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In his annual report upon the progress made during the year in the Territory of Alaska, Governor A. P. SWINEFORD dwells upon the magnitude of the mineral resources that have now commenced to be so efficiently developed, that the mine and mill on Douglas Island have been steadily turning out gold bullion at the rate of \$100,000 per month. He estimates the total value of the Alaskan fisheries at no less than \$3,000,000 for the year, and alluding to the importance of the fur trade, remarks that it is practically monopolized by the Alaskan Commercial Company, which does not confine its operations to the seal islands held by it under lease from the government, but holds and possesses most of the Aleutian chain and the greater part of the mainland as a principality of its own, extending over it undisputed sway. The Governor says that this contract with the company should be rescinded, or if that be legally impossible, that at any rate it should not be renewed.

THE fulfillment of all the reasonable conditions imposed by the mining public in regard to the production of an absolute safety lamp for use in mines is now occupying the earnest attention of our best authorities on electrical affairs, and in addition to the already numerous systems of hand lamps already devised and experimented with, many others are now said to be in course of active preparation. In a letter to the London Times of October 15th, we see that Sir FREDERICK A. ABEL announces

his intention to read a paper before the Institute of Civil Engineers during the present month on the subject of mine accidents and their causes, and there is no doubt the question of safety lamps will come in for its fair share of his attention. It must be remembered that what is needed in a mine is not so much a brilliant as a steady, well-sustained, reliable, and safe light that may be changed about from place to place without chance of accident to the workmen. In all these respects the absolute superiority of the electric over the ordinary, even the newest form of oil lamp, has been sufficiently demonstrated; but it is still heavily handicapped in one particular, and that is in the important detail of cost. When this objection has been finally removed, as it certainly soon will be, its simplicity of construction and great durability will unfailingly insure its universal adoption.

### THE PERFECTED PHONOGRAPH.

The announcement recently made by Mr. EDISON concerning the perfection of his phonograph and the probability of its being placed upon the market ready for general adoption within the next few months, has been much and variously commented upon by the daily and scientific press throughout the country. The results that we are encouraged to expect from this extraordinary instrument are sufficiently marvelous to excite in the practical mind a certain sense of incredulity; but the inventor in a recent letter to ourselves, expresses in his frank and usual hearty way in reply to our inquiries, such utter confidence in its successful performance of all, and even more than all, that is hoped for it, that we look forward to its advent with anxious curiosity.

The greatest of Mr. EDISON's former difficulties—the one which he encountered at the very beginning, some ten years ago—was the impossibility of reproducing tones that were absolutely distinct; sufficiently distinct to be recognized without difficulty or mistake as emanating from the person who had spoken them. To-day, these difficulties have been overcome, and so the sender of a message after setting the machine in motion, need merely talk into the receiver in his usual and natural tone of voice, then withdraw the "phonogram" and mail off to his friends his verbatim utterances. Each phonogram will cost but little more than ordinary letter paper, and will be made in several sizes, so as to contain messages varying in length from 800 to 4000 words. Upon arriving at its destination it will be placed in the apparatus of the receiver, and will at once speak out its communication with a distinctness and clearness equal to that of the human voice, at the same rate of speed as that at which it was originally dictated. The phonogram does not wear out by constant use; every message may therefore be repeated any number of times, and may, when done with, be filed away ready for reproduction, if necessary, in a hundred or a thousand years.

Volumes might well be written upon the various interesting and novel fields thus opened up to correspondence, and the many directions in which this invention is likely to serve mankind!

The taking of evidence by commission in distant places or foreign countries, for example, at once suggests itself as a direction in which it may be of immense utility, and who knows whether, some of these days, when history has once more repeated itself, and our race and tongue are numbered with the dead; English will not be taught in the schools of the future by means of the phonogram. No one who has studied Greek or Latin in our own schools will deny the immense advantage that such a possibility would confer upon our successors, for they would not only master our language and learn to read our books, but could acquire our very accent and true pronunciation. Such a thought is almost sufficient to make old classic writers turn with envy in their graves.

### INTERNATIONAL GEOLOGY.

At the recent meeting in this city of the American Association for the Advancement of Science, it was expected that the Geological Section would be the scene of a lively debate over the work of the International Congress of Geologists, and particularly, as we are informed, over the scheme of classification proposed by the Congress, with its accompanying schedule of colors, which seems to have upon some American authorities the same effect as if it were all bright red, and had been, in pastures exclusively belonging to them, vigorously flaunted by unauthorized intruders.

This expectation was disappointed. The debate was mainly on side issues. But Mr. G. K. Gilbert, Vice-President of Section E, and one of the geologists of the U. S. Survey, delivered an address on the subject, which is criticised in the September number of the *American Naturalist* by Dr. Persifer Frazer. We do not propose to take part in this controversy. The combatants are well able to take care of themselves. But we may venture to express our feelings that there is too much *a priori* opposition to the work of the Congress, and too little real analysis and discussion of it.

Mr. Gilbert, for instance, seems to think that all attempts at an agree-

ment among the geologists of the world on matters of classification and nomenclature are premature and unwise; that they can not be, and ought not to be, carried out at all; at least, not yet; and at the very least, not by such an unscientific measure as a vote. The answer to all such arguments is simply that the way to find out whether an agreement is practicable is to try it; that a vote of the representatives of different countries and opinions is the best way yet discovered of ascertaining the degree of such agreement; that the result of such a representative and provisional agreement must be tested in practice on its own merits; and that, if it fail in such a test, or if it be subsequently superseded in the progress of science, there is no harm done, but on the contrary much good.

We are not aware that American geological surveys have abstained from the publication of results which were subsequently disputed or even retracted. Nor have we ever heard that the more perfect work of the last-comer necessarily casts disgrace on that of the pioneer, or that pioneering is unadvisable, because its beginnings may be rude, in comparison with their own ultimate fruits.

It would be unfair to Mr. Gilbert, however, to intimate that he does not attack in detail some of the proposals of the Congress. He objects to the provisional color-scheme, as adjusted to the rock systems of Europe exclusively, and making no provision whatever for the systems of other parts of the earth; and he opposes "any attempt to coerce the geology of our country into a rigid matrix formed over, and shaped by the geology of another country."

If, however, it should happen to be true that the geology of all countries has a common matrix, namely the physical and chemical history of the earth, and that more or less complete portions of this matrix can be detected in each country, but its entire form in none, then it seems to us more scientific to attempt to reconstruct the one matrix than to insist that each country shall abide by its separate fragment.

To the dictum that this can not be done, we reply, "Let us see." To the complaint that the attempt now in progress is exclusively European and can not be adopted to other parts of the world, we answer also, "Let us see." That the map of Europe will be exclusively European goes without saying. Whether its scheme of classification will be elastic enough for American use can only be found out in practice. First let us have the map.

We learn, by the way, that the American committee has received, thus far, subscriptions for 78 copies of the map from the following institutions and individuals:

Williams College, Rensselaer Polytechnic Institute, University of Virginia, Ohio State University, Amherst College, Cornell University Library, Wesleyan University, Lehigh University, Dartmouth College, Columbia College, Indiana University, Smith College, Rutgers College, Yale University Library, Peter Redpath Museum, McGill University, United States Military Academy (West Point), University of Pennsylvania, University of Wisconsin, Washington University, St. Louis, Mo.; Harvard College Library, University of Nebraska, Johns Hopkins University, American Institute of Mining Engineers, Provincial Museum (Halifax), Academy of Natural Sciences (Philadelphia), United States Geological Survey, American Geographical Society, Second Geological Survey of Penna., State Mining Bureau of California, Lehigh Valley Railroad Company, New York State Library, Kansas State Library, Franklin Institute of Philadelphia, University of the City of New York, Mass. Agricultural College (Amherst), Am. Museum of Nat. History (Central Park, N. Y.), the Cooper Union, Collegiate and Polytechnic Institute (Brooklyn), Cornell University, Colorado School of Mines, Arkansas Geological Survey, Buchtel College, University of Michigan, Alabama Geological Survey, Worcester Polytechnic Inst., Mercantile Library (Phila.), Eckley B. Coxe, R. W. Raymond, Benjamin Smith Lyman, E. V. d'Inwilliers, F. W. Matthiessen, W. S. Keyes, R. D. Baker, S. F. Emmons, H. N. Sims, Alex. Wincheil, H. Huber, Jas. E. Mills, Jos. D. Potts, J. C. Fales, T. H. Aldrich, Chas. Paine, Edward W. Morley, Frank Klepetko, Thos. Macfarlane, E. S. Whelen, Julius Bien.

As our readers are aware, the committee has secured the privilege of taking 100 copies of the map at the low price of 100 francs, which, with duty and freight, will make it cost say \$21 to institutions and \$26 to individuals, or a little less. As 78 copies are already subscribed for, we hope there will be no difficulty in securing the rest. In itself, it will be abundantly worth the money; and for the purpose of criticism, and thus of improvement, it is highly important that as many copies as possible should be accessible in this country.

Finally, in our judgment, the way for American geologists to meet this international movement is not to oppose it, but to join and influence it; to welcome and to help in directing its work; to take a hearty and friendly interest in its first great experiment; to secure a meeting of the Congress in the United States; and then to impress upon its numbers the necessary sense of the importance of American phenomena in framing geological schedules.

**Old, But Good.**—In a Western mining paper of March, 1885, we have come across the following gem of scientific knowledge, which we think ought to be rescued from oblivion and preserved for fame.

"Placer washings are caused where volcanic eruptions have been so great that the metal was thrown in the air long enough to cool before again striking the ground. It then stayed on top of the ground and required but little work to be separated. Such localities are now scarce." Alas, they are indeed.

## 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.

## Separation of Metals from Platinum Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I beg to reply to the criticism on the above, contained in your issue of October 15th, that the processes outlined by Dr. Wyatt, compared with those which I have described, are open to the following objections:

1. The salts produced are less pure.
2. The yield is smaller.
3. The *modus operandi* is not more expeditious.

Of the rhodium only a part goes in solution, and Dr. Wyatt omits to state how the whole of the rhodium and iridium is to be dissolved. The apparently complicated reaction treating with chlorine and alloying with lead, which are absolutely necessary for the swift and rational working of the residues, are also employed by the largest manufacturers of platinum, Messrs. Johnson & Matthey, London.

The whole *modus operandi* of obtaining metals from platinum ores is, in contradistinction from metallurgical practice, pre-eminently and exclusively laboratory work. To practical metallurgists it is only of scientific interest, excepting in gold refining; and I wanted to call the attention of refiners to it, that they should treat the lyes, from which gold is precipitated, before they are thrown away, with Te. The relative cost of a *modus operandi* for the production of metals, which are so dear, with reagents which are so cheap, is of no consequence.

The treatment with Hg(CN)<sub>2</sub> is a disagreeable and unhandy manipulation if it has to be performed frequently or steadily. That the old formulæ were used in my own paper of October 8th is the fault of the translator, whom I requested not to use any formulæ, but to render briefly the course of the separations. In my notes on this subject, taken at the time I was a pupil of Bunsen, the Berzelius formulæ were used; they are easily changed. I have not had an opportunity to answer earlier, which accounts for the delay in giving my views on the matter until to-day.

Yours respectfully,  
NEW YORK, Nov. 3, 1887.

H. PIRNGRUBER.

## The Value of Manganese Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: We are receiving a great many samples of manganese ores from Virginia, West Virginia, Kentucky, Arkansas, etc., etc.

Accompanying the order for analysis is usually a request for information as to the value of the ore. It has occurred to us that the simplest way to answer all these inquiries is through your journal.

There are two uses for which manganese is available.

First. Chemical use. The demand for this purpose is comparatively small, all Europe taking not more than 10,000 tons per annum, of which 4000 tons goes to Liverpool. The price varies from 10 pence to 12 pence per unit of peroxide per ton of 2240 lbs., the principal thing being, first, that the ore shall run as high as possible in peroxide and that it shall contain no carbonates.

Second. Metal use. For metal use an *ideal* manganese ore should contain not less than 50 per cent of manganese, not more than 0.10 per cent of phosphorus and not over 10 per cent of silica. Carbonate of lime present is an advantage; copper decidedly objectionable if over 0.15 per cent, while nickel and cobalt should be absent.

Two good shipments, highly praised by the English metal men as to quality, recently analyzed as follows:

	No. 1.	No. 2.
Manganese.....	53.85	51.35 per cent.
Silica.....	7.20	4.00 per cent.
Phosphorus.....	0.04	0.01 per cent.
Carbonate of lime.....	4.00	11.79 per cent.

Manganese ore for metal use is worth about 1s. 4d., with 1d. per unit deducted if the silica runs over 14 per cent, or the phosphorus over 0.13 per cent. The present system of payment is generally, first, an advance of 75 per cent of value through New York bankers against the bills of lading, balance on the confirmation of the analysis by the buyers or some independent chemist.

You will notice that I give only English quotations, the American market being in the hands of one or two buyers only, who pay whatever price they have to, without reference to any standard schedule.

Like all English metal dealings there are a great many deductions and charges difficult to understand here. For example, a shipment of 100 tons ex steamer from Norfolk, Va., sold in Liverpool as follows:

Cr. *By sale*, agreed analysis: Manganese, 50.00 per cent; moisture, 2.00 per cent; 100 tons, less 2 moisture, net 98. 1s. 3d. per unit of metal, £3 6s. 8d per ton, £336 13s. 4d.

*Charges*—Marine insurance, £300 at  $\frac{1}{2}$  per cent, £1 10s.; sea freight, at 8s. per ton, £40; sampling, at 6d., £2 10s.; analysis fee, 21s., preparing sample, 10s., £1 11s.; commission at  $\frac{2}{3}$  per cent, £8 8s. 4d.; total charges, £53 19s. 4d.; net proceeds, £282 14s.

The only things in this account of sales that interest the shipper are the weight, assay and net returns. From this we will see that his 100 tons of 50 per cent ore brought him £282 14s., or \$1371.09, being \$13.71 per ton of 2240 pounds.

LEDOUX & Co.,  
Chemists and Assayers, N. Y. City.

## The Role of Aluminium in Mitis Castings.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: My attention was this morning called to an article in your paper for October 29th on the subject of mitis castings, by H. M. Howe, being part of his Metallurgy of Steel.

Mr. Howe's article, which is wholly devoted to an analysis of two different theories accounting for the phenomena of melting in the mitis process, viz., the one pronounced last year by me and the other by R. W. Davenport, finishes by indorsing as an indisputable fact that "the at-



probably more than 30 per cent of the actual cost of production in the latter places. The result of a long and searching inquiry, in which we have been kindly and generously assisted by many excellent authorities abroad as well as at home, enables us however, to go somewhat further, and to use the above data for some skeleton illustrations by which to strengthen our text; and although any such illustrations at this early stage may be pronounced premature, the following will pave the way to discussion, and discussion will certainly strengthen and confirm our position and conclusions.

Cost of producing one ton of refined alkali by Leblanc's process :

In Newcastle (England).		In New York State.	
13½ cwt. Spanish pyrites, 42 per cent, @ 8c. per unit and per ton	\$2.20	13½ cwt. of our own pyrites at same price as per contra	\$2.20
25 lbs. nitrate of soda @ 2c. per lb.	.50	25 lbs. nitrate of soda at 2c. per lb.	.50
25 cwt. salt @ \$2 per ton	2.50	25 cwt. salt (ordinary common) @ \$2 per ton	2.50
26 cwt. limestone @ \$2 per ton	2.60	26 cwt. limestone @ \$2.50 per ton	3.25
3 tons of coal (small) @ \$1.15 per ton	3.50	3 tons coal (fines) @ \$1.60 per ton	4.85
Wages	6.00	Wages	8.00
Repairs to plant, waste of material, management, and general expenses	2.70	Repairs to plant, waste of material, management, and general expenses	2.70
Cost per ton of 2240 pounds	\$20.00	Cost per ton of 2240 pounds	\$24.00

Cost of producing 1 ton refined alkali by Solvay's ammonia process in New York State.

1¾ tons of coal (fines), at \$1.60 per ton	\$2.80
4 cwt. coke, at \$2.60 per ton	.50
2 tons salt in ordinary brine, at \$2.00 per ton	4.00
1¾ tons limestone, \$2.50 per ton	3.70
20 pounds ammonia (all that is estimated to be lost in the reaction), at 5c. per pound	1.00
Labor, wear and tear, management, etc., say	6.00
Total cost per ton of 2240 pounds = 58° strength	\$18.00

The actual wholesale market value of soda ash is \$1.25 per 100 pounds, or say \$28 per ton, and it will therefore appear somewhat abnormal to the uninitiated, or to such as have only a superficial knowledge of the chemical industry, that a product about which there are no longer any trade secrets, and of which the cost is so readily ascertained, should be selling in our markets at a price which, even if it were manufactured here by the Leblanc process, would leave but an insignificant margin, and which, coming from so far, must inevitably entail a serious loss to the producer.

Thereby hangs the tale we have set ourselves to unfold, and that it may be properly understood we ask our readers to go back with us into the last century and to follow us as we trace out the history of soda manufacture from its origin to the present time.

It is difficult, not to say impossible, to name the exact date at which the art of alkali making was discovered, but we can have no doubt about its antiquity, since we find frequent mention of soap in the Old Testament, and know that it was commonly used by the ancient Celts and Gauls. When Pompeii was extricated from its ruins there came to light a complete soap-boiler's apparatus, and a quantity of hard and well preserved soap, that had evidently been made from alkali and oil. Geber, the ancient, knew the difference between soda and potash, and we learn from Rodwell that the Phœnicians were well acquainted with carbonate of soda, which they bought from the Egyptians under the name of nitrum, and used for making glass.

Apart from common salt there are several forms in which we constantly meet with soda in nature, the most noteworthy being *Natron* ( $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$ ) a carbonate, generally more or less intimately combined with sodium sulphate and chloride, and *Trona* ( $2\text{Na}_2\text{O}, 3\text{CO}_2 + 4\text{H}_2\text{O}$ ) a sesqui carbonate. *Natron* may result either from the disintegration of rocks or minerals containing sodium, the action of sea salts on limestones, or the putrefaction of certain plants rich in salts of soda, combined in their organisms with some acid base. Under the influence of summer heat moisture evaporates from the soil, solutions of sodium carbonate are drawn upwards by capillary action, and, becoming concentrated on the surface, finally leave the salt as a white efflorescence. The winter rains inundating these plains become saturated with carbonate of soda, and eventually pouring themselves into some clayey or rocky bottoms, form immense lakes, which, with the returned heat of summer soon dry up, leaving a thick crystalline crust of soda behind. A considerable number of natural soda deposits, probably formed in this way, occur in many parts of this country, notably in Wyoming, where attempts have already been made on a small scale to use them in the manufacture of sodium hydrate. At Laramie, for example, the whole of the soil is impregnated with sulphate of soda, and there are three great soda lakes at Donney, covering an area of some 500 acres, with a depth of deposit varying from 6 to 12 feet.

A large number of analyses of all the deposits in and near Laramie, show them to be extremely uniform, their average composition being made up of sulphate of soda, 44.55; water, 54.98; insoluble matter, 0.47, and with a very laudable desire to make the most of this natural resource, the Union Pacific Railway Company sometime ago erected an alkali factory and proceeded to develop it. According to Mr. Jos. D.

Weeks,\* the process used is the old "black ash," with stationary furnace. The capacity of the works is about 2 tons of sodium hydrate per day. The capacity of the furnace is 3½ tons of sodium sulphate per day. Rescreened coal from the Rock Spring mine is used, and the limestone necessary is obtained near Laramie. The "black balls" formed of the fused soda, coal and lime are broken up and washed in four lixiviating pans, and the liquor is then taken to two settling vats. Thence it is drawn to the "causticizer," which is a large circular tank, in which are two perforated vessels containing caustic lime, around which the solution of sodium carbonate is agitated. After the causticizing, the liquor is passed through three long circular iron settlers. The clear liquor is then drawn to the "V pan," where waste heat is used to aid the evaporation of the solution. The slightly concentrated liquor is then drawn to the "boat pan," which is set upon the reverberatory furnace. The evaporation is continued as long as possible, and the now concentrated solution is then drawn to another room, into the "finishing pot." This is a large cast-iron pot, set directly over a furnace. Here all remaining traces of water are driven

off at a low red heat. The hydrate at this stage is generally nearly black. Small quantities of niter are added to the fused mass to whiten it. The hydrate is then ladled into sheet-iron vessels and shipped. Some of the Laramie caustic soda has been used by the Denver Soap Company, which reports favorable results from its use. The works at Laramie are not well adapted to the most economical handling of the soda. Improvements are now being made by which the number of men employed will be greatly reduced and the composition of the "black balls" made more uniform.

