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THE DRY ORE MINES ARE PAYING THE PIPER.

Our special report of the Leadville ore market, which will be found on another page, brings early confirmation of our statement that the exclusion of Mexican fluxing ores under the new instructions would result in a small advance in the price of Colorado fluxing ore and a decline in the price of dry ores; or, in other words, that the smelters, being unable to secure a sufficient supply of lead ore, would charge the dry ore mines a higher smelting rate. Our correspondent says: "A sharp decline has taken place in dry ores. Heretofore this class has sold with a deduction of \$11.50 @ \$13 for smelting charge, whereas now these range from \$13 @ \$16—working charge."

The new treasury instructions, according to Colorado reports, have already resulted in curtailing the entry of Mexican ores to the extent of 40 to 50 per cent. As the effect of this becomes felt, the dry ore mines will find that they, who can least afford it, are being taxed to enable the fluxing lead ore mines to get an additional profit, when it is well known that they are now getting more for the lead in their ore than it brings the smelter in the bullion. The silver miners will soon learn where their interests lie and what kind of protection benefits them.

MAJOR POWELL ON STORAGE RESERVOIRS.

An article by Major J. W. POWELL, in the *North American Review*, entitled "The Lesson of Conemaugh," is disappointing in one way, but at the same time instructive. We were disappointed at the very small space given to what we expected was the subject matter, viz., the Conemaugh Dam and its failure, for we anticipated a careful study of the subject, with the aid and advantage of Major POWELL's wide experience. In reality, it is an essay upon storage reservoirs in general, and the benefit to be secured from them for irrigation purposes. On this subject it is well to have Major POWELL's views in a thoughtfully prepared paper, considering that he has devoted much time to its consideration and is the responsible head of the Department of the Geological Survey, charged with the especial study of the irrigation problem of the arid lands of the West. The importance of irrigation in this country can hardly be overrated, and as we have already, on more than one occasion, pointed out, it is a subject that has not had that careful study bestowed on it by the engineering profession that it deserves. The principles laid down by Major Powell are sound, and form a good

guide for any engineer called upon to advise in such matters. They may be summarized as follows: the ascertainment of the drainage basin supplying the reservoir; second, the declivities of the supplying basin, to know the amount of water to be controlled and the rate at which it will be delivered. This necessitates a topographic survey, which should be followed by a hydrographic one, to determine the precipitation in rain and snow from year to year.

The duty of the dam being thus ascertained, the construction is a simple engineering question following well-known rules. Two other factors are important, the amount of sediment brought down by the flood water and the rate of evaporation. These points attended to, it may be said that all essentials in the construction of an irrigation storage reservoir are included.

THE COPPER COMBINATION.

The copper trade has been in a state of indifferent equilibrium ever since the famous conferences in Paris that succeeded the collapse of the French syndicate. The companies here maintained prices during the sixty days called for in their agreement with the dead syndicate, and having succeeded in that, in the face of the tremendous tumble copper took in Europe, they felt encouraged to enter into an arrangement with each other to permanently maintain prices at some new level on which they could agree. It was, of course, admitted by all that the price would have to come down, and 12 cents was fixed upon as the standard price for Lake brands. Other kinds, being left to take care of themselves, declined to 10 cents, or even below this for some casting brands.

The discovery a short time ago of some transactions in Lake copper which were not in accord with the spirit of the agreement very nearly broke up the market, and showed on how very unstable a foundation prices were based. In order to arrange for a more permanent combination the representatives of the several mining interests concluded about a week ago, as we reported, a more solid treaty arrangement, which covers all kinds of copper, and regulates the prices—at least all this will be effected when all the parties to the agreement have been heard from, which will probably be at a meeting to be held here to-morrow or Monday. They are not, however, to ship any of it back to this country, and are to send to Europe the stocks now held here. In return, the export of American copper is limited to about 32,000 gross tons a year, divided, it is understood, about as follows:

| | Tons. |
|----------------|--------|
| The Anaconda | 15,000 |
| Boston-Montana | 5,000 |
| Arizona mines | 5,000 |
| Lake mines | 7,000 |

These figures are provisional and may be modified.

The production of the several mines is regulated on a quota which allows of no increase at present, in fact, will cause a reduction, and as all the copper is pooled, the receipts are apportioned *pro rata* among the producers without regard to whose copper has been sold.

The committee which has charge of the management of the combination, and which has very wide powers, is composed of Messrs. LIVERMORE, STATION and KEYSER.

In order that prices may be maintained, all the Lake copper is to be sold through one broker, Mr. CHAS. RAHT, and all the other brands are to be sold through Messrs. GLENDENNING, of Baltimore, the effort to have a New York firm appointed having been met by an absolute refusal on the part of the representatives of the two great producers. It is hoped by means of this pooling arrangement such little slips or evasions of the spirit of the agreement as that which recently came so near breaking the market beyond repair, will be avoided, and experience has fully demonstrated that the only way in which prices can be fully maintained is by selling through one office.

