1	Apr. 10	May 10	June 1	.001
Anchor, Utah.	..	Mar. 3	May 5	May 26	.10
Arnold, Ariz.	4	May 1	June 4	June 28	.75
Baltimore, Nev.	1	Apr. 16	May 21	June 8	.25
Bulwer Cons., Cal.	4	May 3	June 7	July 5	.50
Crown Point, Nev.	49	Apr. 13	May 16	June 6	.50
Enterprise M. & D.	1	Apr. 3	May 4	May 19	.15
Homeward B'd, Dak.	5	Mar. 24	May 26	June 21	.001
Himalaya, Utah.	3	Apr. 26	May 26	June 26	.005
K. of the West, Ida.	3	Apr. 21	May 24	June 16	.15
Mayflower, Cal.	41	Apr. 9	May 10	June 4	.25
Navajo, Nev.	19	Apr. 12	May 17	June 7	.30
Oxford, Dak.	2	Apr. 9	May 9	May 25	.05
Paradise Valley, Nev.	5	Apr. 21	May 29	June 18	.15
Peerless, Ariz.	11	Apr. 4	May 7	May 28	.25
Quincy, Dak.	3	Mar. 5	May 2	May 25	.02 1/2
Rattler-Gilroy, Dak.	11	Apr. 7	May 7	May 31	.02
Sierra Nevada, Nev.	91	Apr. 3	May 8	May 26	.25
Silver Mint, Dak.	1	Apr. 3	May 5	May 23	.01
Spanish, Cal.	2	Jan. 4	Apr. 10	June 2	.04
South End, Nev.	..	Apr. 4	May 7	May 23	.10
Trojan, Nev.	17	Mar. 27	May 4	May 28	.10
Utah, Nev.	4	May 4	June -	July -	.25

Pipe Line Certificates.

Messrs. Watson & Gibson, brokers, 49 Broadway, report as follows for the week:

There has been no special feature to chronicle in the oil market the past week. The continued dullness of refined petroleum, and the fact of there being no charter for the foreign export trade, has consequently made no demand for the crude, and the large operators in the market have held off, evidently willing to wait for a time before undertaking a new manipulation. The monthly statement for April showed only about 400,000 barrels decrease in stocks, which was a disappointment to the bull element.

We wish to affirm our renewed faith in cotton oil certificates at present prices, on merit and on the earning capacity and able management of the company.