When the soda works were first begun it was supposed that the natural occurrence of the material as a sulphate, rendering unnecessary the reduction of the chloride to the form of a sulphate, would greatly decrease the ultimate cost of the caustic soda; but it was found that the very large quantity of water present in the soda as it comes from the lakes more than offset any gain by the trouble and delay it caused in the furnaces.

In Sweetwater Valley, Carbon County, there are four soda deposits, known as the Dupont Lakes, and covering an area of many thousand acres. The beds vary in thickness from 6 to 9 feet, and the average results of many analyses of samples taken from the surface in different quarters show them to consist of: Moisture, 9.00; sodium sulphate, 25.75; sodium chloride, 2.13; sodium carbonate, 30.42; sodium bicarbonate, 30.09; insoluble matter, 2.61.

It is probable that if these remarkable natural facilities had been situated in some smaller and more densely populated country than our own say in France, England, or Germany, it is fair to assume that they would long ago have exercised an all important influence on the soda industry, but as neither of these great manufacturing countries, nor in fact any other European nation, happened to be so favored, the original supplies of alkali were obtained by them by a tedious, and costly process, from plants.

The majority of the vegetable species are, as we know, organized to absorb potash, as a principal more necessary to their healthy growth than soda, but there are nevertheless certain kinds of marine plants that grow in the neighborhood of the sea or of salt lakes that can not be properly developed without a supply of sodium which they derive from absorbing and decomposing the brine. When these plants have become mature and are subjected to calcination, their ashes constitute what is known as *Barilla*, resulting from the reduction of their organic sodium salts into the simpler carbonate. The following varieties may be mentioned as the most important:

Salsola Clavifolia—The ash of which contains in every 100 parts 45.99 per cent of $\text{Na}_2\text{CO}_3$	
Salsola Soda—	40.95
Halmiocrum Capsicum—	36.75
Salsola Kali—	34.00
Kochia Sedoides—	30.84
Salsola Brachiata—	26.26

Previous to the commencement of the present century all these plants were cultivated in Spain, their seeds being sown at the end of the year, and the crops gathered and burned in the following September; and so highly important, indeed, did this cultivation and industry become, and so jealously was it guarded by the Spanish government, that the punishment of death is said to have been imposed upon certain individuals who were detected in the act of exporting the seeds to a foreign country.

Although, as we can easily conceive, the soda derived from these sources by any means then known was very far from pure, it nevertheless commanded an exorbitant price, and we consequently find that in all cases where it was necessary to use a fixed alkali, our forefathers gave the preference to potash. This was the state of things in 1736, when Duhamel du Monceau, a French chemist, discovered and demonstrated that sea salt was a chloride of sodium, and thereby induced the *Academie des sciences* to offer a prize of \$500 (at that time regarded as a very large sum) for the invention of a process for transforming this chloride into a carbonate. For thirty years, none of the efforts made by numerous competitors were successful, but at length, in 1777, it was proposed by Malherbe to treat the sea salt with oil of vitriol—thus transforming it into a sulphate—and to calcine the product with charcoal and iron; and although the resulting carbonate was exceedingly impure, the method was carefully examined and most favorably reported upon by the members of the examining committee.

From this time no important movement was made until 1789, when De la Metherie, another French chemist, made known a plan of his invention for calcining sulphate of soda with charcoal alone. His theory was that the reactions induced by this incineration would yield, on the one hand, sulphurous acid, and, on the other, a pure carbonate of soda; but in reality, of course, he could only obtain a sodium sulphide containing but a mere trace of the product he required, and his process was consequently denounced as a failure. If it served no other purpose, however, it at least had the incalculable merit of awakening the thought and attracting the attention of another and greater chemist, Doctor Nicolas Leblanc, who at that very time was working to solve the same problem.

TO BE CONTINUED.

**Estimation of Coal Contained in a Given Area of Seam.**—The *Indian Engineer* says that an approximately correct method of making this calculation is to consider an area of coal one inch thick as containing 100 tons, and this will allow a sufficient margin for faults and loss. Calculated in this way, a seam of coal 24 inches thick will yield 2400 tons to each area. But to ascertain the exact quantity of coal under a given area, we must first know the specific gravity, then knowing the weight of one cubic foot, the rest becomes a mere matter of calculation. Taking the specific gravities—water being 1.0 and weighing 1000 ounces per cubic foot—as 1.10, 1.15, 1.20, 1.25, 1.30, 1.35, 1.40, 1.45, 1.50; we have the following weights in the natural bed per acre per inch thick in tons: 111.411, 116.475, 121.540, 126.604, 131.668, 136.732, 141.796, 146.860, 151.925, and the weights of a cubic foot in the broken state in pounds will be of large coal—42.62, 44.56, 46.50, 48.43, 50.37, 52.31, 54.25, 56.18, 58.12; and for small coal—37.12, 38.81, 40.50, 42.18, 43.87, 45.56, 47.25, 48.93, 50.62. In measuring heaps of coal in England it is customary to allow 45 cubic feet to one ton.

\* Mineral Resources of the United States, 1885.

OFFICIAL STATEMENTS AND REPORTS.

The Tamarack Mining Company.

The following extracts are taken from the report of Mr. John Daniell, the superintendent of this mine, and will doubtless prove of interest to many of our readers:

Our underground work has gone on during the entire year with much regularity. As we have attained depth, and with it length of territory, the rock output has increased and the production of copper also. The results of our first half year's work were less satisfactory than was expected at its commencement, but later there has been a steady improvement, which has continued up to the present. Dividing the year, we find the rock stamped in first half afforded 8½ pounds ingot less per ton, and that in second half a little in excess of the preceding year, showing for the whole quantity stamped a slight falling off. The shrinkage was due to the working of ground in back of 4th and 5th levels, which was comparatively lean, and owing to our limited development at that time, we could not draw more heavily on richer ground to keep up the average.

During the year, No. 1 shaft has been sunk 175·2 feet, making the depth July 1st, 2459·2 feet. At this time the depth from surface is 2490·7 feet. Cross-cuts at 5th, 6th and 7th levels have been drifted to the conglomerate from shaft. Winzes communicating the above levels, also to the 8th, have been sunk, and openings on the conglomerate pushed north and south as fast as practicable.

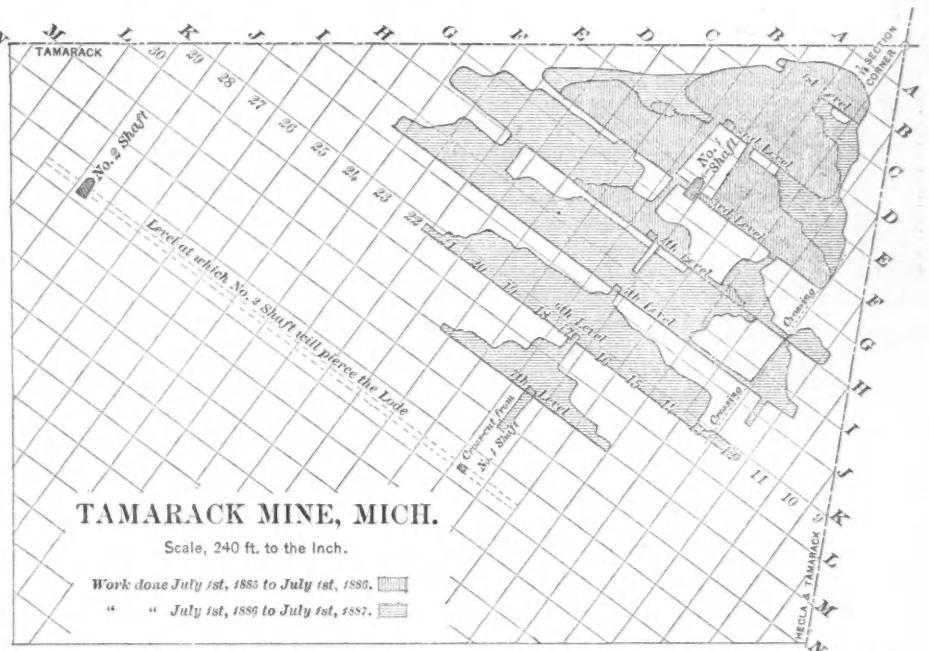
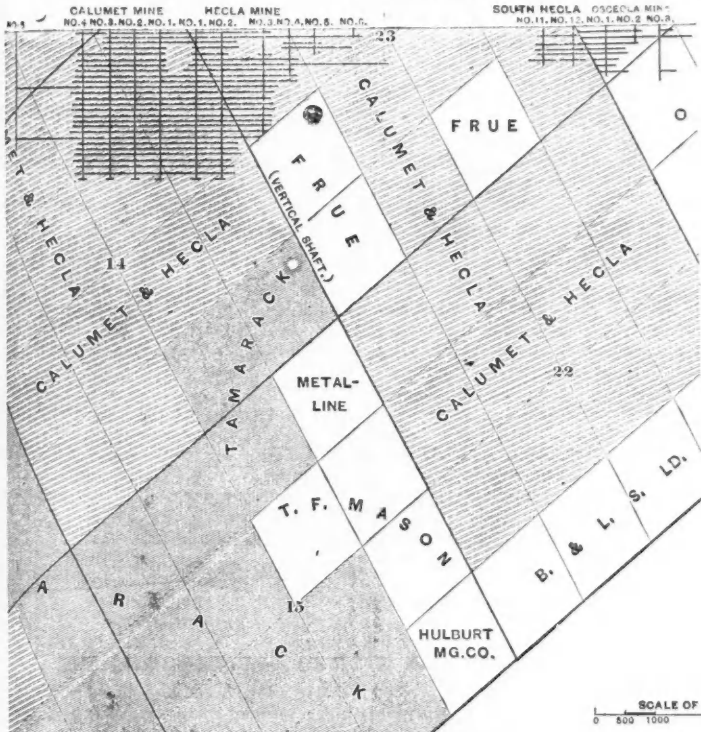
In the last six months our mine very much improved, and, as far as I can judge, best results have by no means been attained. The presence of so much poor ground at 4th and 5th levels, met with early last year, embarrassed us. The 4th level really afforded less than 250 feet in length of stoping ground, while the 5th gave much rock of less than average quality. As before explained, our openings were at that time much restricted in other directions. There was no alternative from handling too much of a grade of rock which, had our mine been better opened, would have made no material difference. At this time, we are in much better shape: are down to 8th level, and in two months expect to be stopping. Here we will have a length of 1200 feet to work out. At 7th level

plant that will ultimately be the auxiliary engine to work third compartment of this shaft. This will enable us to hoist rock much faster, and to materially increase the rate of sinking. There is nothing special to remark in connection with the beds of rock sunk through. Neither of them shows any copper in quantity. We have rather more water than in No. 1 shaft, and the rock seems firmer, requiring less timber.

To the rock house, in the last year, we have added one 10 inch by 15 inch breaker, and now have nearly ready a hammer for breaking the largest-sized rocks. This plant may be regarded as complete, and is assuredly quite efficient. It cost 9·62 cents per ton to pass rock through the house. Transportation expense is but little in excess of 18 cents per ton. For the current year this will be less, the larger output insuring a reduction of the rate. We continued stamping at the Osceola mill until May 18th last, so that we have but little to report respecting our own operations. The cost at Osceola was 80 cents per ton. The charge for the year was 76·8 cents per ton. We are counting on stamping for 50 cents per ton when the two heads are fully supplied with rock. This of itself will be an important reduction of expense. The new stamps will crush, each head, in excess of 200 tons of conglomerate daily, probably more than 225 tons. Up to the present we have not tested its full capacity. Results attained in first two months' running are misleading. Expenses have been comparatively higher than what would be rated as regular. Nor is it possible to equip a mine of this magnitude without spending large sums of money.

The financial statement presented to the stockholders by the officers of the company for the year ending June 30th, 1887, is as follows:

Assets and Liabilities.	
Cr.	Dr.
Cash in bank at Boston.....	Drafts outstanding.....
Hancock & Calumet R. R. Co. 6 per cent bonds.....	Accounts payable at mine.....
Assessment No. 1.....	Bills payable.....
Supplies on hand at mine.....	Loan account.....
Cash on hand at mine.....	Balance of assets, July 1st, 1887.....
Accounts receivable at mine.....	
Wood and timber land.....	
250 shares H. & C. R. R. stock.....	
Bills receivable.....	
Copper on hand.....	
Total cash assets.....	



less than a fourth of our ground has been removed, up to date. At 6th level, we have more than a year's stoping before us, and at 5th level we have ground which will enable us to maintain present output until we can increase it, when we commence stoping at 8th level. A year ago the reserves were equal to only a few months' work; at this time, I would estimate the quantity of rock available above 8th level as equal to three years' work. It has cost heavily to attain this position, but it was necessary for the future of the mine. The pressure in this direction may be more moderate after a few months, while our reserves will steadily increase.

The product of copper obtained in the last two months shows that the rock stamped yielded 1½ per cent more ingot than the average of first six months of last year. I look for no falling off, but rather, as the higher stoping ground is worked out, a further improvement.

Cost of producing and treating rock has steadily decreased as the output grows; \$3.32 per ton against \$4 the previous year. From present outlook, \$3 per ton will be the maximum cost for handling rock.

The amount of rock handled for the year was 106,802 tons. Of this, 6350 tons came from openings in country-rock—shaft, cross-cuts, winzes, etc.—much of it being hoisted to upper levels and stowed under ground; 100,452 tons were passed through the rock house from the conglomerate workings; 9865 tons were discarded, and 90,587 tons were sent to the mill. The quantity of rock broken on the lode equals 5580½ fathoms. Mineral produced, 6,232,119 pounds, which yielded 74·397 per cent ingot, or 4,636,521 pounds. Each fathom of ground afforded 1116 pounds mineral, or 831 pounds ingot. It might be remarked that 187,164 pounds of copper bowlders were selected during the year.

No. 2 shaft was sunk for the year 517·2 feet. Excellent rate of speed, considering that we are working but one drill and have not yet got efficient hoisting machinery. The shaft, to date, is 725 feet deep. In the next two months we shall put in and have ready a new

STATEMENT OF RECEIPTS AND EXPENSES OF ALL KINDS, 1882, TO JULY 1, 1887.

RECEIPTS.	
From capital stock, 50,000 shares. \$13.00 a share paid in.....	\$650,000.00
" 363 lbs. copper 1882. at 18.00.....	\$65.34
" 7,435 " 1883, at 14.71.....	1,093.37
" 1,979,400 " 1885-6 at 10 05.....	198,944.56
" 4,636,521 " 1886-7 at 10.24.....	474,614.68
" 6,623,719 " total, \$10.19.....	674,717.95
From interest receipts, 1882 to 1886.....	6,169.50
From 350 shares Hancock & Calumet R. R. Co.'s stock sold and paid for.....	35,000.00
250 shares Hancock & Calumet R. R. Co.'s stock on hand.....	25,000.00
Total receipts.....	\$1,390,887.45

EXPENSES.	
Running expenses prior to July 1st, 1886.....	\$308,039.56
Running expenses during 1886-7.....	380,582.21
Construction expenses prior to July 1, 1886.....	152,633.67
Construction expenses during 1886-7.....	171,468.53
No. 2 shaft.....	22,718.20
Real estate.....	330,000.00
Total expenses.....	\$1,365,442.19
Balance of receipts July 1st, 1887.....	\$25,445.26
	\$1,390,887.45

SUMMARY.	
Rock stamped.....	90,587 tons.
Product of mineral.....	6,232,119 lbs.
Product of refined copper.....	4,636,521 "
Yield of refined copper per cubic fathom of ground broken.....	831 "
Yield of refined copper per ton of stamp rock.....	51·18 "
Yield of mineral per cubic fathom of ground broken.....	1,116 "
Percentage of mineral in stamp rock.....	3·44 per cent.
Percentage of refined copper in stamp rock.....	2·56 "
Refined copper, cost per pound at mine.....	6.49 cents
Cost of smelting, freight, commission, and Boston expense.....	1·72 "
Total cost per pound of refined copper laid down in New York and sold.....	8·21 "

## REVERSING ROLLING-MILL ENGINES.

A short time ago we described, and were able to illustrate, one of the Reynolds hoisting engines, and we now present a view of the magnificent reversing rolling-mill engines designed and built at the Reliance Works, by the same skillful engineers and constructors, and now in successful operation at the Homestead Works, Pittsburg.

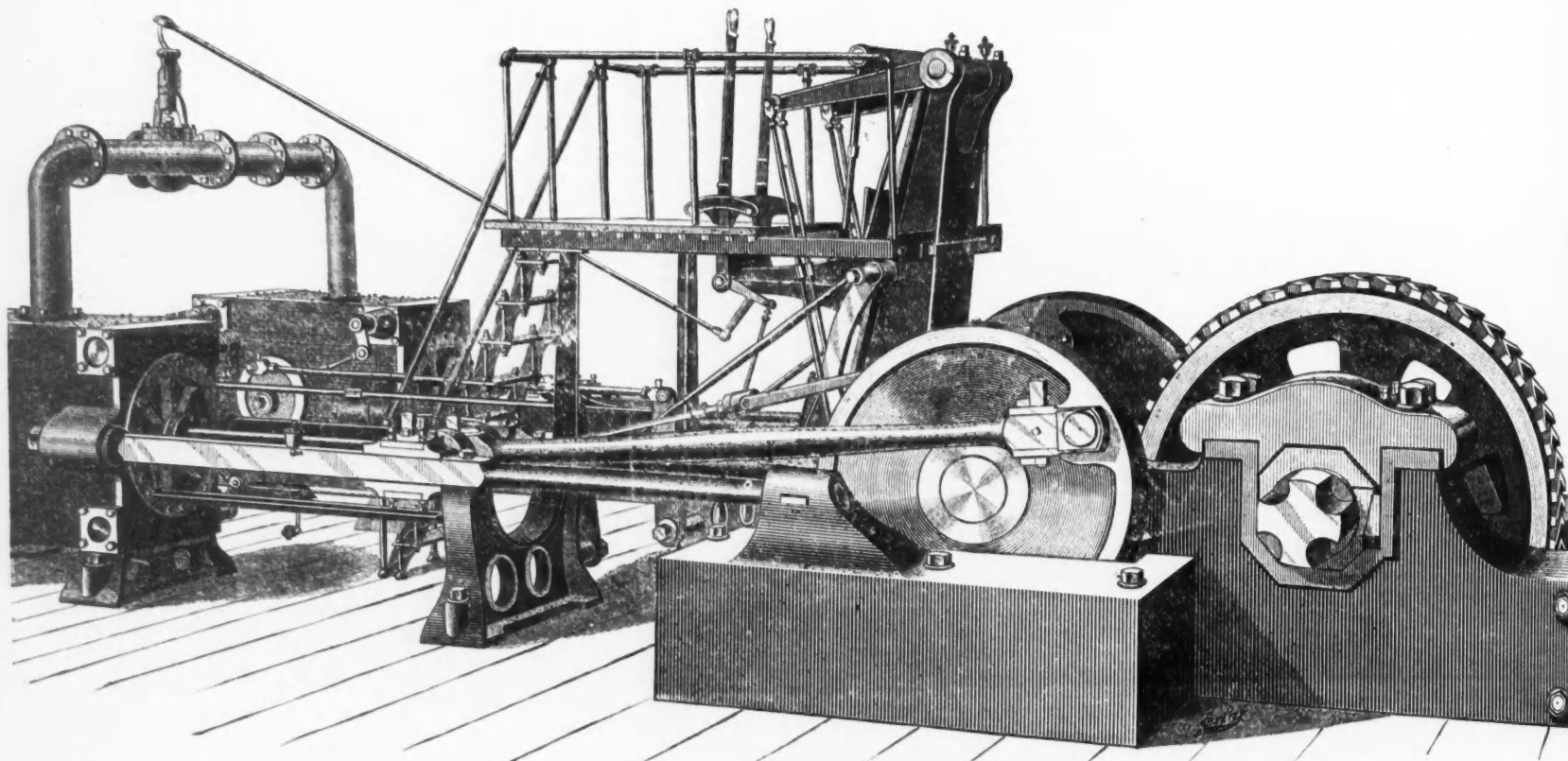
The steam cylinders are 28 inches in diameter by 48 inches stroke, and, save for the absence of the drop, cut-off mechanism, from all the steam valves, they exactly resemble the well-known Reynolds-Corliss cylinders and valve gear.