This agreement is made in accord with the foreign producers, who are to restrict output to the extent annually of one-fifth of the old syndicate stock now held by the European banks, so as to allow this stock to be marketed within five years without demoralizing the market.

This arrangement between copper producers, if perfected, will undoubtedly be a strong one in consequence—1st, of the reasonable price at which copper is sold, for though 12 cents for Lake leaves a very large profit to nine-tenths of the production, it will close some of the mines; 2d, because the copper being all sold by two brokers, the price can be maintained, nominally at least; and 3d, because it unites the producers more effectively than has hitherto been done.

THE WEAK POINTS.

There are, of course, certain weak points in this combination:

- 1st. All the companies are not yet in it.
- 2d. The price, though moderate, is sufficiently profitable to stimulate the opening and development of new mines.
- 3d. The very strong feeling of personal resentment between some of the leading men in the trade has been deepened by the recent friction. It was unwise to create or maintain such animosities; they always bring about results which tend to the disintegration of the scheme.

SUBWAY EXPLOSIONS.

The special committee appointed by the New York Board of Electrical Control to investigate the subject of the explosions in the subways made, on Thursday, the 15th inst., a somewhat remarkable report, which appears to have escaped, somehow, the notice it deserves.

The Committee announces and maintains the "important conclusion" that such explosions are "primarily due to escape of gas," and may occur in any confined space containing gas. The recent Twenty-third street explosions, it declares, were caused by the rapid accumulation of illuminating-gas in the man-holes from a leak in adjacent gas-mains, "which illuminating-gas was ignited *presumably by a spark resulting from the atmospheric differences of temperature* [italics ours, and expressive of mingled perplexity and awe], or by a flame carried backward through the distributing duct" leading into a cellar. The Committee does not think any leak from the electrical conductor fired the gas, because no current had been turned on the conductor at the time. These experts do not seem to be aware that an insulated conductor, without a current, may receive from the atmosphere a static charge, or may react with a spark to a highly electrified atmosphere, as was undoubtedly the case in the explosion before the Field building at the foot of Broadway.

The Committee recommends two things: first, that the gas-companies shall be compelled to stop their leaks; and secondly, that the subways shall be more thoroughly ventilated.

As to the first proposition, it is, as we have said on a former occasion, undoubtedly the desire of the gas-companies to diminish their loss by leakage as much as possible. If they know of a leak, they are ready enough to stop it. Whether the comfort and health of the city would be benefited by forcing the gas-companies to dig up the streets continually and hunt for leaks, is another matter.

But the Committee ignores an important element in the situation. Engineers in general are quite surprised that a conduit made of iron pipes, laid in cement, and having man-holes lined with masonry, should be penetrated by gas in explosive quantities. It is quite true that ordinary masonry is not impervious to gas; but it is equally true that, with atmospheric pressure on both sides, the amount of gas that will pass through is very small. We know from practical experience that very large leaks in the mains, continuing for months, have made themselves perceptible on the other side of a poorly built wall by a faint, disagreeable odor only.

The mystery disappears, however, when the astonishing method of subway construction in this city is studied. The euphemism of this committee, describing the gas-mains "adjacent thereto," should be translated into plainer language. Gas-mains "adjacent to" cement or masonry, leaking gas through the medium of the soil, are not going to fill the spaces within. But gas-mains deliberately included in the subway man-holes, deprived of the soil which surrounded them when laid by the gas-companies, and carefully provided with "confined spaces" to leak into, are a different thing. More than this: it is not at all likely that serious leaks in the mains, existing when the ground was broken for the subways, would be overlooked. It is, on the other hand, highly probable that these leaks have opened since the handling which the gas-mains have received at the hands of the bungling subway builders. Everything indicates that the complainants have themselves created the nuisance and doubled the peril. To their demand that the gas-companies shall be held responsible, the latter may well reply with the counter-demand that reckless and ignorant experimenters shall stop monkeying with the mains, first causing them to leak; then preventing the gas from escaping harmlessly, and finally, if these fooleries are not enough, blowing air into it, so as to make explosive what was before inflammable only.

Under the head of ventilation the Committee describes four classes, namely:

1. Openings in the man-hole covers.
2. A gas-jet in the man-hole.
3. Vents from top and bottom of man-hole.
4. Blowers, maintaining a pressure along the entire construction.

Various objections are urged against each of these, but the last is pronounced to give the best results. True, the committee mentions, as a slight drawback, that "while this action on the part of the Board of Control will reduce the chances of explosions in the electrical subways, it will increase the danger in house-vaults, sewers, and other places into which the gas may be driven!" But this trifling drawback did not prevent the committee from recommending that further provision for blowers and air-compressors be ordered.