The engines are operated from the platform, which is placed between the engine frames and raised high enough to give the engineer a clear view of all of the working parts of the engine and the roll train. The operating levers, two in number, are located on the platform; one is connected to the throttle valve of the engines; the other operates the valve on the steam reversing gear. The reversing gear is a new design, positive in its action and very simple in construction, securely holding the link blocks in the position indicated by the hand lever, to determine whether the engines shall run over or under, fast or slow. Practically no effort is required to move the reversing lever, as it is used simply to operate a very small steam valve and serve as an index to note the position of the reversing gear. The engines can be started, stopped, run fast or slow in either direction without closing the throttle valve. They are at all times under perfect control of the engineer, as refers to speed

tons, the following are the estimated quantities used in different ways: Paper making, 960,000; copper, lead, tin, and zinc smelting, 1,280,000; water-works, 2,240,000; breweries and distilleries, 2,880,000; chemical manufactories, 3,040,000; railways, 3,200,000; steam navigation, 4,800,000; clay, glass, and lime kilns, 4,960,000; textiles, 6,720,000; gas-works, 9,600,000; mining operations, 10,720,000; steam engines, 19,360,000; iron and steel-works, 48,000,000; domestic use, 27,502,000; and exported, 14,720,000.

**Engineers' Club of Philadelphia.**—At the regular meeting of the members of this club on October 15th, Mr. A. Marichal presented a description of the Gileppe Dam, Belgium, which was completed in 1879. The object of its construction was to supply the city of Verviers with water. The capacity is 3173 million gallons. The dam is 49.2 feet wide at the top and 216 feet at the bottom. Its total height is 156.6 feet. At the top the dam is 771 feet long, and at the bottom 269 feet. It is built of rubble masonry, weighing 1½ tons per cubic yard. The dam is surmounted by an immense statue of a lion. This statue is composed of 188 pieces of sandstone. Its total height is 70.52 feet. The body is 16.4 feet wide and 52.5 feet long. One of the claws measures 5.31 feet, and the length of the nose is 8.20 feet.

**A New Armor-Plate.**—The struggle between armor-plate and guns, says the *Ironmonger*, has until lately resulted in favor of the latter, for no plates had been constructed which could resist the impact of steel projectiles discharged from the longest breech-loading guns. A factor



REVERSING ROLLING-MILL ENGINE, FOR ROLLING ARMOR PLATE AT HOMESTEAD WORKS, PITTSBURG, PA.

and direction in which they are to run. The main crank shaft of the engine and the roll shaft run in very large bearings, which are formed in the massive bed frame casting. These bearings are provided with ample means for taking up wear and maintaining the gears in perfect line one with the other. The helical tooth gears are made of cast steel, both gears having a "shrouding" on each side, to give additional strength to the teeth. When the engines are running at their maximum speed in either direction, they can be instantly reversed, under a full head of steam, all parts being designed for this purpose and made amply heavy and strong to safely withstand the work.

**The Panama Canal.**—The Brussels correspondent of the *London Times* says the Belgian engineers who have been at work on the Panama Canal express most unfavorable opinions as regards the position of the enterprise, and consider the difficulties still to be overcome as almost insuperable. On the other hand Count de Lesseps has just announced to the Academy of Sciences at Paris that the Panama Canal will be opened on February 3d, 1890. The work will not then be entirely completed, he admits, but the passage will be free for twenty ships a day. It is estimated that this traffic will produce an annual revenue of from 90,000,000 to 100,000,000 francs.

**Measurement of the Forces Brought into Play by the Flight of a Bird.**—This was the title of a very interesting paper recently presented to the *Academie des Sciences* in Paris by M. Marey. Anatomy shows that nearly all the muscles acting on the wing serve to lower it, while the kinematic data drawn from photo-chronography show that during this lowering of the wing the mass of the bird is upheld against gravity and propelled forward against the resistance of the air, the result being flight. The author here studies these two elements of the motor power separately, whence may ultimately be deduced the sum total of the motor power.

**Production and Utilization of Coal in the United Kingdom.**—Taking the year's coal production in the United Kingdom at 160,000,000

of great value, however, is now introduced, in the shape of a new kind of metallic armor-plate, designed by Mr. A. Wilson, Sheffield, England. A specimen shield, 8 feet by 6 feet, and 10½ inches thick, has been experimented upon at Portsmouth, and has successfully resisted every attempt to fracture it. Projectiles weighing 400 pounds, discharged from the 18-ton gun, with a charge of 70 pounds of powder, were shattered at a range of 30 yards only, without in any way damaging the plate. The mode of manufacturing this new armor is at present a secret.

**A Very Simple Barometer.**—Alluding to the habits of the spider, *Nature* says that the web of this insect may be regarded as an admirable barometer, for when there is a prospect of rain or wind, the spider shortens the filaments from which its web is suspended, and leaves things in this state as long as the weather is variable. If the insect elongates its thread, it is a sign of fine, calm weather, the duration of which may be judged of by the length to which the threads are let out. If the spider remains inactive, it is a sign of rain; but if, on the contrary, it keeps at work during a rain, the latter will not last long, and will be followed by fine weather. Other observations have taught that the spider makes changes in its web every twenty-four hours, and that if such changes are made in the evening, just before sunset, the night will be clear and beautiful.

**The Export Coal Trade of Germany.**—The German official statistics of the export coal trade for the eight months ending with August show the total quantities of German produce exported to be 6,084,768 tons, against 5,963,297 tons in the corresponding period of 1886—an increase of 2.04 per cent. The comparison with last year is less favorable than it was at the end of July, when the increase appeared as 2.67 per cent. The falling-off is due chiefly to the low water in the Rhine, which, during the month of August, occasioned a serious interruption of the navigation. The total quantity is made up of 5,549,479 tons of coal—an increase of 0.78 per cent, 464,206 tons of coke—an increase of 17.54 per cent, and 71,083 tons of briquettes—an increase of 15.01 per cent. The trade with Holland in the eight months exceeded 2 million tons. A tendency to

increase is observable in the trade with Italy, the total exports being 46,838 tons against 37,164 tons in the corresponding period of last year. The increase is chiefly in coke.

**The Chemical Laboratory of Wiesbaden.**—The chemical laboratory of Geh. Hofrath Prof. Dr. R. Fresenius, at Wiesbaden, enjoys a very large attendance. In the summer term (1887) there were 77 students on the books. Of these 51 were from Germany, 8 from Austria, 4 from England, 3 from Russia, 3 from North America, 2 from Sweden, 2 from Spain, 1 from Holland, 1 from Belgium, 1 from France, and 1 from Brazil. Besides the Director, Geh. Hofrath Prof. Dr. R. Fresenius, there are engaged as teachers in the establishment: Prof. Dr. H. Fresenius, Dr. E. Borgmann, Dr. W. Fresenius, Dr. E. Hintz, Dr. (Med.) F. Hueppe, and Architect Brahm. The assistants in the instruction laboratory were two in number, in the private laboratory sixteen, and in the Versuchstation three. Besides the scientific researches, a great number of analyses were undertaken in the different departments of the laboratory and the Versuchstation, on behalf of manufacture, trade, mining, agriculture, and hygiene.

**The British Iron and Steel Trades.**—The returns of the English Board of Trade for the first nine months of the year show that iron and steel were exported to the value of £2,304,573, against £1,716,089 and £1,934,390 for the corresponding months of 1886 and 1885. For the nine months the total values for each year are: 1887, £18,579,845; 1886, £16,388,229; 1885, £16,510,298. Hardware and cutlery were exported during September to the value of £267,629, against £257,257 for September of last year. There is thus a gain on the month; but the statistics show a loss on the year to date of £10,000. Pig-iron has been sent abroad to the value of £283,417, against £230,561, the respective values for the nine months of 1887 and 1886 being £2,113,229 and £1,722,464. Bar, angle, and bolt, £133,745 (last year £106,541); for the nine months of 1887, £1,046,053; 1886, £992,210. Steel rails, during September, £334,665 (September, 1886, £225,794); for the nine months of 1887, £2,452,044; for the nine months of 1886, £1,865,988. In railway material of all sorts the value exported last September was £454,638, against £308,900 for September of 1886; for the nine months of 1887, £3,372,123; for the nine months of 1886, £2,919,593. Hoops, sheets, and plates, £329,972 for last September, and £233,745 for September, 1886; for the nine months of 1887, £2,408,952; for the nine months of 1886, £2,296,639. In steel (unwrought) there is also an important improvement, chiefly owing to the demand from this country. For the month the value of steel exported was £133,050, against £136,106; for the nine months, £1,639,050, against £975,621. The value shipped to our ports has advanced from £347,688 in the nine months of 1886 to £957,777 in the corresponding period this year.

**The Submarine Cables of the Globe.**—There are at present ten submarine cables between Europe and the northern part of this continent. Of these, six start from Valentia, Ireland, two from Brest, two from Penzance. The two latter have a connection with Havre and Emden. South America is joined to Europe by two cables from Lisbon to Pernambuco, Brazil. England has two cables to India, one from Bombay over Aden to Alexandria and Marseilles, the other from Falmouth over Gibraltar. Between England and France there are eight cables from Dover to Calais. England is further connected by four cables with Germany (Lowestoft-Emden), by two with Norway, two with Holland, one with Lisbon, one with Sweden (Gothenburg), one with Denmark (Londerwig), and one with Belgium (Ostend). English companies also own the cables between Malta and Tripoli, Malta and Sicily, Alexandria and Otranto, Alexandria and Alep, Alexandria and Port Said, Suez and Aden, Suakim and Jeddah, Madras and Australia over Penang, and Singapore and Java. From the latter cable, a branch goes to Saigon, Hué, and Haiphong. In the Sea of China we find the connections Saigon, Hongkong, Shanghai, &c. Two cables go to Nagasaki in Japan, Corea, and Siberia. On the African coast, English companies own the cables from Cadiz to Senegal, Aden to the Cape of Good Hope, Australia to New Zealand. France and Algeria have three cables from Marseilles, and another goes to Spain (Barcelona). Russia has connections with Denmark, Sweden, and by Odessa with Constantinople. The latter cable passes on to Salonica. Austria has a cable from Trieste to Corfu. Of shorter cables may be mentioned that from Otranto to Valonia (Turkey) and that from Corsica to Sardinia. The Antilles are joined to this continent by a cable from English Guiana. There is also a cable along the Mexican coast, and a second from Mexico to Chili.

**Progress of Electricity in France.**—Although the precise details of construction of the new accumulator just introduced by Desmazure and used on the electric launch recently tried at Havre, have not been made known by the inventor, sufficient information can be gleaned from the French patent specification to show the general principle involved. According to this patent the electrodes consist of amalgamated zinc plates and porous copper plates, the latter being produced by the consolidation of powdered copper under very great hydraulic pressure. The zinc plates form the negative electrode, and are in metallic connection with the box, which is also of zinc, whilst the positive plates are placed in vegetable parchment bags and suspended in the usual way. Contact with the negative plates is prevented by glass rods. The electrolyte is a mixture of chlorate of sodium and a caustic solution of zinc oxide. The patent gives very complete data relating to the construction of a particular form of cell, from which the following are abstracted as the more important: There are five positive and six negative plates, having a total weight of 13 pounds. The positive plates measure 10 inches square, and are .08 of an inch thick. The negative plates, which reach right to the bottom of the cell, measure 10 inches by 12 inches, and the weight of the box complete is 45 pounds. The external dimensions are 12 inches long by 3½ inches wide and 16 inches high. The cell should be charged with a current of 18 ampères, and may be discharged at 36 ampères, the total capacity being 2 ampère hours. The E. M. F. on open circuit is 1 volt, but when discharging at full current it falls to .85 volt. From these figures it would appear that the Desmazure battery is considerably lighter per horsepower hour than any secondary battery of the Planté type, and the result of the trials with the electric launch, where two tons of battery were used, indicates even a still better performance than that referred to the patent specification.

BOOKS 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.]
- Recent Advances in Electricity.* Edited by Henry Greer. Published by the College of Electrical Engineering, New York. 1887. Pages 55. No Index. Illustrated. Price \$1.
- Transactions of the American Institute of Electrical Engineers.* Vol. IV. Published by the Institute, New York. 1887. Pages 232 and Index. Illustrated.
- The Railways of Brazil, South America.* By John C. Branner, Ph.D., Little Rock, Ark. Reprinted from the *Railway Age*, with Notes and Additions. Published by the *Railway Age* Publishing Company, Chicago, 1887. Pages 26. No Index. Illustrated.
- The Labor Problem: Plain Questions and Practical Answers.* Edited by William E. Barns. With an Introduction by Richard T. Ely, Ph.D., and Special Contributions by James A. Waterworth and Fred Woodrow. Published by Harper Brothers, New York. 1887. Pages 330 and Index. Price \$1.

DIVIDENDS PAID BY MINING COMPANIES DURING OCTOBER AND FROM JANUARY 1st, 1887.

NAME OF COMPANY.	Paid in Oct.	Since Jan. 1.	NAME OF COMPANY.	Paid in Oct.	Since Jan. 1.
Adams, Colo.		\$15,000	Lady Franklin, N. M.		\$50,000
Amy & Silversmith, Mont.		42,678	Leadville Cons., Colo.		20,000
Aurora, Mich.	75,000	155,000	Mammoth, Utah		10,000
Atlantic, Mich.		40,000	Mary Murphy, Colo.		70,000
Bellevue Idaho, Idaho.		37,500	Montana, Lim., Mont.	247,600	669,800
Big Bend Hydraulic, Dak.		48,000	Morning Star, Colo.		25,000
Brooklyn Lead, Utah.		25,000	Moulton, Mont.		30,000
Calumet & Hecla, Mich.		1,000,000	Mount Pleasant, Cal.		45,000
Central, Mich.		40,000	Mugwump, Dak.		4,000
Cons. Cal. & Va., Nev.	108,000	1,080,000	Ontario, Utah	75,000	750,000
Colorado Central, Colo.	13,750	68,750	Original, Mont.	3,000	9,000
Daly, Utah		300,000	Osceola, Mich.		50,000
Deadwood Terra, Dak.	20,000	80,000	Paradise Valley, Nev.		10,000
Derbec Blue Gravel, Cal.		20,000	Parrott, Mont.		38,000
Durkin, Colo.	20,000	30,000	Plymouth Cons., Cal.	40,000	295,000
Elkhorn, Mont.		35,000	Plumas Eureka, Cal.	17,578	42,590
Empire, Mont.	37,500	70,500	Quicksilver, Cal.		118,250
Eureka, Nev.	12,500	25,000	Quincy, Mich.	40,000	200,000
Gardfield, Nev.		12,500	Richmond Con., Nev.		67,500
Granite Mountain, Mont.	200,000	1,600,000	Russell, Cal.	5,000	25,000
Grays Queen, N. M.		2,000	Silver King, Ariz.		175,000
Homestake, Dak.	35,000	250,000	Sierra Buttes, Cal.	38,281	76,256
Houma, Utah		37,500	Small Hopes, Colo.	30,000	500,000
Hope, Mont.	25,000	25,000	Standard, Cal.	5,000	5,000
Illinois, New Mex.		25,000	St. Joseph's Lead, Mo.		30,000
Iron Hill, Dak.	12,500	25,000	Surinam, D. G.	45,000	75,000
Iron Silver, Colo.	100,000	200,000	Viola, Limited, Idaho		37,500
Idaho, Cal.	15,500	124,000	Yankee Girl, Colo.	12,500	187,500
Jav Gould, Mont.	16,000	71,000			
Jumbo, Colo.		15,000	Total	\$1,259,799	9,242,814

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 NOVEMBER 1st, 1887.
- 372,289. Safety Vent for Steam Boilers. Wm. C. Baker, New York, N. Y., Assignor to the Baker Heater Company, same place.
- 372,290. Self Lubricating Car Wheel. Irving Barker, Braidwood, Ill.
- 372,292. Converter. Simon C. Collin, Bradstock, Pa.
- 372,407. Nail Plate Feeder. James Fielding, Steubenville, O.
- 372,320. Machine for Making Wire Nails. Thomas McMahon, Brooklyn, N. Y.
- 372,327. Apparatus for Producing Coal. Raoul Pierre, Pictet, Geneva, Switzerland.
- 372,330. System of Electrical Distribution. E. Wilbur Rice Jr., Lynn, Mass.
- 372,336. Metal Mold for Casting Car Wheels. William Sellers, Philadelphia, Pa., Assignor to Wm. Sellers & Co., incorporated, same place.
- 372,348. Oscillating Engine. Frank L. Wheeler, Southington, Conn., Assignor of one half to Edward M. Lewis, same place.
- 372,358. Electric Dynamometer. Jules Caudeker, Paris, France.
- 372,360. Steam Generator. Joseph E. Culver, Jersey City, N. J.
- 372,409. Draft Regulator for Furnaces. Wilhelm Fischer and Theodore Stiehl, Essen-on-the-Ruhr, Prussia, Germany.
- 372,427. Boiler-Furnace. Frederick Ludwig, Glencoe, Minn.
- 372,469. Ore-Jigger. David Hill and George W. Hall, Georgetown, Colo.
- 372,479. Pipe Coupling. H. Sellers McKee, Pittsburg, Pa.
- 372,486. Composition for Mineral Wool. Richard D. A. Parrott, Greenwood Iron Works, N. Y.
- 372,487. Boiler-Flue. David Purves, Ferro Dene, Green Lane, North Dulwich, County of Surrey, England.
- 372,490. Machine for Cutting and Screw-Threading Tubes, etc. Alexander Saunders, Yonkers, N. Y.
- 372,491. Machine for Testing the Water-Proof Quality of Fuses for Blasting. George A. Saunders, Avon, Conn., Assignor to the Climax Fuse Company, same place.
- 372,493. Safety-Valve and Alarm. Thomas Shaw, Philadelphia, Pa.
- 372,501. System of Electric Distribution for Alternating Currents. Elihu Thomson, Lynn, Mass.
- 372,504. Screw-Cutting Tool. James C. Williams, Erie, Pa., Assignor to the Jarecki Manufacturing Company, Limited, same place.
- 372,519. Steam Boiler. Miles L. Clinton, Ithaca, New York. Assignor to Sarah C. Clinton, same place.
- 372,521. Shaft-Bushing for Loose Pulleys. Hilen C. Crowell, Erie, Pa.
- 372,541. Machine for Threading Bolts and Nuts. Frank M. Kennedy, Youngstown, Ohio. Assignor to Edwin Bell, Jr., same place, and Henry J. Kennedy, Hadley, Pa.
- 372,550. Apparatus for Covering Insulated Electrical Conductors. Edw. McKnight, Philadelphia, Pa., Assignor to William P. Tatham, Henry B. Tatham, and James Tatham, same place.
- 372,568. Joint for Gas Mains. George N. Riley, Braddock, Assignor to Edmund C. Converse, Allegheny City, Pa.
- 372,571. Art of Ups-tting and Shaping Metal Bars. George H. Sellers, Ridley Park, Pa., Assignor to the Edge Moor Iron Company, New Castle County, Del.
- 372,572. Steam Boiler. George H. Sellers, Ridley Park, Pa., and William Malam, Edge Moor, Del., Assignors to the Edge Moor Iron Company, New Castle County, Del.
- 372,582. Submarine Excavation. John Wagner and Peter Wagner, Atchison, Kan.
- 372,583. Crushing Roll. Enos A. Wall, Salt Lake City, Utah.
- 372,589. Sheet Metal Roofing. Joseph A. Andrews, Cincinnati, Ohio. Assignor to the Globe Iron Roofing and Corrugating Company, of Ohio.
- 372,598. Circuit System for Electric Brakes. George F. Card, Covington, Ky., Assignor to Henry K. Lindsley, Cincinnati, O.
- 372,599. Coupling for Electric Brakes. George F. Card, Covington, Ky., Assignor to Henry K. Lindsley, Cincinnati, O.
- 372,606. Measuring Apparatus for Oil. Bernhard Droeger, Allegheny, Pa.
- 372,619. Hardening Compound. Hiram G. Hicks, Worcester, Mass.
- 372,621. Appliance for Heating Rolls of Rolling Mills. Franklin Hilton, Middleborough-on-Tees, County of York, England.
- 372,623. Machine for Forging Horse-Shoe Nails. John A. Hutchinson, Chicago, Ill., Assignor to Abraham W. Kinsland, same place.
- REISSUES.
- 10,878. Gas Engine. Albert Schmid, Allegheny, and J. Charles Beckfield, Reserve, Pa.

## THE METALLURGY OF STEEL.\*

By Henry M. Howe.

(Continued from page 315.)

They obtained alloys of steel (A) with 50% of platinum, beautiful, with the finest imaginable color for a mirror, taking a high polish, non-tarnishing and malleable; (B) with 11% of platinum, taking a high polish, finely damasked, and free from rust after many months exposure.<sup>a</sup> They were probably in error in attributing the excellent qualities of platinum as of silver steel to the presence of the noble metal.

Billings found that platinum increased the hardness of steel less, but diminished its forgeableness more, than a like proportion of carbon did. A pure ingot iron with .08% carbon and .82% of platinum was extremely redshort and white-short: otherwise pure steel with 4% of platinum and nearly 2% of carbon was slightly redshort, and inferior in quality to steel of like composition less the platinum.<sup>b</sup>

B. PALLADIUM in steel in the ratio 1 : 100 produces according to Faraday and Stodart an alloy "truly valuable" especially for instruments demanding a perfectly smooth edge.<sup>c</sup>

RHODIUM, uniting with iron in all proportions, forms with steel alloys "perhaps the most valuable of all" according to Faraday and Stodart, remarkably hard, forgeable, and hardening without cracking. Steel with 50% of rhodium has when polished "the most exquisite beauty" and "the finest imaginable color" for mirrors, and long resists tarnishing.<sup>c</sup>

C. OSMIUM-IRIDIUM-iron alloys of the following compositions have been prepared.

3% osmium-iridium with pure iron; forgeable, long resists rusting, distinctly blue, hardens when quenched from redness, though no carbon could be detected in it. Faraday and Stodart.<sup>d</sup> Calculated composition.

2.98% osmium-iridium with Swedish iron containing not more than .07% of carbon. Very homogeneous, not hardened by quenching; Boussingault.<sup>e</sup>

2.98% iridium replaced the osmium-iridium of the preceding alloy with like results; Boussingault.<sup>e</sup>

Note that osmium-iridium conferred the power of hardening on Faraday's alloy but not on Boussingault's.

D. GOLD alloys with iron: of the value of its alloys with steel Faraday and Stodart were doubtful.

E. SILVER does not alloy with iron readily if at all. On exposing steel and 0.62% of silver foil to a white heat for three hours in a crucible filled with crushed glass, Faraday and Stodart found the silver fused and adhering to the steel, but none had combined. After many trials they found that steel would take up but 0.2% of silver: when more was present part was found as a metallic dew lining the interior of the crucible, and the fused button itself was a mere mechanical mixture of the two metals. But 0.2% of silver appeared to unite perfectly with the steel, yielding a product harder than either the best cast-steel or wootz, and with no disposition to crack in forging or hardening.<sup>f</sup> They thought that silver greatly benefited steel, but were probably completely deceived.

Of 0.5% of silver added by Billings to molten ingot metal

only traces were found in the solidified ingot, while globules of silver were found above it.<sup>g</sup> Of 1.5% of silver added by Karsten to cast-iron in the charcoal refinery, but .034% was retained by the bar iron, which was unsound, laminar and very redshort.<sup>h</sup>

IRON WITH THE METALS OF THE ALKALINE EARTHS.—It is very doubtful whether any class of iron made by ordinary methods can contain calcium, magnesium, barium or strontium as such: nor is it certain that any of these metals can be alloyed with iron even experimentally. The small quantities occasionally reported probably exist as oxide or silicate in the mechanically held slag. Gay Lussac and Thenard were unable to reduce calcium, barium or strontium from their oxides by heating with charcoal and iron: Berzelius failed to reduce calcium in this way, though he obtained "indications" of an alloy of iron and magnesium.<sup>i</sup>

Hot iron absorbs vapor of magnesium, evolving it when heated in vacuo.<sup>j</sup>

POTASSIUM AND SODIUM, however, are reduced from their hydrates by iron at a white heat, and from their carbonates by carbon: hence their reduction in the blast-furnace and their retention by the metal through the refining processes is not impossible on a priori grounds, especially if the refining be accompanied by basic slags. By strongly heating iron-filings with bitartrate of potash, alloys containing 74.6 and 81.4% of iron and 25.4 and 18.58% of potassium respectively have been produced, which closely resemble wrought-iron, can be forged and welded, are so hard as to be barely fileable, and oxidize rapidly in air or water.<sup>k</sup> By long exposing iron turnings at a high temperature to vapor of potassium Gay-Lussac and Thenard obtained a flexible iron-potassium alloy, which was occasionally soft, sectile and even scratched with the nail.<sup>l</sup> These metals have, however, rarely been detected in iron, perhaps because rarely sought. Their influence on commercial iron is unknown, if indeed it exists.

### CHAPTER IX.

#### IRON AND OXYGEN.

##### § 163. THE OXIDES OF IRON.

A. SUBOXIDE.—Bell obtained strong indications of the existence of an oxide lower than ferrous oxide, perhaps of the composition  $Fe_2O$ .<sup>m</sup>

B. FERROUS OXIDE.— $FeO$ , though it may be isolated according to Debray by passing equal volumes of carbonic acid and oxide over red-hot ferric oxide, and though according to Liebig it may be obtained mixed with spongy iron by igniting ferrous oxalate in a closed vessel, yet absorbs oxygen with such avidity that it is not easily produced.<sup>n</sup> A powerful base, its silicates and phosphates are of great importance in the slags of iron metallurgy. Ferrous silicate is formed with evolution of oxygen by the action of silica on ferric oxide at high temperatures:<sup>o</sup>

<sup>g</sup> Trans. Am. Inst. Mining Engineers, V., p. 454, 1877.

<sup>h</sup> Percy, Iron and Steel, p. 175.

<sup>i</sup> Percy, Iron and Steel, p. 196. A famous analysis of spiegeleisen by Fresenius gave .063 potassium, traces of sodium, .045 magnesium, .091 calcium and traces of lithium. (Kerl, Grundriss der Eisenhüttenkunde, p. 42.) Karsten found .1774 calcium in wrought-iron, which was deficient in weldability and tenacity, though neither red-nor coldshort. (Percy, Iron and Steel, p. 197.) Kerl quotes seven cast-irons which contain from .02 to .46% of calcium and from .00 to .25% of magnesium. (Op. cit., pp. 27 to 43.) Percy quotes but doubts an analysis of cast-iron with .97% aluminium, 1.37% calcium and 0.43% magnesium. (Iron and Steel, p. 542.)

<sup>j</sup> Compare § 145, A.

<sup>k</sup> Calvert and Johnson, Phil. Mag., 4th Series, X., p. 242, 1855.

<sup>l</sup> Percy, Iron and Steel, p. 196.

<sup>m</sup> Journ. Iron and St. Inst., I., 1871, p. 106.

<sup>n</sup> Watts, Dictionary of Chemistry, 1871, III., p. 393.

<sup>o</sup> Percy, Iron and Steel, p. 20.

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<sup>a</sup> Percy, Iron and Steel, p. 177. These are the calculated compositions.

<sup>b</sup> Trans. Am. Inst. Mining Engrs., V., p. 452, 1877.

<sup>c</sup> Percy, Iron and Steel, p. 189, from Phil. Trans., 1822, p. 256. Calculated composition.

<sup>d</sup> Percy, Iron and Steel, p. 181.

<sup>e</sup> Journ. Iron and Steel Inst., 1886, II., p. 812, from Ann. de Chimie et Phys., 5th Ser., XV.

<sup>f</sup> Phil. Trans. Royal Society, 1822, p. 255.



stable at moderately high temperatures, at extremely high ones it readily absorbs oxygen from the air.

C. FERRIC OXIDE,  $Fe_2O_3$ , frequently giving up its oxygen to organic matter even at ordinary temperatures, at higher ones becomes a strong oxidizing agent, being reduced to magnetic oxide with evolution of oxygen when heated alone to its very high melting point, and at apparently much lower temperatures when heated in contact with metallic iron. It is readily and completely reduced by hydrogen, by carbon and by ammonia: its reduction by carbonic oxide is probably never quite complete unless carbon intervenes, though the contrary is generally stated, for Bell found that both spongy iron and ferric oxide when heated at bright redness and cooled in this gas yielded a product containing from .8 to 1% of the oxygen required to form ferric oxide.<sup>a</sup> Even large lumps of ferric oxide may be nearly if not quite completely reduced by contact with lump carbon, the carbonic oxide formed by the surface action doubtless penetrating, then carrying oxygen from the interior oxide outwards, being again reduced to carbonic oxide by the surrounding carbon, and so on. In the interior of lumps of ore which had been heated in lump charcoal, I have found particles of malleable spongy iron so placed that they had been apparently (though not certainly) completely surrounded by gangue, and so cut off from contact with outer iron which was being deoxidized.

Both at high and low temperatures ferric oxide, like alumina, at least occasionally acts as an acid. Percy completely melted mixtures of ferric oxide and lime, twice obtaining masses of interlacing acicular crystals containing 73.39% of ferric oxide and 24.5% of lime ( $Fe_2O_3 \cdot CaO = Fe_2CaO_4$ ), which may be regarded as magnetic oxide whose ferrous oxide is replaced by lime.<sup>b</sup> The neutral carbonates of potash and of soda are not decomposed by heat alone: but their carbonic acid is expelled when they are strongly heated with ferric oxide.<sup>c</sup> A compound of the formula  $4CaO \cdot Fe_2O_3 = Ca_4Fe_2O_7$  may be precipitated from certain solutions as a snow-white powder, though containing nearly 50% of ferric oxide.<sup>d</sup>

D. IRON RUST, consisting essentially of hydrated iron oxide, varies in composition with the conditions under which it forms. According to Mallet<sup>e</sup> it tends in proportion to the duration of reaction to approach the formula  $2Fe_2O_3 \cdot 3H_2O$  (limonite), mixed with more or less (usually less) ferrous carbonate  $FeCO_3$ , and when very old it appears to lose water and approach the composition of hematite,  $Fe_2O_3$ . When formed far beneath the surface of water it consists of black hydrated magnetic oxide.<sup>f</sup> Iron rust often contains minute quantities of ammonia.

E. FERROSO-FERRIC OXIDES.—Oxides of many and perhaps all compositions intermediate between ferrous and ferric oxide form: magnetic oxide  $Fe_3O_4 = Fe_3O_3 \cdot FeO$ , and probably scale oxide  $Fe_8O_9 = 6FeO, Fe_2O_3$  are of definite composition: the others may be viewed as chemical compounds of ferrous and ferric oxide in continuously varying proportions.

These oxides are in general unstable, on slight provocation taking up oxygen or letting it go, and passing readily from a lower to a higher state of oxidation or vice versa: they thus act as carriers of oxygen, assisting

oxidation in oxidizing operations and reduction in reducing ones. This is probably true of their silicates also.

THE MAGNETIC is in many respects the most stable oxide of iron. At ordinary temperatures it resists the action of the weather and of many reagents. A coating of this oxide, such as is produced in blueing, Barffing, etc., protects metallic iron from rusting, while ferric oxide on the one hand hastens the rusting of iron with which it is in contact, and ferrous oxide on the other itself rapidly absorbs oxygen. While at moderately high temperatures, as when ignited in air, magnetic oxide is converted into ferric oxide, at still higher ones it is spontaneously formed by the decomposition of ferric oxide by heat alone.

The facts that magnetic oxide is so comparatively stable: that ferrous oxide is so powerful a base: that in certain cases both at high and low temperatures ferric oxide acts as an acid, and in certain of them forms compounds similar to magnetic oxide, (*e. g.*, the compound  $Fe_2CaO_4$  already described), and in others even isomorphous with it (*e. g.*, franklinite  $Fe_2ZnO_4 = ZnO, Fe_2O_3$ ): that the sesquioxides analogous to ferric oxide, viz. alumina and chromic oxide, form with ferrous oxide compounds isomorphous with magnetic oxide, (ceylonite  $Al_2FeO_4 = FeO, Al_2O_3$  and chrome iron ore  $Cr_2FeO_4 = FeO, Cr_2O_3$ ), in the latter of which chromic oxide may reasonably be regarded as an acid: that ferric oxide and alumina often replace part of the chromic acid in this mineral: and that in other cases both alumina and chromic oxide act as acids, strongly suggest that in magnetic oxide we have a true salt, a ferrite, ferric oxide its rather mild acid, ferrous oxide its powerful base. This view harmonizes with the fact that, when magnetic oxide is attacked in a closed vessel by not more than enough hydrochloric acid to dissolve its ferrous oxide, the latter alone dissolves, hydrochloric acid appearing to displace ferric oxide much as it would carbonic acid.

F. SCALE OXIDE.— $Fe_8O_9 = 6FeO, Fe_2O_3$ . Exposed to air or to furnace gases at a red or higher heat, iron acquires a coating intermediate in composition between ferrous and ferric oxides, often divisible into two or three layers more or less arbitrarily chosen: the outer is always the most highly oxidized, the inner though probably of indefinite composition sometimes approximates the formula  $Fe_8O_9$ . The following percentages of ferric oxide in iron scale have been published, chiefly by Percy.<sup>g</sup> The heavy faced figures represent the compositions  $Fe_8O_9$  and  $Fe_3O_4$ .

TABLE 40.—PERCENTAGE OF FERRIC OXIDE IN IRON SCALE.

26.19 inner layer.	36.60*	47.67 middle layer.	89.27 velvet scale.
27.04 $Fe_8O_9$	37.49 all layers.	52.01 " "	98.63 outer layer.
27.08 inner layer.	40.51 middle layer.	59.00 " "	98.80 " "
35.77 outer "	46.77 inner "	68.97 $Fe_3O_4$	99.68 " "

\* G. W. Maynard, Trans. Am. Inst. Mining Engrs., X., p. 281, 1882.

G. FERRIC ACID, though never isolated, may be supposed to exist in the ferrates of the alkalis and of baryta, which form in the dry and the wet way. It is conceivable that similar salts may form in metallurgical operations.

(TO BE CONTINUED.)

NOTE.—The publishers of the ENGINEERING AND MINING JOURNAL will thank the readers of this article if they will promptly call attention to any inaccuracies they may observe in it.

<sup>a</sup> Iron and Steel, pp. 21 et seq.

CORRECTION.—In the note to Table 34, page 260, I speak of Imperial Steel as made by Park, Brother & Co. I learn that, though sold exclusively by them, it is made only at the Frankford Steel Works, of Philadelphia.

<sup>a</sup> Jour. Iron and St. Inst., 1871, I., p. 113.

<sup>b</sup> Metallurgy, Fuel, New Edition, 1875, p. 78.

<sup>c</sup> Percy, Iron and Steel, p. 17.

<sup>d</sup> Idem, p. 19.

<sup>e</sup> Rept. British Ass., 1843, p. 11.

<sup>f</sup> Percy, Iron and Steel, p. 28.

## PERSONALS.

Mr. Petter Ostberg, of Stockholm, is at present on a visit to this country, and is staying at the Brunswick Hotel, New York.

David Morgan, President and General Manager of the Republic Iron Company, Marquette, Mich., died on the 29th ult., aged 68 years.

Mr. E. G. Spilsbury, mining engineer, has just returned from Europe, where he has been for two months on professional business.

We learn that the next meeting of the American Institute of Mining Engineers will be held at Boston, and that during the Spring the members will assemble at Birmingham.

Mr. William H. M. Henderson, of Philadelphia, mechanical engineer, has been engaged by Messrs. Cabot Brothers, to entirely reconstruct their gas regulator factory at Worthington, Pa.

Prof. T. B. Comstock has resigned his position as Assistant Geologist of the Geological Survey of Arkansas. He will be succeeded by Arthur Winslow, of North Carolina, who will devote particular attention to the coal-fields of Arkansas.

Mr. Philip E. Chapin, General Manager of the Cambria Iron Works, Johnstown, Pa., has tendered his resignation, to take effect on New Year's. It is generally believed that John Fulton, the present General Superintendent, will be his successor.

## FURNACE, MILL, AND FACTORY.

The Fairhaven Iron-Works, Fairhaven, Pa., were destroyed by fire on the 3d inst.

Natural gas has been introduced in the extensive plant of Brown, Bonnell & Company, at Youngstown, Ohio.

The Crane Iron Company's furnace at Catsauqua, Pa., is again in blast. Five of the company's furnaces are now in operation.

It is stated that the business of the American Electric Manufacturing Company, of this city, has been doubled in the last six months.

The lease which the Tudor Iron-Works held on the Laclede Rolling-Mills, St. Louis, Mo., was not renewed and the mill is now idle.

The new puddling mill of the Catsauqua Manufacturing Company, at Ferndale, Pa., has been completed. The first iron was puddled in it on the 27th ult.

Coleman, Shields & Co. have purchased the original Ward Mill, at Niles, O., and have started 16 puddling furnaces and the plate-mill, making skelp iron for pipes and tubes.

The capital stock of the Elm City Iron, Works, at Marietta, S. C., has been increased and the capacity of the works will be doubled. Agricultural machinery of all kinds, engines, etc., will be manufactured.

The North Star Iron-Works, of Minneapolis, has made arrangements to put in a large plant at Oakland, a suburb of St. Paul, Minn. The land has already been secured from the Union Land Company, and work will be commenced at an early day.

The Sharon Iron Company, of Sharon, Pa., are experimenting with a machine capable of making either cut or wire nails. It produces diamond-pointed cut nails, and it is asserted that cut-nail machines can be readily changed at a slight cost to produce wire nails.

The Chattanooga Tool Company, Chattanooga, Tenn., has purchased the outfit, patents, and good-will of the Lorain Tool-Works, of Lorain, Ohio, and has removed the plant to Chattanooga. The works at that place have been completed and the capacity has been greatly enlarged.

It is stated that the Tennessee Coal, Iron and Railroad Company and the Sloss Iron and Steel Company, of Birmingham, Ala., having bought the right to manufacture steel by the basic process of Jacob Reese, have selected sites at Ensley, Ala., for mammoth steel works, and propose to begin work soon.

The difficulties of parties interested in the Oregon Iron and Steel Company at Oswego, Oregon, have been settled and work is to be resumed. The new furnace will be finished and a plant for making cast-iron pipe put in. The company owns 14,000 acres of timber land, upon which are extensive iron mines.

The Western Forge and Tool Works, St. Louis, Mo., made an assignment to R. W. Cruttenden, on the 29th ult., for the benefit of creditors. The company was incorporated in 1885, capital \$8000. In November, 1886, it reorganized, with a capital of \$20,000. The assets are given at \$12,000, liabilities not stated.

The Duquesne Steel-Works, located below Duquesne, Pa., will begin operations December 1st with 60 men, and will produce 100 tons of pipe per week. The product will be chiefly steel boiler tubes, and lap-weld wrought-iron tube. Two bending and a welding furnace will be erected. Natural gas connections have been made by the Philadelphia Company.

An explosion occurred at the works of the American Forcite Powder Company, at McCainsville, near Lake

Hopatcong, N. J., on the 31st ult., killing four persons and blowing the whole building to bits. The men who were killed were workmen engaged in packing away cartridges. The coroner held an inquest and exonerated the company from all blame in the matter.

A company is now being organized in Pittsburg, Pa., for the purpose of manufacturing safe deposit and other vaults, safes made from iron and steel, and for the prosecution of business in this branch of manufacture. The names of Reuben Miller, John W. Chalfant, William Metcalf, Wilson McCandless, George I. Whitney, C. L. Magee, P. C. Knox and others are included in the list of incorporators.

The New York Wire and Wire Spring Company, New Haven, Conn., has made an assignment, and Gen. S. E. Merwin was named for trustee. The business was carried on at the mill of the New Haven Wire Company, in Fair Haven. The assignment was made to dissolve certain attachments. The capital stock of the concern was \$25,000. It was closely allied to E. S. Wheeler & Co., and the failure is another result of the failure of that firm.

Furnace F, of the Edgar Thomson Steel Works, Homestead, Pa., has just completed its first year's blast, having been blown in on October 18th, 1886. Its product for this period was 87,969 gross tons of Bessemer pig-iron, and the coke consumed was 2067 pounds per gross ton of pig-iron produced. The average yield of ore mixture through the furnace was 61 per cent of iron. But for the coke strike the furnace would have made over 90,000 tons of pig-iron in the first year of its history.

The firm of Summers Bros. & Co., owning and operating the rolling-mill at Struthers, Ohio, has undergone some change, Samuel Summers purchasing the interest of Silas Summers, and James Summers selling his interest to William and Samuel Summers, who are now the owners of the fine industrial plant. Samuel Summers will manage the financial part of the business, and William Summers will superintend the property.

The parties who purchased the Scottdale Iron-Works, formerly owned by W. H. Everson & Co., of Scottdale, Pa., referred to in our issue of October 15th, have effected a permanent organization by electing P. S. Loucks, J. R. Stauffer, J. R. Smith, Clark Grazier, Thomas Tennant, of Scottdale, and Messrs. Taylor and Rotstatt, of Pittsburg, directors. Mr. Loucks was chosen chairman of the board, and Clark Grazier treasurer and secretary. The mills will be started up shortly.

In reference to the use of the Clayton air compressors for caisson work, Col. Geo. S. Morrison, C.E., writes to the manufacturers as follows: "I am still well satisfied with the working of your air compressors, and just now, as you know, have four No. 4 Clayton Duplex air compressors in actual work—two at Omaha and two at Rulo." Col. Morrison also used the Clayton air compressors in sinking the caissons for the Bismarck bridge on the Northern Pacific Railway; at Council Bluffs, on the Union Pacific Railway, and at the Blair Crossing bridge, on the Missouri Valley & Blair Railway.

A meeting was recently held in Toronto, Ont., by a number of local consumers of finished iron and others interested in the iron trade, who propose to establish rolling-mills there. It was stated that the city would give a long lease at a nominal rent of any land possessed by the corporation for the purpose of establishing the mills, and that the total cost of erecting mills with capacity to produce 60 tons of finished iron per day would be about \$66,000. A committee was appointed to gather all necessary information relating to the scheme, to report to a subsequent meeting to be held at an early day.

A meeting of the creditors of Robert Hare Powell & Company, and Robert Hare Powell, Sons & Company, which recently suspended, was held at Philadelphia recently. It was proposed that an extension be granted, by which the bondholders would be paid in five years with interest at 6 per cent, and the unsecured creditors be paid in installments in 10 years with interest at 5 per cent. It was decided to accept this proposition with any modifications which might be suggested by a committee of the creditors to be appointed by the officers of the meeting. This committee was also given authority to call an early meeting of the creditors to hear its report. A resolution requesting that the new blast-furnace at Saxton, Pa., be put in blast at once was passed unanimously.

The Erie Railway officials have just issued an order changing the name of their station Greenwood Works to Arden, N. Y. The change marks the final collapse of the iron mining and smelting industries that were carried on in the locality for more than three-quarters of a century. The furnaces at Greenwood were erected in 1812 by two brothers named Cunningham, for the purpose of reducing the ores found in the Mount Bashan, O'Neil, Hogan camp, and other valuable mines in the vicinity. In 1852 the property, which then included the smelting furnaces, mines, tramways, and machinery, and 10,300 acres of land, was purchased by Peter and Robert Parrott, and they, after operating the works for twenty-eight years, were succeeded in the ownership, in 1880, by the Parrott Iron Company, a corporation with \$500,000 capital. The Parrott Company made a bad failure about two years ago, and the subsequent sale of the property under legal proceedings by the referee appointed by the courts has been followed by the total cessation of the industries connected therewith. Workmen are now engaged dismantling the furnaces and taking up the railroad

tracks. The mining machinery and apparatus was purchased and removed recently by Pennsylvania parties. The 10,300 acres of land were bought in by some of the creditors of the Parrott Iron Company, who propose, it is said, to convert it into a rural pleasure resort on a grand scale, after the pattern of Tuxedo Park, which is distant six miles.

## CONTRACTING NOTES.

Contracts open will be found on page xix. New contracts this week, No. 603, Water-Works; No. 609, Harlem River Improvement, excavation of 150,000 cubic yards; No. 610, Iron Stairs, etc.; No. 611, Terra-Cotta Pipe and Bends; No. 612, Iron-Work and Masonry; No. 613, Bridge; No. 614, Iron Columns, Beams, Roof, etc.; No. 614, Lighthouse Supplies.

A contract for cast-iron water-pipe for the town of Lake, a suburb of Chicago, Ill., was awarded last week to the Shinkle, Harris & Howard Iron Company, of St. Louis, Mo. The terms are \$29.74 per ton of 2000 pounds of 24-inch pipe, to be delivered as fast as required by the board. The length of pipe needed is about 27,000 feet and it will cost \$95,000.

The Swindell Construction Company, of Pittsburg, Pa., has been awarded a contract by the Syracuse Tube Company, of Syracuse, N. Y., to erect for them complete a tube-welding gas furnace having a working hearth 26 feet long by 7 feet wide, and also a block of four improved gas producers, including the necessary conduits etc.

The Navy Department, Washington, D. C., has received the following bids for the construction of one first-class steel twin screw sea-going torpedo boat: Vulcan Iron Works, of Chicago, at \$84,800, and the Herreschoff Manufacturing Company, of Bristol, R. I., at \$82,750. For the overhead traveling cranes and appurtenances, bids were made in detail for the different parts of the structures by William G. Coolidge & Co., of Chicago; Roberts & Co., of Philadelphia; Yale & Towne Manufacturing Company, of Stamford, Conn.; Post & McCord, of New York, and Morgan Engineering Company, of Alliance, Ohio. The lowest bidders in the different classes were Roberts & Co., Morgan Engineering Company, W. G. Coolidge & Co., and the Yale & Towne Manufacturing Company.

## LABOR AND WAGES.

The railroad coal miners of the Mansfield Valley (Pa.) have notified the operators that, if the 5 per cent advance in wages promised them at the Columbus, Ohio, conference is not granted before next Monday, a general strike will be begun. November 1st was the date fixed for the railroad miners of the country to receive a five cent per ton advance in wages, according to the Columbus agreement, provided it can be shown that the latter has been faithfully carried out. The Inter-State Board of Arbitration will meet before November 15th to consider the matter. If an advance is decided upon it will date from November 1st.

St. Louis, Oct. 30.—The President and Executive Committee of the Consolidated Coal Company, which controls the output of the St. Louis District, met at St. Louis October 30th, and considered the demands made on the 29th ult. by the miners. The coal operators agreed upon an increase of 6½ cents a ton to hand miners, which falls short of the demand by 5 cents; an increase of 22 cents a day to machine miners, which falls short more than 26 cents, and 15 cents to helpers and laborers, which is short 30 and 25 cents. The miners were to meet this week, and the indications are that they will reject the offer.

The miners' strike at Washington, Davies County, Ind., is ended. The miners struck over a month ago for what is called the Columbus scale, and pay every two weeks. Other miners in Southern Indiana followed, and men quit work in various counties south of the Ohio & Mississippi Railroad. The miners will get for the present 35 cents a car until scales can be put in and the coal weighed, and then the prices will range from 42 to 53 cents, according to the screen. The pay will be made semi-monthly, just a fraction over two weeks. Day hands will get \$1.50 a day. This ends a long, tiresome, and expensive strike. No doubt all the miners will agree to the same terms.

Delegates representing all the coal miners in Southern Illinois held a secret convention at East St. Louis, Mo., on October 29th, and adopted the following resolutions:

Resolved, That we demand 61½c. per ton, track weight, screened over a ½-inch screen, or 55½c. per ton pit top weight, of 2000 pounds to the ton.

Resolved, That Murphysboro prices be 68½c. per ton, over ½-inch screen, or 50c. per ton, top weight, the run of the mine.

Resolved, That machine miners be paid equivalent to the above advance of hand miners, according to the following:

Present prices.	The advance.
\$2.25 per day, advanced to . . . . .	\$2.76¼ per day
\$2.00 per day, advanced to . . . . .	2.40 per day
\$1.75 per day, advanced to . . . . .	2.15¼ per day
\$1.50 per day, advanced to . . . . .	1.84¼ per day

A committee of ten was appointed to convey those resolutions to the operators on the 30th ult., and to give them till November 5th to respond to the demand

## GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including October 26th, as reported by the *Marquette Mining Journal*, were as follows:

	Tons.	Tons.
Marquette, Marquette District.....	1887.	1886.
St. Ignace, " ".....	740,947	779,733
Escanaba, " ".....	86,930	68,081
Menominee District.....	794,444	565,273
Ashland, Gogebic District.....	1,018,198	774,747
Two Harbors, Minnesota Iron Company, Vermillion District.....	988,036	653,294
	357,774	279,941
Total tons.....	3,986,329	3,121,069

SHIPMENTS OF IRON ORE, GOGEBIC DISTRICT.—Shipments of iron ore from Ashland, Wis., the mines of the Gogebic District, for the season, up to and including October 26th, are as follows:

	Tons.	Tons.	
Atlantic.....	2,637	Norrie.....	164,192
Anvil.....	5,817	Odanah.....	20,071
Ashland.....	150,393	Pabst.....	8,947
Aurora.....	105,512	Palms.....	1,414
Bessemer.....	12,492	Pence.....	1,157
Brotherton.....	21,277	Puritan.....	25,939
Colby North.....	64,767	Sunday Lake.....	11,724
Colby South.....	141,465	Superior.....	21,370
Germany.....	41,768	Seliwood.....	2,374
Iron Chief.....	2,250	Vaughn.....	2,101
Iron King.....	44,512	Trimble.....	15,288
Ironton.....	23,110	South 15.....	2,814
Kakagon.....	47,439	Parker.....	578
Montreal.....	26,991		
Nimikon.....	19,454	Total tons.....	988,036

The shipment shows an increase of 334,742 tons this year, as compared with the shipments made at the same time last year.

## ALABAMA.

ALABAMA & TENNESSEE COAL AND IRON COMPANY.—This company is going to build 500 coke-ovens at Jasper, on the line of the Kansas City, Memphis & Birmingham Railroad.

## JEFFERSON COUNTY.

CORONA COAL AND COKE COMPANY.—This company has been organized at Birmingham with a capital stock of \$1,500,000, the incorporators are Joseph W. Burke, S. V. Musgrove, and J. C. Musgrove, all of Alabama. The principal place of business will be at Birmingham, and their operations will include the mining, transportation, and selling of coal, iron, stone, etc., and boring for oil and gas.

## CALIFORNIA.

## PLUMAS COUNTY.

GREEN MOUNTAIN GOLD MINING COMPANY.—Local papers state that there are no developments concerning the difficulties at this mine, to which we referred in our issue of October 22d. The men are running the mine in order that they may get the money due them. It is stated that they are taking out good ore sufficient to run 30 stamps. The want of water will, however, prevent the running of the mill any great length of time. The present indebtedness, judging from the expressions of creditors, could be settled by the company at 50 cents on the dollar.

## COLORADO.

The Chicago, Burlington & Quincy Railroad Company advise us that they have now placed tickets on sale to Aspen, Colo., to which the Denver & Rio Grande Railway has recently completed its new line.

## LAKE COUNTY.

ARKANSAS VALLEY SMELTING COMPANY.—The company is now receiving from 250 to 300 tons of ore per day, and has nearly 12,000 tons stored in the bins. Five furnaces are in blast, reducing about 17 car-loads of bullion per week. The bullion is sold to the Pennsylvania Lead Company, and the matte goes to Pueblo.

EVENING STAR MINING COMPANY.—William Roberts, who has a long lease upon the upper contact of the Evening Star, is shipping about 25 tons of iron per day to the Pueblo Smelting Company. It is of high grade, averaging 45 per cent in excess of iron and manganese. The company commenced to sink the upper shaft to second contact a few months ago, but after doing 40 feet encountered water, and stopped. This shaft is now 512 feet deep. The west end of the Evening Star, below the first contact, is leased to Major Bohn for two years, who is sinking, and is now down 390 feet. The company, in 1883, sunk a drill-hole from the bottom of the shaft, and at about 500 feet cut a body of iron ore, 13 feet thick, which assayed from 12 to 20 ounces silver. The water now rises through this hole, but the lessees keep it plugged, and are not troubled much.

LILLIAN MINING COMPANY.—The majority of the stock of this company has been sold to the stockholders of the Small Hopes Consolidated Mining Company. Mr. C. M. D. Donaldson, manager of the latter company, will take charge of both properties. The following are the gentlemen concerned in this deal: United States Senator C. D. Farwell, of Chicago, President; Col. C. M. Donaldson, of Leadville, Vice-President and General Manager; Maurice Starne, of Leadville, Secretary. The following directors are announced: C. M. Donaldson, Maurice Starne, and Frank Brooks, this giving three of Leadville, while Chicago has two. The property purchased covers an area of ground from Iowa Gulch on the southeast to California Gulch in a northwesterly direction, and consolidates thirty-one district claims into a district of forty acres.

LITTLE SLIVER.—Work has been resumed at the Union-Emma shaft of the Little Sliver. The shaft is now being enlarged, and as soon as this is completed

sinking will be commenced. The large hoister and boiler from the May Queen are being placed in position, and preparations will be made for handling what water may be encountered, although the management do not expect much. The workings from the old shaft are connected with those of the Forepaugh, and the flow of water from that source was too great to be overcome except with a very heavy plant of machinery and large expense. The Union-Emma shaft is but a short distance from the Bohn shaft of the Matchless and Dunkin No. 4, neither of which are troubled with water, the latter never having had to raise more than 50 gallons per minute, while just above it is the Bankok, shut down on account of more water than its 10-inch pump could handle.

TIP TOP.—This mine closed down on the 1st inst. on account of the burden of pumping the enormous flow of water which was encountered. Operations in this mine have for the past three months been confined to work in the old stopes and upon small bodies of ore detached from the main chute. This work was conducted at much expense, and so restricted by natural obstacles that it was unprofitable and consequently the management decided on the present step. The main ore chute of the Tip Top continues into the Forepaugh, and there is now an ore-body supposed to be as large and valuable as that already taken out, but with the large stopes of the Forepaugh filled with water which stands 100 feet over the second level of the Tip Top, is out of the question for the latter mine to work in that direction at this time, when the pumps of the Forepaugh, Cora Belle and Bankok are all idle.

With the mines that might be large producers lying idle, and the great prospecting enterprises now in progress in this section, the necessity for a centrally located pump shaft, through which the bulk of the water could be raised, is becoming more and more apparent.

## DAKOTA.

## LAWRENCE COUNTY.

The building of a narrow gauge railroad to connect Deadwood with outlying mining camps is under consideration.

Reports received from San Francisco state that the leaching process applied to the treatment of Bald Mountain ores had proved successful. Ores from this district were sent to San Francisco some time ago, as mentioned in our issue of August 27th, for the purpose of making tests to ascertain the best process for the treatment of the same.

BIG HILL MINING COMPANY.—A strike has been made in this mine. The open cut is now 7 feet deep, and in its face is shown a well defined body of carbonates of lead, fully 4 feet wide. The ore is rich.

BULLION MINING COMPANY.—The company has decided to ship ore on the dump to the Galena Smelting and Reduction Company, at Galena, and to accept the proposition of the company to treat it for \$16 per ton. The company has upon its dump at present something over 300 tons of ore, which will average about \$30 per ton.

BUXTON MINING COMPANY.—This property is regarded as one of the best mines situated in the Bald Mountain District. A great deal of high-grade ore has been extracted. Most of it has been shipped to Omaha for reduction.

TROY GOLD AND SILVER MINING COMPANY.—The company has sunk eight shafts. Average tests of the ore shows that it yields about \$22. Developments so far have consisted principally of assessment work. The property consists of three full claims, the Peabody, Mogul, and Amega.

## INDIANA.

The Standard Oil Company and J. M. Guffey & Co. have formed a combination with the Indianapolis Natural Gas Company for the purpose of supplying the city of Indianapolis and its environments. Under the arrangements the local company will have absolute control of the pipe lines, but the other two firms will have a large and influential interest in the management of affairs. The Standard Oil Company and J. M. Guffey & Co. own 40,000 acres of land in the neighborhood of Indianapolis, including the Noblesville belt, which is the largest natural gas development in Indiana. There will be a 12-inch line 20 miles long laid at once between the lands of J. M. Guffey & Co. and Indianapolis. The line is to be finished to Indianapolis by January 1st.

## KENTUCKY.

## WARREN COUNTY.

Gas was struck at Bowling Green last week at the depth of 249 feet. The pressure is 35 to 50 pounds to a square inch. Other wells will be put down at once. One well bored last January, in which some gas was found, is as strong to-day as when first brought in, forcing itself through a self-flowing oil well of 1700 feet.

## MEXICO.

The importation of silver ore from Mexico at El Paso, Tex., during October, was 5276 tons, valued at \$265,608. The average is higher by thirty tons per day than in any preceding month, but the ore is of a lower grade than usual.

## PACHUCA DISTRICT.

The Mexican *Financier* reports the following:

EL BORDA MINING COMPANY.—The report made by experts on El Borda is discouraging; shareholders are much dissatisfied.

LA BLANCA MINING COMPANY.—La Blanca has communicated at the 220 vara level with the winze with the works in ore.

LA CUEVA SANTA MINING COMPANY.—La Cueva

Santa is a mine of which well-founded hopes are entertained. The shareholders show their belief in the property by vigorously continuing work thereon. We think this property will show double the present price for shares within a short time.

MARAVILLAS Y ANEXAS.—This mine continues to lead all the mines. This property may be considered the best at Pachuca.

REAL DEL MONTE MINING COMPANY.—This property continues improving, shares being in demand at \$1050 and holders standing off for \$1150.

SAN RAFAEL Y ANEXAS.—The mines San Rafael y Anexas continue improving daily, and the arrival of the machinery, which has taken place, will improve the situation at this property.

## MICHIGAN.

## COPPER MINES.

TAMARACK MINING COMPANY.—This company will commence this month stoping on the eighth level. Heretofore they have been working on upper levels where mine is not as rich. It is thought product for balance of year will show larger.

## GOLD AND SILVER MINES.

MICHIGAN GOLD MINING COMPANY.—Work continues on this company's property. Both shafts are going down, each being about thirty-three feet in depth. In the one furthest east the veins are still separated by about fifteen inches of slate, having come thus close together from a width of eight feet on surface. The shaft was started between the two veins. The south vein has, up to within a few feet of the bottom of the shaft, been pitching toward the foot, but is now turning back, conforming to the lay of the latter. It is the intention of the company to sink these shafts to a depth of at least a hundred feet, and in the spring to have a mill test made of the rock. The company has done a great amount of work in the way of exposing the quartz veins on its property, of which it has several. It has stripped these as far as they could be traced.

## IRON MINES.

The Ironsides and Iron Prince mining companies are in financial difficulties and work has been abandoned on the property. The *Ironwood Record* says: In fact, it is probable they were genuine "wild-cats" from the start. The stockholders of the two mines have held an indignation meeting, at which the incorporators were bitterly denounced. Messrs. Stowell, Sammond, Schlesinger and Reed, officers of the mine, tendered their resignations. The stockholders desired that the incorporators holding 53,000 shares, for which they paid only \$5000, should pay the indebtedness of the company, but the incorporators, seeing the mines are a failure, do not intend to do any thing of the kind, as their resignation indicated. The stockholders will bring suit against the incorporators.

## MISSOURI.

## ST. LOUIS COUNTY.

A company has leased about 3000 acres of land near Webster for the purpose of boring for natural gas. It is desired to lease as much more as possible, and to that end a committee from the company is now working. This company is said to be the one that carried on operations at Edwardsville where no natural gas was found, and to the operations of which we referred some time ago.

## MONTANA.

HELENA MINING AND REDUCTION COMPANY.—At the annual meeting held at Helena last week the following officers were elected: S. T. Hauser, President; D. C. Corbin, Vice-President; T. H. Kleinschmidt, Treasurer; H. H. Hill, Secretary. Owing to the great abundance of ores being constantly offered this company for purchase and treatment, they have found it constantly necessary to increase its plant and make additions, and for that purpose they leased the Toston furnaces some time ago and improved them to a great extent to handle custom ores. This has not proved sufficient and the company has now leased the works of the Boulder Mining and Reduction Company. These are the old Amazon smelters. They will immediately be put in shape for operation, and large additions will be made to them. Ore can now be delivered at the Boulder works, which are convenient to the Boulder Valley Railroad, and afford an excellent market to all the numerous productive mines reached by that road.

## DEER LODGE COUNTY.

GRANITE MOUNTAIN MINING COMPANY.—The company has decided to add 80 additional stamps to the 70 now at the mill. Of these 70, only 65 have been in operation, that being all that the roasting facilities would allow. When the increase is made, however, every thing will be complete to allow dropping the entire 150 stamps. This will allow of the payment of a dividend of \$1@\$.150 a share each month; it is intended to have the new stamps in operation inside of one year.

NEVADA CREEK PLACER MINING COMPANY.—This company proposes to work the placers by bringing the waters of the Blackfoot River upon them on an extensive scale. The tract of land belonging to the company and containing the auriferous deposits is said to be over six hundred acres in extent, and prospects well. The officers of the company are: C. A. Broadwater, President; J. W. Bailey, Vice-President, and W. B. Raleigh, Secretary and Treasurer.

## LEWIS &amp; CLARKE COUNTY.

EMPIRE MINING COMPANY, LIMITED.—Twenty stamps of the new mill have started up and twenty more will commence dropping shortly. The mill when completed with the twenty stamps now in construction will have sixty in all.

SILVER BOW COUNTY.

The Wakeup Jim, Modoc, Mountain Consolidated, and all other mines included in the Chambers' syndicate group have been closed down. The reason given by the local papers for the suspension is the incomplete condition of the new works at Anaconda, including the concentrators, work on which has been stopped by the cold snap. It is not likely that work will be resumed in the above mines until the new works at Anaconda approach completion, as their ore chutes are full to overflowing, and the old Anaconda works are kept amply supplied with ore from the Anaconda and St. Lawrence mines.

**ANACONDA MINING COMPANY.**—A terrific explosion occurred at the Anaconda mine and resulted in the death of two men. They went where fifty pounds of giant powder was deposited and in some mysterious way it exploded.

**BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.**—At the Old Colusa some much needed dead work is being done and in consequence but little ore is hoisted, though sufficient, with the aid of what comes from the ore dumps of the Mountain View, to keep the smelter working on rather a limited scale. No work of any great magnitude will be done by the company until the coming spring.

**BLUE BIRD MINING COMPANY.**—A fine body of ore has been discovered on the 500-foot level of this mine. Assays showed that it runs over 150 ounces in silver. Native silver could be seen scattered over the ore.

**HARRIS TUNNEL COMPANY.**—This company is making arrangements to prosecute work the coming winter on a more extensive scale than formerly. The intentions are first to commence a raise at the extreme end of the tunnel and also sink from the surface to connect with the raise. When completed it will be a distance of about 300 feet to the surface and will be of sufficient dimensions to constitute a three-compartment shaft. The mine no doubt is one belonging to the copper belt.

**HOPE MINING COMPANY.**—The main workings are to be sunk an additional 100 feet, and the mine is to be opened up in such a manner that it can be worked more conveniently than at present.

NEVADA.

ELKO COUNTY.

**HUMBOLDT COAL COMPANY.**—The annual meeting of this company, to which we referred in our issue of October 22d, was held in Carson last week and the following trustees elected: W. W. Mason, S. R. Noyes, George T. Mills, H. W. Tangerman, and John Q. Moore.

ELKO COUNTY—TUSCARORA DISTRICT.

**NEVADA QUEEN MINING COMPANY.**—The Grand Prize mill has started up and is running nicely. Average pulp assays for four days, \$219.88. The furnace is doing good work.

**NORTH BELLE ISLE MINING COMPANY.**—Fair progress has been made in driving the first stope along the vein, 150-foot level. The vein is showing a much greater width than was developed by the drifts, requiring in some places twenty-foot stulls. The usual grade and quantity of ore has been sent to the mill the past week.

ESMERALDA COUNTY.

**CANDELARIA WATER-WORKS AND MILLING COMPANY.**—The mill of this company has started up on the ore of the Georgene Company. It is expected that the mill will now be kept running continuously upon the ores of the district.

HUMBOLDT COUNTY.

**PARADISE VALLEY MINING COMPANY.**—The pumps at this company's mines are to be run by electrical power and the mine will also be lighted by electricity.

LANDER COUNTY.

**BLANCO GOLD MINING COMPANY.**—This company is working its mines and the new mill at Blanco, a new town which has sprung up near the old mining camp of Galena. A post-office has been established there with mail communication to Battle Mountain.

**MANHATTAN MINING COMPANY.**—According to the *Silver State*, mining is now being carried on at this company's mines, all debts due miners and others are being paid, and the concentrators are steadily working on ore. We referred to the difficulties of this company in our issue of October 15th. In the attachment suit of C. W. Hinchcliffe, Receiver of the Nevada Central Railroad vs. the Manhattan Silver Mining Company, judgment was taken by default against defendant for the sum of \$10,420.90 and costs of suit. Henry H. White also took judgment by default in the sum of \$3155.

STOREY COUNTY—COMSTOCK LODGE.

The Virginia City *Chronicle* reports the following:

**CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.**—During the week ended October 22d, 1054 tons of ore were shipped to the Morgan mill and 865 tons to the Eureka mill, and 1190 tons to the California mill. The average assay value of all the ore worked at the above mills during the week, according to battery samples, was \$31.21. The ore shipments to the Eureka mill are limited on account of the low stage of water in the Carson River, which is only sufficient to run the mill at one-third its full capacity.

Connection is made between the Consolidated California & Virginia and Best & Belcher on the 1300 level, opening a valuable air-way and stripping a large area of virgin ground. The main object of

the connection is preparatory to a large increase in the Consolidated California & Virginia daily ore output, a portion of which will be hoisted to the surface through the Gould & Curry shaft, as there is only one compartment of the old Consolidated Virginia shaft in condition to admit of operating cages. Another important object of the connection is to afford a means of escape for miners in case of a fire or other accident in the mines, to prevent the repetition of the tragic results of the Gould & Curry fire.

**SUTRO TUNNEL COMPANY.**—After the shut-down of the hydraulic pumps at the Combination shaft the flow of water from the Sutro Tunnel mouth was reduced from 412 miners' inches (7,000,000 gallons) in twenty-four hours to 20 miners' inches (340,000 gallons). Since the California battery and pan mills were started at one half their full capacity by water-power the flow from the tunnel mouth has been increased by 75 inches, and there is now a total of 1,635,000 gallons pouring through the drain boxes. When the other half of the California battery and pan mill and the new mill at the Chollar are in full operation, Superintendent Thomas estimates there will be about 270 miners' inches of water flowing from the tunnelmouth every twenty-four hours, representing a volume of 4,600,000 gallons. The tunnel company management is discussing a project for utilizing this power for operating a stamp-mill to be located in the town of Sutro for crushing ore. The plan includes the erection of a pan mill on the Carson River, operated by the water of that stream, to which the pulp can be conveyed through pipes from under the stamps. With the auxiliary pressure obtained from the tunnel water flow, added to that of the Carson River, there will be sufficient power to operate nearly 200 stamps during seven months of the year. This power can be utilized by the erection of a large stamp-mill on the river or can be transmitted by wire rope to operate stamps in the town of Sutro, thereby saving the cost of a railroad track for transporting ore from the tunnel to the river. If the project is carried out, water-power, transmitted by wire rope, will be utilized for moving cars of ore from the tunnel to the mill. The main features of the above project were suggested by the *Chronicle* about two years ago.

PENNSYLVANIA.

COAL.

Messrs. Carnegie & Co. are about to erect 150 ovens at Scott Haven, on the line of the Pemicky Railroad. The coke will be made from the slack and refuse from Scott's mines.

**LEHIGH & WILKES-BARRE COAL COMPANY.**—On the 1st inst., the company struck the Baltimore vein of coal in South Wilkes-Barre, nearly 1089 feet below the surface. The shaft is the deepest in this part of Pennsylvania, being 200 feet deeper than the Diamond at Scranton. The Baltimore vein at this point is from 15 to 18 feet thick, and though it cost the company four years of work, nearly \$80,000, to find it the money has been judiciously expended, as the discovery is estimated to be worth \$3,000,000 to the company.

NATURAL GAS.

**DUQUESNE NATURAL GAS COMPANY.**—This company has its 12-inch line, nine miles long, nearly completed. The line extends from the wells of the company back of Ferrysville to the borough of Millvale.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to October 29th:

	1887. Gallons.	1886. Gallons.
From Boston.....	3,506,927	4,736,632
Philadelphia.....	136,002,211	126,104,472
Baltimore.....	6,502,266	13,384,229
Perth Amboy.....	13,622,729	4,850,046
New York.....	311,148,112	323,913,866
Total exports ..	470,782,245	472,989,245

Concerning the great shut-down movement of the oil producers, *The Oil City Derrick* this morning says: "The most important deal ever consummated in the history of the oil business was brought to a head at a late hour on the night of the 31st ult., at a meeting held in Pittsburg of the Executive and Advisory Boards of the Produce Protective Association, when the great shut-down movement was completed. The *Derrick* makes the announcement by authority of the two Boards that all the contracts were officially signed and nothing remains to be done but to carry out the provisions of these contracts. What these contracts are has not been officially stated, but they contemplate the shutting in for one year of one half the production, based on the gauges of wells during July and August; the entire stoppage of the drill for the same length of time. No glycerine is to be used in the same time, and no wells are to be cleaned out. The general feature of the plan is that the Standard Oil Company has set 5,000,000 barrels of oil at 62 cents a barrel, the profits on this to be divided among those producers who shut in their wells and comply with all the terms of the contracts. In addition to this, the Standard and the producers have made a pool of 2,000,000 barrels, the profit accruing from which is to create a wage fund for the laboring men thrown out of employment.

The shut-down in the oil regions went into effect on the 1st inst. in every district except the new pool at Saxenburg, Butler County, Pa., and that is not regarded as dangerous territory by the trade. The region on the 1st was producing between 15,000 and 20,000 barrels less than on the 31st ult.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 4th.

Statistics.

Production Anthracite Coal for week ended October 29th, and year from January 1st:

Tons of 2240 Lbs.	Week.	Year.	1886. Year.
P. & Read. RR. Co.	178,040	6,051,817	9,565,420
Cent. R. R. of N. J.	92,137	4,005,153	"
L. V. RR. Co.	119,419	5,173,332	5,163,160
D. L. & W. RR. Co.	170,477	4,718,820	4,175,387
D. & H. Canal Co.	92,026	3,153,068	3,048,695
Penna. RR.	53,421	2,945,578	2,545,507
Penna. Coal Co.	40,275	1,257,487	1,150,845
Penna. Canal Co.	19,413	414,361	413,848
Total.....	765,208	27,719,616	26,062,892
Increase.....		1,656,754	
Decrease.....	64,975		

\* Included in tonnage of Philadelphia & Reading RR. 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:

1882.....	24,399,908	1884.....	25,617,681
1883.....	26,640,470	1885.....	25,316,081

Production of Coke on line of Pennsylvania RR. for week ended October 29th, and year from January 1st. Tons of 2000 pounds.

	1887. Week.	Year.	1886. Year.
Tyrone & Clearfield ..		1,750	
Alleghany Region ...	5,452	206,994	155,153
West Penn. RR.....	2,432	92,173	89,514
Southwest Penn. RR.	61,787	1,311,324	2,195,993
Penna. & W. Region..	8,649	286,087	271,267
Monongahela.....	1,729	100,661	116,538
Pittsburg Region....		38	95
Snow-Shoe.....	1,238	43,792	22,688
Total.....	81,287	1,042,819	2,851,248

Anthracite.

The coal market continues to present a most encouraging and joyful aspect to the producers. More coal is wanted than can be supplied, and though nominally prices are unchanged, in reality they are a matter of negotiation with all except the great companies, and the minimum basis is the quoted price, the maximum depending on the urgency of the purchaser's wants and the kind of coal.

Egg and chestnut are the scarcest. Stove is also hard to get. Broken is in fair supply. The following are about the company's prices for standard free-burning coals f. o. b. New York shipping ports:

Lump.....	@ \$4.00	Stove and nut.	\$4.30 @ \$4.50
Broken.....	\$3.80 @ 4.00	Pea.....	3.00 @ 3.20
Egg.....	4.10 @ 4.20	Buckwheat ..	2.00 @ 2.25

From these prices dealers go up from 25 to 50 cents as occasion offers, until it is not uncommon to hear of \$4.75 @ \$5 asked for stove and even for nut. It is noteworthy that many domestic consumers are using pea coal in the usual base-burning stoves where nut was formerly used, and it is found, under suitable conditions, to give excellent results. A mixture of nut and pea is almost as good as nut alone, when the grates are close enough to prevent loss from fine coal passing through them.

Bituminous.

The bituminous coal market still continues very active with a rather short supply. The hoped for increase in cars has not yet made itself felt, and producers are still complaining to railroad companies on that account, consumers are constantly reminding them of their unfilled contracts, and there is no probability of this state of affairs being much better during this month. The Pocahontas still continues to send coal here, but the Clearfield and Cumberland companies do not apprehend much danger from this source, notwithstanding that this coal is finding a ready market at the standard price of \$3.50 a ton alongside.

There is nothing new in the Lehigh strike, the men being apparently more determined than ever, and fewer of them are at work to-day than two weeks ago. The union has been sending them remittances of cash and supplies, which have greatly encouraged them, but the operators are firmly decided to settle the question now, and there is no chance of any giving in on their part.

At a meeting of the operators in Philadelphia this week, the Lehigh Coal & Navigation Co. decided to rent its cars to the Philadelphia & Reading Co. for the transportation of soft coal; and the Lehigh Valley, it is said, has decided to rent its cars to the Pennsylvania Railroad, also for the transportation of bituminous coal. This will bring a much needed relief to the soft coal producers, who are far behind their contracts in delivery. It was found inexpedient to send these cars into the northern anthracite field, probably on account of the apprehended strikes if it were done.

Stocks of coal that were formerly so large are now almost exhausted; the Delaware & Hudson is cleaning up the last of its Honesdale stock, and tidewater stocks have also disappeared. Notwithstanding this, extraordinary demand for coal, the companies are acting in general with much more prudence, and are opposed to any further increase in price. Consumers, who are now so urgent in their demands, may possibly have to pay more for their coal since many of the markets will shortly be closed by ice, and they will be obliged to receive their supplies by rail, at an advance in cost. But there is not the least danger of a famine in coal and no occasion for any excitement about supplies. The amount produced is very large, much larger, in fact, than the usual December output, and when it comes to that season those who are short can fill up their supplies even though they may have to pay a little more for it.

**Boston.**

Nov. 3.

[From our Special Correspondent.]

Those who looked for a softening of the anthracite market about this time are not realizing their expectations. The market is stronger than last week. Fully as much coal is being sold as for some weeks past, however, for there is more demand, and some of the companies, notably the Wilkes-Barre, Lackawanna and Lehigh, are booking orders in this market freely. These orders are at current prices f.o.b. in New York, but without limitation as to time of delivery. It would look, therefore, as if these companies thought prices had about reached top, and that it was a good course to take all the orders they could get now. The Reading and Scranton people are not like minded, however, as they are taking no orders, believing, it is said, that when they are fixed to ship coal prices will be higher. Boston trade is fairly well supplied, but some retailers are beginning to need coal, and that need will be considerable if more coal does not arrive shortly. It takes about two weeks to get an order filled, and spot cargoes or cargoes for immediate shipment would command outside prices, fully 25 cents above current quotations.

There seems to be a growing strength to the bituminous coal market, due chiefly to lack of shipping facilities. Vessels are scarce at the lower ports. The f.o.b. price of bituminous rarely falls below \$2.60 nowadays though some Clearfield coal may be had at less, ranging to \$2.50.

Freight rates are unexpectedly firm for this season. It has been said that a fleet is bound out to shipping ports, but they do not seem to show up in any large numbers.

We quote rates, exclusive of discharging: New York, 75¢@85¢; Philadelphia, 95¢@1.05; Baltimore, \$1.40; Newport News and Norfolk, \$1.25.

The retailers have been obliged to advance the price of Nova Scotia hard wood again, as it has become very scarce indeed. Some large dealers have no stock and a cargo would sell quick at \$8@9 per cord. The retail price has been advanced to \$10@11. We quote delivered prices of coal, which, by the way, will be advanced again if the wholesale prices are maintained: Stove, \$6.25; Egg, \$6; Furnace, \$5.75; Nut, \$6.25; Franklin, \$7.50; Lehigh Egg, \$6.25; Furnace, \$6. Wharf prices are 50 cents less than the foregoing.

**Buffalo.**

Nov. 3.

[From our Special Correspondent.]

A year ago these words were used in my letter: "Dealers complain of the scarcity of cars and shippers of the lack of coal for freight by lake to Western points." And again, "Trade would be good if transportation facilities were to be had; but as a dealer says: 'There's hell to pay and no pitch hot.'" History is said to repeat itself; surely the utterances above stated exemplify the situation of the coal trade now, with the addition of strong adjectives and notes of exclamation.

Anthracite coal nominally advanced 5c. per ton wholesale, but none of the dealers are selling at schedule rates, but are getting from 25 to 50c. in addition to said rates. No circulars apparently have been issued lately; sellers make their prices on application of customers. Retail quotations have been advanced 25c. per ton net delivered; the schedule is: Grate and Egg, \$5.50; Stove and Chestnut, \$5.75, and No. 4, \$6.00. Pea size sells at old rate, namely \$4.50 per net ton delivered. No. 4 Stove and Chestnut same, and wanted.

Bituminous coal very firm and business good. Nominally no changes in quotations.

Coke quiet and steady. Connellsville quoted at \$2 per ton at the ovens. More cars wanted.

Mr. A. W. Horton, the manager of the Lehigh coal docks at Superior (L. S.), said yesterday: "They have not enough coal in that country to carry them through the winter." A dispatch from Duluth announces that a spontaneous fire started in the interior of a large heap of coal on the Lehigh docks Monday, but that total combustion had been prevented later in the day.

As an indication of the close of navigation, the Lake Superior Transit Company will discontinue receiving freight at Buffalo after Saturday, November 5th.

Lake freights steady, but little coal shipped in consequence of scarcity on docks and in chutes. The going rates for the week were as follows: \$1 to Chicago and Milwaukee; \$1.15 to Racine; 50c. to Toledo, Detroit, Cleveland, and Bay City; 75c. to Saginaw; 50c. to Duluth, and about 75c. to Kincardine; closing quiet, with vessels far in excess of demand, which made a weak feeling, although no change in quotations was reported. The rates to Chicago and Milwaukee on October 31st were \$1 in 1886 and 50c. in 1885.

The shipments of coal by lake westward from October 27th to November 2d, both days inclusive, were 58,397 net tons, namely, 35,010 to Chicago, 14,260 to Milwaukee, 1130 to Detroit, 1760 to Toledo, 217 to Bay City, 2480 to Racine, 600 to Saginaw, 440 to Kincardine, 500 to Cleveland, 2000 to Duluth. Total for the season, 1,517,364 net tons, not including vessels from Tonawanda which load here without reporting at Custom House.

The distribution of coal by lake from Buffalo thus far this season to November 1st includes 592,000 net tons to Chicago, 343,000 to Milwaukee, 159,000 to Duluth, 90,000 to Superior, 24,000 to Washburn, 62,000 to Toledo, 29,000 to Detroit, 17,000 to Racine, 2000 to Evanston, 4000 to Bay City, 6000 to Kenosha, 4000 to Kincardine, 27,000 to Green Bay, 7000 to Manitowoc, 3000 to Sandusky, 18,000 to Sheboygan, 17,000 to Saginaw, 10,000 to Marquette, 6000 to Port Arthur, 7000 to Lake Linden, 3000 to Hancock, 9000 to Oakland, 3000 to Menominee, 1400 to

Marine City, 4610 to Port Huron, 1850 to Houghton, 1860 to Escanaba, 1250 to St. Clair, 2500 to Windsor, 700 to East Tawas, 500 to Barga, 136 to Port Burwell, 1000 to small ports, 300 to Sault Ste. Marie, 580 to Mackinac, 600 to Muskegon, 250 to Put in Bay, 400 to Alpena, 630 to St. Ignace, 400 to Port Dover, 300 to Amherstberg, 700 to Portage, 410 to Pequaming, 580 to Algonac, 440 to St. Josephs, 600 to Cheboygan, 250 to Huron, 800 to Kingston, 1000 to Kelly Island, 500 to Manistee, 450 to Cleveland, 400 to Owen Sound, 450 to Depere, 660 to Livingston, and 400 to Osceola. To this should be added about 100,000 tons shipped on Tonawanda vessels which are not reported in the Custom Houses clearances of this port.

**Statistical.**—Receipts of coal at this port by lake this year none. Receipts and shipments by railroad not reported, the companies' officials declining to give the information. Shipments by lake westward for the month of October, 275,750 net tons, as compared with 218,470 tons in 1886 and 221,690 tons in 1885; for the season to November 1st, 1,657,890 net tons this year, 1,347,340 tons in 1886 and 1,291,570 tons in 1885. The receipts by canal for October, 9048 net tons; the shipments, 1439 tons. The receipts by canal for the season to November 1st, 55,978 net tons, as compared with 72,666 tons in 1886 and 143,082 tons in 1885; the shipments, 8141 net tons, as compared with 17,572 tons in 1886 and 25,281 tons in 1885.

Canal freighting of coal very dull. The only charters were two loads to Syracuse at 65c. gross ton free on and off. The nominal rate to New York, \$1.50, and Albany, \$1.10 per net ton, captain to pay loading and unloading.

Canal shipments for fourth week in October, 1503 net tons; the receipts, 415 tons.

**Pittsburg.**

Nov. 3.

[From our Special Correspondent.]

COAL.—The price is firm, but not quotable higher in this market. The large consumption of natural gas keeps prices down. In Cincinnati and Louisville and other Western cities the situation is different. Consumers have to pay a big round price, and a further advance, viz., second pool, afloat, 12@13c.; delivered, 15@16c.; fourth pool, 11@11½c., with stocks nearly exhausted. The last shipment from Pittsburg was made in June. Price of coal, f.o.b., first pool, \$4.50; second pool, \$4.25; third pool, \$3.65; fourth pool, \$3. Coke at ovens, per ton: Blast-furnace, \$2; Crushed, \$2.60; Foundry, \$2.60.

CONNELLSVILLE COKE.—The situation is the same as last week. Although the men have been ordered out, they refuse to go. The rates are: Blast-furnace, f.o.b., \$2 per ton; Foundry, \$2.30; Crushed, \$2.60.

**FREIGHTS.**

The latest actual charters to Nov. 3d, per ton of 2240 pounds:

**From Philadelphia to:**—Alexandria, 85; Annapolis, 65; Baltimore, 60; Boston, 1.10@1.25; Galveston, 2.75; Georgetown, 85; Newark, 90; New York, 90; Norfolk, Va., 65; Portsmouth, Va., 60; Richmond, Va., 75; Saco, 1.45; Washington, 85; Weymouth, 1.25.

**From New York to:**—Cambridge, Mass., 80\*3c.; Cambridgeport, 80\*3c.; Cnelsea, 85\*; Com. Pt., Mass., 90\*; E. Boston, 85\*; E. Cambridge, 85\*3c.; Fall River, 80\*; New Bedford, 90; New Haven, 75; Portsmouth, N. H., 95\*; Providence, 85@90; Salem, 85\*.

**From Baltimore to:**—Bangor, 1.75; Bath, 1.50; Boston, 1.50; Bridgeport, 1.35; Bristol, 1.35; Brooklyn, 1.15; Charleston, 80; Fall River, 1.35; Galveston, 2.75; Lynn, 1.60; New Bedford, 1.35; New Haven, 1.35; New London, 1.35; New York, 1.10; Portland, 1.50; Portsmouth, N. H., 1.60; Providence, 1.35; Salem, 1.50; Savannah, 1.10; Somerset, 1.35; Williamsburg, N. Y., 1.15; Wilmington, 1.00. Freights firm and tonnage scarce.

\* And discharging. † And discharging and towing. 3c. per bridge extra. ‡ Alongside. † And towing up and down. † And towing. †† Pilotage. \*\* Below bridge. \*\*\* Old B. L.

**MARKETS.**

NEW YORK, Friday Evening, Nov. 4.

Prices of Silver per ounce troy.

Oct.	Sterling exchange	Lon'd'n Pence.	N. Y. Cents	Nov.	Sterling exchange	Lon'd'n Pence.	N. Y. Cents
29	4.85	44	95½	2	4.85	43	95½
31	4.85	†	95½	3	4.85	†	95½
*	4.85	†	95½	4	4.85	43%	95½

\* Nov. 1. † 43 15-16.

India Council will increase their offerings next week 5 lacs.

Market closes dull, with prospect of some concession in prices.

**Foreign Bank Statements.**—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 4 per cent. During the week, the bank gained £56,000 bullion, and the proportion of its reserve to its liabilities was raised from 45.47 to 45.56 per cent, against a loss from 41.50 to 38.11-16 per cent in the same week of last year. The weekly statement of the Bank of France shows a loss of 5,725,000 francs gold and a loss of 1,275,000 francs silver. The weekly statement of the Imperial Bank of Germany shows a specie gain of 3,140,000 marks.

**Copper.**—The prediction we ventured in our last week's report has been verified in a manner even startling to ourselves, and without showing the least sign of weakness prices have gone up from day to day, and this in spite of the fact that for two days London sent lower prices for Chili Bars, which dropped on Wednesday from the highest prices previously touched, about

15s. to £1 a ton, but this weakness proved to be only of a temporary character, and prices again became strong and close to-day at the best, viz., £46 17s. 6d. to £47 spot, and £47 12s. 6d. to £47 15s. for 3 months forward.

The statistics in Europe show a further decrease of 400 tons for the second half of last month, which will be, no doubt, succeeded by more favorable returns still for the first half of this month, as many sales for the second half of October can only then be brought into account. Manufacturers evidently discouraged the rise in the first instance, and they rather complained towards the end of last week of the slowness with which orders were coming in, but this state of things has now completely changed, and they have now advanced their prices for manufactured copper 2 cents per pound, or from 18c. to 20c. per pound. The Calumet & Hecla Company is still in the same position as last week, and it is difficult to say when they may come on the market. Our closing quotations are for Lake Copper, spot, 12'60c.; December, 12'75c.; January, 12'90c.; February, 13c.

The week has been an eventful one on the Metal Exchange. Sales of copper, which last week amounted to about 3,000,000 pounds, this week have reached 3,770,000 pounds, and prices have advanced about 1½ cents per pound since we last went to press. Every one asks the reason for this sudden and heavy advance, and rumors are abundant, though their foundations are something extremely unstable.

The boom appears to have been commenced in Paris by parties who had large interests in tin, and the first argument on which it was based was that the officials had decided to light the city altogether by electricity, and intended to permit companies to compete for putting electric lights in private residences, and that consequently a large amount of copper wire would be required.

Further indications of the grounds for the boom are found in the English statistics already referred to and in the following extracts which we make from the Copper Report of James Lewis & Son, dated Liverpool, October 17th, 1887:

The variations in the price of Chili bar copper during the past fortnight have been confined within a limit of 3s. 9d. a ton, between £39 13s. 9d. @ £39 17s. 6d. for cash warrants. The closing value to day is £39 16s. 3d. for cash buyers, and £40 7s. 6d. for three months' prompt sellers.

Three thousand six hundred tons Anaconda matte have been sold for forward delivery at 4'04d. a pound of fine copper, or 8s. a unit, this quantity being divided among twelve different smelters.

Contracts for a considerable quantity of Mason's precipitate have been completed for delivery the remainder of this year and a chief part of next, on a Chili bar basis.

The price of yellow metal has been advanced by the association ½d. per pound, ¼d. for Sheets, and ¼d. for Sheathing; £47 10s. per ton is now asked for India sheets, and £50 for other sheets.

In Lake copper a large business has been done in New York at 10'40 cents per pound for October, and at 10'60 cents for December delivery. During the past week, however, there has been an advance of 0'10 cent per pound. Baltimore copper is held for 10'25 cents (£48 17s. 6d. per ton, with 2½ per cent discount), or only 0'25 cent below the price of Lake. This is due to the absence of competition from other smelters of casting brands who are unable to obtain supplies of matte.

Messrs. Mason & Barry, Ltd., have declared a dividend for the first half of this year at the rate of 2 per cent per annum, and the Rio Tinto Company at the rate of 3 per cent per annum. During this period the average value of Chili bars was £39 10s., or £1 below the average of 1886. The Rio Tinto dividend for the six months is the same as that for the year 1886, the decline in the value of copper being made good by an increased production, though there can be little doubt that this increased production has caused the said decline.

The fact that copper can not be produced in sufficient quantity to supply the demand when Chili bars sell at or under £40 per ton, is clearly proved by the great falling off in the "visible supply" and stocks during the past thirteen months. On the 15th of September, 1886, the visible supply was 66,369, whereas now it is only 48,849 tons, a reduction at the rate of 1332 tons per month. In the same period the English and French stocks have decreased from 54,875 to 42,999 tons, or at the rate of 913 tons per month. As at present there seems every probability of these reductions continuing, the stock of copper available for consumers will ere long be in very moderate compass. The visible supply is now less than it has been since the 15th of December, 1884, when Chili Bars were selling at £47 10s. per ton.

The arrivals from the United States have been 1045 tons here and 190 tons in France. The copper product of the Anaconda matte having fallen to about 60 per cent, it has been decided to estimate the copper contents in future at 60 per cent instead of at 65 per cent as heretofore.

Possibly the fact that Mason & Barry precipitate has been sold on the basis of Chili bar prices, thus showing an interest on the part of this large Spanish producer to boom bars may have had something to do with it. The rumors of negotiations for a combination of the large producers on a basis of regulating prices only and not production, has been very extensively used as a bull argument, and, though not without some foundation, it has been heavily exploited.

The readers of the ENGINEERING AND MINING JOURNAL have long been aware of the fact that our home consumption has grown much more rapidly than production, and that we are rapidly approaching the

time when we will have no copper to export, with Chili bars at £40; and the surprising fact is not that the price has now advanced to its present point, but that it did not advance long ago to something near this figure.

It is the suddenness of the advance that causes distrust in its permanency, and to some extent also the motives and persons who are credited with being the prime movers in the advance. There can be no question of the fact that 10 cents for lake copper here will not induce a production equal to our growing consumption, and it is not in the least probable that we will for some years see that figure again reached. Our consumption, especially for telegraph wire, aluminum bronze, etc., is increasing enormously and will continue to increase, while the increase in production will be comparatively slow. The present prices are too uncertain to justify the opening or re-opening of mines and our home demand will now easily absorb our output.

The recent heavy sales of Anaconda matte reported above, and 900 tons sold yesterday and 800 tons today, at 9s. per unit, Liverpool delivery, have taken about all this company can ship at present.

The Baltimore copper works are said to be out of the market, and Orford copper is held at 12 cents.

The Calumet & Hecla output in October was 2933 tons of mineral, the largest month's output ever made at this mine.

The Central mine has just struck a good body of ore on its 27th level, which will bring a much needed help. The Chambers' syndicate mines, near Butte, Mont., are said to have been closed down, as also its furnaces; this will offset in some degree the output from the new Boston-Montana mines.

The exports of copper during the week have been as follows:

To Liverpool—	Bags.	Lbs.	
By S.S. City of Chester—Matte	2,950	338,613	\$15,000
Adriatic	4,425	483,286	24,500
The Queen	3,402	367,420	18,500

**Tin.**—The further rise in this article must have astonished the most sanguine bull, and very large transactions have again taken place at prices up to 32½¢@33c. for spot, which is considerably higher than London, although that market also rushed up last week from £120 to £145@£135 10s. The consumption goes on at a marvelous rate and there is really very little spot tin in the market. What the ultimate course of prices will be is easily foreseen, but it appears as if for the present time prices are comparatively safe.

**Lead.**—In sympathy with the movement in copper and tin, lead has at last also given some signs of life, and whilst last week very few buyers could be found at 4-25, this week there has been a general demand, and from 1000 to 1500 tons have changed hands at gradually improving prices. We close to-day with Spot lead 4-45@4-50. November, 4-50@4-60; December, 4-55@4-65, and the quotations in London have been raised to £12 17s. 6d. for Spanish, £13 5s. for English.

Messrs. John Wahl & Co., of St. Louis, telegraph to-day as follows: Market is changing for the better. Sellers before asking 4c. have withdrawn and are now asking 4-12½c.

Messrs. Everett & Post, of Chicago, telegraph as follows to day: Sales and offerings are light. Holders anticipating better prices have withdrawn from the market at present, and refuse to make sales for future delivery, although later there has been a somewhat better feeling due to growing inquiry. Market closes nominally 4-15@4-20c., and 4-25c. asked for corroding.

**Spelter.**—Of course in the general movement this article could not be left far behind, and with firmer prices reported from the other side, an improvement has also taken place here, and we quote Domestic, 4-75c., while Foreign Spelter is not now obtainable below 5-25c. for spot; and for shipment from Europe even higher prices are asked.

Sheet Zinc remains active at 6¾@7c.

**Antimony** continues steady at 8¾c. for Hallet's and 9½c. for Cookson's. London has improved to £37 for Hallet's.

Domestic Antimony is offered at 8¾@8½c.

**Nickel** remains in a satisfactory position, with quotations unaltered at 65c.

**Quicksilver.**—The English market is very firm at £7 15s., the price ruling here being \$42½ per flask.

**Chemicals.**—During the past week, and especially since the commencement of the current month, the business position of this market has decidedly improved, not perhaps on the actual volume of the trade so much as in the more settled feeling that generally prevails. The fears of a break up in the combination of bleach producers have now been definitely dispelled, at any rate for the time, and with the news of a continuation of the agreement which keeps this product at nearly three times its real value, comes a greater disposition to make contracts for future delivery, over say the next three or four months. As would be very naturally expected this movement has been reflected upon the soda compounds, and as a consequence our prices are distinctly firmer. If we are correctly informed, and we can see no reason to doubt the reliability of our informants, there is now a movement on foot to very considerably increase the present rate of ocean freights (already much too high), and if this should succeed we may look forward to come very lively times; all the more so because manufacturers will probably adhere to their policy of restricted production, and keep all superfluous stock carefully out of the market.

English and American sal soda continue to be well inquired after, and while in the latter there is no reported change in price, there have been several rather important sales for spot consumption. In the English article there has been very little movement, owing to the presence of such very small stocks, but some small parcels have changed hands from dock at about \$1.15, and from store at an advance of some 8 to 10c. This price, however, will probably be lowered within the next week or two, and, in fact, we have already heard of some transactions for future delivery—January and February—at 95c.

Newcastle and Liverpool brands of soda ash are both firmly held by sellers at a slight advance upon our last quotations, and the business during the week has continued to be fairly good. The demand, however, principally proceeds from the smaller class of buyers, who only take what they require from week to week, the larger consumers having apparently decided to wait for further developments from the other side.

There is very little stock of either make, and not by any means an over anxiety to make forward sales at such reduction, sellers holding out for \$1.25@ \$1.35, according to quality or brand. Refined alkali shows no signs of change and may be said to have been neglected since we last wrote. With caustic soda the same feeling prevails, and nothing but very small jobbing transactions of 50 to 100 drums are recorded, principally in 60 and 70 per cent.

In England, according to our latest advices to-day, the tone of the various centers of production is very decidedly better and more healthy, especially with regard to bleaching powder, of which none is at present obtainable at less than £7 15s. to £8 and then only very small spot parcels. Several important contracts for delivery over 1888 are said to have been signed by some of the larger makers at £7 10s. Some of them being reported, in fact, as having disposed of their entire production at an approximation to these figures.

We presume the level-headed members of the "pool" know what they are about in thus disposing of all they expect to turn out, but as to the wisdom of the buyers, in the present fluctuating state of the industries, and the probabilities of making cheap chlorine in connection with the Solvay process, we are not so favorably impressed.

As we predicted last week, most brands of caustic soda are already somewhat easier, the best being quoted in Liverpool at £6 2s. 6d. for 60 per cent, £7 2s. 6d. for 70 per cent, and £7 17s. 6d. for 74 per cent, with a slight tendency to decline. Sal soda has been offered at £2 10s. to £2 12s. 6d., according to quality and brand, and there is no change in the position of salt cake.

Contrary to our expectations, the market for brimstone has become extremely firm, the change being partly attributable to the higher rates of freight. Several important sales to arrive are reported at \$20, and we are informed, as we go to press, that nothing more will be obtainable for shipment within the next few months on new contracts, at less than 50c. advance on that price. Oil of vitriol remains unchanged.

## IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 4.

The market for American pig-iron is practically unchanged. Foundry brands remain scarce, in active demand, and with little change in price. It would be impossible to buy 1000 tons of a good No. 1 brand for early delivery. Still, there is some disposition to name a little lower figure for next year's delivery, but beyond the sales of Southern irons noted last week and week before, we do not hear of any new transactions of size.

Forge brands remain rather dull and weak.

Scottish irons are in fair demand, with but little supply. Quotations are, however, unchanged.

Bessemer pig and spiegeleisen are very dull with no new transactions, and quotations nominal.

No new business is reported in Bessemer blooms, billets or wire rods, and we repeat former quotations.

New sales of steel rails amounting to 16,000 tons from an Eastern mill are reported. The price was very low, probably about \$32. It has also been stated that 40,000 tons have been purchased for the Missouri Pacific road, this amount being distributed among three or four mills. This statement is not fully confirmed. There is no doubt that there has been a decided weakening in prices of steel rails. Buyers have been holding off. There are certainly several large orders in the market likely to be placed before long. Prices are unsettled and we put quotations nominally \$32@33 at Eastern mills.

The manufacturers of crucible steel have held a meeting at Pittsburgh and have formed an association for the establishment and maintenance of prices, the result of which is shown in our merchant steel quotations.

The market for old rails is weaker and we hear of small lots of tees sold at \$21.50, and doubles offered at \$22. This is only for small lots, however, as the rails can not be imported at these figures.

Louisville, Nov. 1.

[Reported by Geo. H. HULL & Co.]

The market for pig-iron continues in an unsettled condition. Some large speculative lots have been sold at concessions, while the iron actually in demand has brought outside prices. Some buyers have found on asking that prices are so much above their views that they are holding off purchasing. The product of most of the furnaces between now and January is provided for by future delivery sales. Many of the buyers that are expecting iron by river will run short unless there is a rise in the river soon, and there is very little pros-

pect of their being able to purchase iron to come by rail, the railroad furnaces being sold up and out of stocks. Current quotations for cash will be found in our weekly register of prices.

Pittsburg.

Nov. 3.

[From our Special Correspondent.]

The iron market has exhibited a good deal of uncertainty as regards values and demand. Dealers are exceedingly conservative. The plain facts are that buyers (whether correct or not) have made up their minds that present prices will have to give way in the near future. The result is natural; their purchases are governed by their opinions, merely purchasing sufficient to meet immediate wants. While prices are no lower, buyers show more indifference than was exhibited last week. The fact is, there is want of confidence among dealers that is detrimental to business generally. City furnaces, most of them, are well sold up, and show no anxiety to sell, and are not disposed to make further concessions in order to effect sales. Parties who sold for future delivery when prices were at the top are in a particularly good humor with themselves and everybody else. Outside unknown brands are disposed of at various prices. We heard of a lot of 1400 tons storage iron, Gray Forge, that sold below at \$16.75 cash. It was a mixed lot, and not a desirable article. Consumption continues very large, and parties who have been holding off will soon have to become purchasers, whether prices are satisfactory or not. The output of iron is also large, so large that a person at times feels like injuring where it is all disposed.

Muck Bar was not very active. Sales were made at prices current some days since. The stock on hand is not large. Old iron rails are in good supply and lower. Scrap material is very dull; prices nominal and unsettled.

The coke muddle is not yet settled, in fact, seems no nearer that end than it was last week. The men are still at work, and earning good wages. There are plenty of idle men in the coke regions ready to go to work should a strike take place. It looks to an outsider, that the men are not anxious to quit work. Carnegie & Co. propose to build 150 new ovens at Scott Haven, on the line of the Pemicky Railroad. The coke will be made from the slack, and refuse from Scott's mines. Work will be commenced at once on the ovens, and will be hurried to completion. The week's quotations will be found in our weekly register of current quotations.

SALES SINCE OUR LAST REPORT.

Coal and Coke Smelted Lake Ore.

500 Tons Gray Forge	18 00 4 mo.
500 Tons Gray Forge	18.00 4 m.
500 Tons Standard Bessemer	20.25 cash.
300 Tons Neutral Mill	17.65 cash.
100 Tons No. 2 Foundry	18.50 cash.
60 Tons No. 1 Foundry, all ore	21.00 4 mo.
50 Tons No. 2 Foundry, all ore	20.50 4 mo.
30 Tons No. 2 Foundry Storage	18.50 4 mo.

Coke, Native Ore.

200 Tons No. 1 Foundry	21.00 cash.
100 Tons Gray Forge	18.00 4 m.
100 Tons No. 2 Foundry	18.50 cash.
100 Tons Gray Forge	17.75 4 mo.
100 Tons Cold Sheet Gray Forge	16.50 cash.
40 Tons Silvery	19.00 cash.
20 Tons No. 2 Foundry	20.00 4 mo.
20 Tons No. 2 Foundry	19.00 4 mo.
20 Tons Gray Forge	18.40 cash.

Charcoal.

50 Tons Cold Blast	26.50 cash.
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Steel Billets.

500 Tons Billets	31.00 cash.
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Muck Bar.

500 Tons Neutral	31.25 cash.
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Old Iron Rails.

600 Tons Imported D. H.	25.50 cash.
300 Tons Imported Tees	25.25 cash.

Philadelphia.

Nov. 3.

[From our Special Correspondent.]

The situation in the eastern and middle Pennsylvania iron market has been modified some since last week. There is a little more inquiry and stronger disposition to buy, but no improvement in business or change in prices. Consumers of iron and steel are resting under the impression that a reaction is among the near-by possibilities, and those whose supplies of material are light are now looking around to see where they can pick up a bargain before makers of iron have their courage strengthened by an improving demand.

Careful inquiry shows that no large transactions have taken place either in crude or finished material, excepting in car iron. No. 1 foundry iron is sold at as high as \$22, but there is very little material of that kind to be had for prompt delivery, and those who are using it decline to place mid-winter or spring orders at that figure. Cheapest No. 1 is sold at \$21. No. 2 iron has been neglected for a week, but a little inquiry shows that some large consumers have very little in stock. Agents who are endeavoring to bring matters to a point, count on selling a good deal of No. 2 before the end of the year at about \$19. Sales could be made now for the kind of iron wanted at fifty cents less. Forge iron is very dull this week, although a number of brokers and makers have a large amount of business in sight, which will be upon the basis of about \$17 or a little under. Muck bar is selling at \$30.50. Mills seem to be kept quite busy. Foreign material is without much activity, though a change of fifty cents in the asking price would bring buyers into the market, and large transactions would be closed at once. It is known there are negotiations pending for some 30,000 tons of foreign material. The real difficulty seems to be about this, that foreign makers have sold an immense amount of material on

WEEKLY REGISTER OF CURRENT QUOTATIONS.

This list is the result of careful compilation and is destined to meet the demands of all classes of subscribers. The prices quoted are those actually ruling in our own and foreign markets. Manufacturers and importers will please give notice of all modifications not later than Friday noon each week.

CHEMICALS.

Table listing various chemicals and their prices, including Sulphuric Acid, Nitric Acid, Potassium, and various salts.

Table listing various minerals and ores such as Phosphate Rock, Manganese, Mercury, and various types of Iron and Steel.

IRON AND STEEL.

Table listing iron and steel products, including American Pig-Iron, Bessemer Pig-Iron, and various types of steel.

Table listing various types of steel, including Steel Blooms, Steel Billets, Steel Wire Rods, and various iron plates and pipes.

Table listing various types of charcoal and coke, including So. Charcoal, Silver Gray, and Sc. Coke.

STOCK MARKET QUOTATIONS

Table listing stock market quotations for various companies, including Baltimore Stock Quotations, Birmingham, Ala., Stock Quot., and Pittsburgh Stock Quotations.

this side this year and are holding their figures a little higher than consumers think they should or can, and some large buyers are, therefore, holding off. At least such an explanation has been made for a little quietness just now, and in the absence of a better one, may answer their purpose. Importers say they see no reason for expecting any falling off

in foreign importation. The bar mills throughout the State are extremely busy. Heavy car iron orders have been placed within a week, and there are more to come. This is helping the common and medium iron trade very much. The nail trade shows a little more activity. Prices are weak and the outlook is not improved as to prices. All kinds of plate

and tank, in both iron and steel, are in good demand, and a better feeling exists among the Pennsylvania mill men than for a very long time. The heavy consumers have made inquiries this week for liberal winter supplies, and there will be no difficulty in obtaining orders at rates given elsewhere. The structural iron makers report no very large orders but a steady run of small

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date & amt. of last. It lists 150+ mining companies and their financial details.

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., 1884, the California had paid \$81,320,000 in dividends, and the Con. Virginia \$43,390,000. Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid \$1,350,000 in dividends.



NEW YORK MINING STOCK QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stock Quotations, listing companies like Alice, Mon, Argenta, and others, with columns for dates (Oct. 29, Oct. 31, Nov. 1, etc.) and sales figures.

\*Dealt in at the New York Stock Exchange. Unlisted Securities

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing companies like Atlantic, Mich, Bodie, Cal, and others, with columns for dates and sales figures.

New York: Dividend shares sold, 20,355. Non-dividend shares sold, 174,800. Total New York, 195,155. Boston: Dividend shares sold, 21,817. Non-dividend shares sold, 34,000. Total Boston, 55,824.

COAL STOCKS.

Table of Coal Stocks, listing companies like Barclay Coal, Cameron Coal, Ches. & O. RR, etc., with columns for dates and sales figures.

\*\* Of the sales of this stock, 58,018 were in Philadelphia, and 277,385 in New York. † The quotations for these stocks are not percentage, but actual price. Dealt in at the New York Stock Exchange, Unlisted Securities.

Total sales, 502,328.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing companies like Alpha, Alta, Argenta, etc., with columns for dates and closing quotations.

\* Opening quotations.

orders at full prices. The merchant steel mills have a fair share of work. The sheet iron makers are not in want of business. Hardware dealers are doing a good fall trade. The pipe mills here and throughout the State are very busy. Steel rail makers have no new points to give. There will probably be no change in the situation until after the next meeting of the Board of Control, which, it is intimated, will be held in about three weeks.

There is no change in prices, and this fact will probably induce the placing of orders that have been held back in apprehension of a further break. The sales of old rails have been moderate, owing to the refusal of makers to accept the slightest concessions. The opinion of importers is that the foreign supply of rails will be dull and insufficient, and that an advance of \$1 per ton will be made within sixty days. Scrap dealers are all doing good business, especially in No. 1 selected. For quotations we refer to our weekly register of current quotations.

**FINANCIAL.**

NEW YORK, Friday Evening, Nov. 4.  
The Condition of Trade.

Reports from all important points of production and distribution throughout the United States point to a continuance of a good trade for this season of the year. The activity recorded is not equal to that of a month or six weeks ago, but is, nevertheless, in excess of the aggregate recorded one year ago, and in the main is reported to be quite satisfactory. No serious trouble is known to exist in relation to mercantile collections, which are generally easy and fairly prompt in all directions. The few exceptions are caused by what may be classed as purely local influences. The outline included in the above refers particularly to the movement of hardware, dry goods, both of cotton and woolen, boots and shoes, and staple groceries.

The general industrial situation is less favorable than it was last month, as strikes by employes of manufacturing establishments have notably increased within a week. The responses being made to the appeals of the striking Lehigh Valley coal miners for financial aid point to less likelihood of an early termination of that strike than existed two weeks ago. Inasmuch as the failure of the Lehigh strike would in all probability result in the revocation of the advance of wages made in the Schuylkill anthracite coal mining regions, it will be noted that there is a double and a very strong incentive for the miners of the lower region to furnish substantial aid in maintaining their brethren in the Lehigh. Meanwhile the anthracite companies at work in the Wyoming and in the Schuylkill valleys are pushing work to the extent of their ability in order to meet the demand upon them. Their measure of success may be gauged by the fact that the total tons of coal mined thus far this season, as compared with a like period in 1886, fails to show a discrepancy in favor of 1887, even with nearly 20 per cent of the total number of mines usually employed in the whole of the anthracite region on strike.

In iron production the situation can not be truthfully described as showing any improvement over the preceding week. The demand for pig-iron has improved at no point, and the weakness of the demand west and east, heretofore described, continues in full force. Excepting some of the more important eastern furnaces engaged in making the better grades of raw iron, pig-iron manufacturers generally report an absence of demand except for nearby wants, which points to an expectation on the part of consumers that lower prices are probable in the near future. The exception is in the South, where the furnaces are declared to be actively employed, with orders ahead and cars scarce. There is even less demand noted at bar iron mills at important centers of production than was reported a week ago, and nails at Philadelphia are weak at \$2@ \$2.15, with cutting of prices. Steel rail sales at \$32.50 at Eastern mills have been announced, which is not calculated to influence consumers to place their orders in advance of necessity, inasmuch as this rate represents a decline of not less than \$1.50 per ton within a fortnight. The talk a week ago, on the part of steel rail makers, of the advisability of shutting down all the rail mills for five or six weeks has resulted, so far as made public, in no definite plan in that direction; but the mere announcement of its having occurred must have a bearish influence on the rail market through its natural effect on buyers.

The dragging efforts to bring about a strike of Connellsville coke burners have thus far resulted in naught except several postponements of the date upon which such action is to be taken, which does not point to the serious situation which was originally threatened. In the Ohio River Valley the lowest water ever known is reported by Bradstreet's, and Cincinnati and Louisville announce very low supplies of bituminous coal, with advancing prices, and the likelihood of this state of affairs is continued of a serious disturbance to the local industries depending upon Western Pennsylvania, Eastern Ohio, and West Virginia coals.

The leading money markets of the country are, as a whole, easier than they were a week ago, and at some of them discount rates have been reduced somewhat. In New York City prime commercial paper is taken care of at 6@7 per cent with little difficulty, though comparatively little of it at the lower rate. Call loan rates on prime stock collateral are very easy at 3@4 per cent, with demand not equal to the supply. The position of the New York banks continues strong in the matter of the surplus reserve, and there is no cloud upon the financial skies here at this time. The course of sterling exchange in this market points, in the face of the treasury reports of exports and imports of

merchandise, coin and bullion, to a fairly steady buying abroad of American securities within the past month or more. At the close to-day the London Exchange was quoted at \$4.84@ \$4.85, against \$4.85@ \$4.85 1/2 one week ago.

**The Coal Road Stocks.**

The course of prices of stocks in Wall street has been upward rather than the reverse, although there have been no great changes. The bear contingent continues active, but has met with a conspicuous check within a week or two, and many conservative houses in the street believe that a moderate advance, a general improvement may be safely relied on. The leading coal road stocks have been favorably affected owing to the excellent condition of the anthracite trade, Reading in particular. The Central of New Jersey would be expected, ordinarily, to show a reverse, inasmuch as its source of supply, the Lehigh region, is not sending out any coal worth mentioning. But the strength of Reading and other lines have favorably affected general list. The stock last referred to has gained 1/4 on the week; Delaware, Lackawanna & Western, 4/8; Delaware & Hudson, 3/8, and New Jersey Central, 1/8.

**Mining Stocks.**

The mining market during the past week has been an uneventful one. There have been occasional spurts here and there, but the increased transactions noted on the eve of our last issue have not been maintained, and trading during the week has been on a small scale. On several days the official transactions recorded on the Mining Exchange exceeded 50,000 shares. This looked well, and would have caused a feeling of decided encouragement had not close investigation revealed the fact that the bulk of the sales were in Taylor-Plumas.

As an indication of how mining stocks have declined in Milwaukee, the following, from the blackboard of the only mining stock exchange now in existence at Milwaukee, was given on the 28th ult.: Kingston is quoted at 10 cents a share; St. Louis, 5 cents; Kinnickinnic, 10 cents; Williamantic, 75 cents; Breed, 5 cents; Courtland, 75 cents; Kimball, 15 cents; Lake Agogebic, 50 cents; Emma, 75 cents. Summit stock, which was quoted at \$3 a share last February, is now quoted at 50 cents; New Hampshire, which was sold at \$1.85 at the same time, is now held at 2 cents a share; Aetna is now 5 cents, which was then \$2.25; United Iron and Land Syndicate is now 10 cents a share, but then it was 75 cents, and at one time sold at \$2.50; Tontine, quoted at \$4 a share in February, can now be bought at 20 cents; Ontonagon is 15 cents a share—it was then 75 cents a share; Norway, then quoted at \$2.50, is now valued at 50 cents; Ironsides and Iron Prince stock are now quoted at 25 cents a share, sales of which were made in February at \$3.50 and \$4.35 respectively; Gogebic Iron Syndicate stock, which eight months ago was quoted at \$4.75 per share, is now offered at 80 cents.

Excepting the Tontine, which is well situated and has a value, none of the other Gogebic stocks mentioned represents any known value, and most of them are the wildest of wild cats, that never were worth any more than their present figures.

Considerable attention has been given to El Cristo, which advanced from \$2@ \$2.40, with sales of 3000 shares. Mr. Geo. D. Roberts, Mr. Gibson and some other gentlemen are going to leave for the mines on the 12th inst., and it is probable that another boom will be inaugurated in this stock before long.

Little is doing in Surinam; the stock has been selling at \$3.65.

There are no new developments in the Horn-Silver "muddle," and nothing is doing in the stock, which this week shows but one sale at 80c. Ontario is quoted at \$27.

The Sutro Tunnel Company has furnished the following statement of its liabilities and the measures adopted to meet them: The mortgage amounts to about \$1,000,000, drawing 12 per cent interest. The overdue interest amounts now to about \$525,000. The mortgagees have consented to reduce the interest on the mortgage to six per cent from the beginning, and to credit the company with all payments made and to be made with six per cent interest on them, provided the balance due is paid in cash on or before January 1st, 1888. Estimating the payments to be made on account of mortgage interest in November and December, the net amount due January 1st, 1888, will be but little more than \$900,000. To meet this payment bonds will be issued bearing interest at the rate, probably, of five per cent. These bonds will be sold to the shareholders in the company at about 80 per cent. The shareholders are subscribing promptly and readily, and it is plain that the bonds will be subscribed for in ample season to meet the required payment. It is stated that whatever amount is not taken by shareholders is already guaranteed by some parties in New York. The stock has been active and firm, ranging from 35@38c.

Castle Creek shows but little business, selling at from 10c. to 12c.; Holyoke at 8c.

Deadwood-Terra was firm at from \$2.85 to \$2.95. Colorado stocks are neglected. Robinson is quoted at 40c., Little Pittsburg at 35c., Leadville at 36@ 37c., Dunkin at \$1.05, Cashier at 40c., Lacrosse at 11@12c., Monitor at 17@18c. Security shows the largest business, at lower prices, going from \$1.63 to \$1.37.

Consolidated California & Virginia shows a downward movement, it opening on Saturday at \$18.13, on Wednesday sold at \$16.25, and to-day at from \$16.50 to \$16.63. Yellow Jacket is quiet at \$5. Sierra Nevada was active towards the close of the week, when the price advanced to \$5.88. Savage shows one sale at \$7.63. Ophir a few at from \$8.75 to \$7.75. Hale & Norcross advanced from \$3.90 to

\$4.10. Gould & Curry sold at from \$4.95 to \$4.50. Crown Point at \$8. Julia at from 60 to 70c. Mexican declined from \$5.13 to \$4.35. Potosi is quoted at \$5.88. Union at \$3.30.

There has been some demand for Tornado, which sold at from \$1.25 to \$1.35. Navajo was dealt in only to-day, selling at from \$1.15 to \$1.05. North Belle Isle at from \$10.63 to \$10.75.

It has been given out that the large demand which has apparently sprung up for Taylor-Plumas stock has been brought about by the confidence inspired by the public in the new management, to which we recently had occasion to advert. Just as we are about going to press we learn that still another injunction has been served upon the Taylor-Plumas officers. It now looks as if the parties in control would soon wish they had left the management to the clique with whom they were continually wrangling, and the struggle of the ins and outs promises to be a protracted one. In the meanwhile little actual improvement is to be expected in the value of these shares, which have been selling at from 2@4c. The total transactions in this stock amounted to 73,200 shares.

Little interest so far has been shown in Hector, for which a large business was predicted before it was brought on the market; a sale of 100 shares was made at 70c. per share. Brunswick remains unchanged at from \$1.55 to \$1.60. Plymouth Consolidated was quiet, going from \$18.63 to \$18. Quick-silver Preferred shows a sale at \$26. Bodie was active at from \$1.90 to \$2.15. Green Mountain declined from 9c. to 5c. Mono advanced from \$1.60 to \$1.70, and Standard from \$1.50 to \$1.60.

Middle Bar shows the usual amount of business, selling at from 42c. to 45c.; Amador, from \$1.30 to \$1.40.

Higher prices are predicted for stock of the Rappahannock Gold Mining Company, owing to a strike just made at the company's mines (to which we refer in our Mining News). The price this week advanced from 18c. to 21c., with sales of 18,600 shares.

The expected conference between the Committee on Mining Securities of the Consolidated Stock and Petroleum Exchange and the President of the Tortilita Mining Company did not come off as expected. On the day appointed for the "confab" President Reall failed to show up, and his counsel, together with other officials, who were on hand, giving assurance that his absence was unavoidable, the hearing was postponed until the 14th inst., when the committee will endeavor to extract some satisfactory replies from the floaters of the great Arizona swindle regarding the past, present, and future condition of the property.

Phoenix of Arizona shows only sales of 200 shares at from 70c. to 75c.

Silver King shows a declining tendency, and went from \$6.25 to \$5.25.

**Meetings.**

The annual and special meetings of the following companies will be held at the times mentioned:

Colorado Central Consolidated Mining Company, No. 48 Exchange Place, Room 26, New York City, November 11th, at eleven o'clock A. M.

**Dividends.**

American Electric Manufacturing Company has declared a quarterly dividend of one and one half per cent, payable December 5th, at No. 18 Cortlandt street, New York City.

Buxton Mining Company, of Dakota, has declared a dividend, No. 1, of fifty cents per share.

Eureka Consolidated Mining Company, of Nevada, has declared a dividend, No. 79, of twenty-five cents per share, or \$12,500, payable December 5th.

Pennsylvania Railroad Company has declared a

**Assessments.**

COMPANY.	No.	When levied.	D'n't in office.	Day of sale.	Am't per share.
Anchor, Utah	2	Sept. 20	Oct. 22	Nov. 12	.20
Atlas, Dak.	1	July 22	Sept. 30	Nov. 15	.001
Belcher, Nev.	33	Sept. 15	Oct. 20	Nov. 7	.50
Como-Eureka, Nev.	2	Sept. 10	Oct. 18	Nov. 26	.06
Concord, N. C.	1	Sept. 16	Oct. 31	Nov. 8	.02
Cons. Pacific, Cal.	9	Sept. 6	Oct. 11	Nov. 8	.15
Golden Fleece, Cal.	11	Oct. 15	Dec. 7	Jan. 4	10.00
Golden Prize, Nev.	8	Oct. 4	Nov. 4	Dec. 5	.40
Guadalupe, Cal.	2	Oct. 21	Nov. 25	Dec. 12	.05
Himalaya, Utah	2	Oct. 10	Nov. 10	Dec. 12	.005
King of the West, Ida.	2	Oct. 19	Nov. 23	Dec. 10	.15
Kearsarge, Mich.	1	Oct. —	Oct. 15	Nov. —	1.00
Mayflower, Cal.	38	Sept. 27	Nov. 1	Nov. 22	.25
Mikado, Mich.	1	Sept. 13	Oct. 22	Nov. —	.40
Missoula, Utah	2	Oct. 11	Nov. 15	Dec. 5	.02
Mono, Cal.	24	Sept. 15	Oct. 20	Nov. 21	.50
Mutual, Dak.	3	Oct. 3	Nov. 12	Dec. 12	.01
North Bonanza, Nev.	7	Sept. 27	Oct. 31	Nov. 18	.15
Peerless, Ariz.	10	Sept. 20	Oct. 27	Nov. 18	.25
Pilgrim, Mich.	1	Sept. 12	Oct. 22	Nov. —	.15
Pioche Cons., Nev.	3	Sept. 14	*Nov. 7	*Nov. 26	.10
Prior, Dak.	1	Oct. 11	Nov. 11	Nov. 28	.002
Rochester, Utah	1	Sept. 19	*Oct. 30	*Nov. 15	.05
Scorpion, Nev.	22	Oct. 7	Nov. 11	Dec. 5	.10
Seabury-Calkins, Dak.	7	Oct. 27	Dec. 1	Dec. 20	.01 1/2
Segreg, Iron H., Dak.	2	Oct. 17	Nov. 20	Dec. 7	.1
Spruce Gulch, Dak.	2	Sept. 14	Oct. 20	Nov. 10	.01
Sugar Loaf Hill, Dak.	2	Oct. 17	Nov. 17	Dec. 3	.001
Taylor Plumas, Cal.	1	Oct. 17	Nov. 20	Nov. 20	.02
Utah, Nev.	2	Aug. 10	Sept. 12	Oct. 29	.25
Virginia Creek, Cal.	4	Sept. 27	Nov. 1	Nov. 30	.05
Weldon, Ariz.	1	Sept. 20	Oct. 25	Nov. 15	.20

\* The delinquent day and the day of sale were postponed to dates given above.

† Levied on assessable stock only.

‡ The assessment of five cents per share, levied August 8th, has been rescinded.