This is what we have come to, then, under the spectacular administration of a lot of enthusiastic inventors, respectable nonentities and headlong reformers. After repeated assurances that everything had been solved and arranged, and nothing more was needed but to chop down the poles, we are told that the only way to make the subways safe is to make the cellars dangerous!

We take the liberty of making some recommendations which may perhaps form a wholesome comment on this report:

1. Take the gas-mains out of your man-holes.

2. Make your man-hole covers with light fastenings and hinged, so as to blow open easily. (This, gentlemen, is the way we simple engineers, who are dealing all the while with inflammable gases, are accustomed to construct our "explosion-doors" and "explosion-valves," so that a slight explosion will at once be relieved of tension. Properly constructed man-hole covers would have rendered harmless every explosion that has thus far taken place in the New York subways. But if all our recommendations are adopted, then explosion-doors, though a wise precaution, are not likely ever to open.)

3. Abandon your silly system of house connections, by which open pipes may at any moment, through accident or carelessness, connect a citizen's cellar with the conduit air, or the cellar air, or the sewer air of a whole block. Whether this common atmosphere be inflammable or explosive, or poisonous or malodorous, merely, it is not wholesome.

4. Haul off your blowers, except for local and temporary uses. You will not need them, if you follow our advice; and if they were apparently needed, they would do harm as well as good—not improbably more harm than good.

5. Send your sub-committee over to the slow city of Brooklyn, with instructions to inquire into the obscure but pertinent fact that somehow or other those Brooklyn subways are not explosively conspicuous, although there is plenty of gas in the Brooklyn soil. Bid them follow their noses into the big tunnel through which thousands of miles of underground conductors enter the basement of the Telephone Exchange building and report whether they smell any gas. Then let them meekly go up stairs and ask Mr. SARGENT how he manages it. They will find that he employs neither of the four systems of their exhaustive classification, but a fifth, which they have overlooked, because it was so simple and easy and close at hand. When he takes a cable from the subway he runs it up through a box which acts as a chimney; and the small amount of gas which may leak into his conduit leaks out again up chimney. Of course, this is all highly absurd and inadequate as a remedy for "New York conditions." But it is worth the attention, nevertheless, of those eminent experts, Mr. GILROY and Mr. GIBBENS, who compose the committee of the New York Board.

ON DRY LUBRICANTS.

Owing to numerous inquiries we have received regarding dry lubricants and their manufactures, we detailed a practical member of our staff to give the matter thorough investigation to the end that we may in the future be in a position to advise applicants as to the best methods of filling their special requirements.

It is almost needless to state that graphite forms the base of nearly all dry lubricants, and as many of the compounds now manufactured seem to us worthy of the attention of our mining clients (under *special circumstances*), we will be glad to point out in which particular they can be properly utilized.

In preparing a compound which should so far reduce the friction between the moving surfaces of machinery as to render the use of ordinary lubricants unnecessary, it has been sought to combine four different properties:

1. A sufficient degree of coherence in the particles of the material employed to prevent practically any change of form in them under the pressure to which they would be subjected.

2. So much facility of movement between the particles themselves as to prevent the development of heat to any injurious extent.

3. A sufficient degree of "fixedness" in the relative position of the particles, between them and the metal of the bearing, that adhesion to the latter shall not take place.

4. That the characteristics just enumerated should be so proportioned that little or no abrasion or wear of the shaft or journal should take place. After a close examination of three of the best known dry lubricant compounds, we find that all depend on a homogeneous mixture, in which graphite is thoroughly mixed and evenly assimilated, so that every part of the wearing surface is constantly lubricated thereby. In each case this mixture is placed under the highest possible pressure, and as some of the fractures distinctly showed other mineral than graphite, it is reasonable to suppose that the softer metals, such as lead, antimony, and perhaps tin, are brought into use, and by higher pressure converted into a liquid state and completely assimilated with the graphite, which is naturally the base of the lubricating substance. To show that this is possible, we quote the following experiments made by Mr. W. Spring, a German chemist, on the "flow of solids."

"The substances experimented with were taken in the form of fine powder, and subjected, in a steel mold, to pressures varying from 2,000 to 7,000 atmospheres per square centimeter. Lead filings under a pressure of 2,000 atmospheres were transformed into a solid block, which no longer showed the least grain under the microscope, and density of which was 11.5, while that of ordinary lead is 11.3 only. Under 5,000 atmospheres the lead became fluid and ran out through the interstices of the apparatus. Toward 6,000 atmospheres, zinc and tin appeared to liquify.

"Powders of zinc and bismuth at 5,000 to 6,000 atmospheres became solid blocks of a 'crystalline' fracture. Powders of soft and of prismatic sulphur were transformed into solid blocks of 'octahedric' sulphur. Red phosphorus appeared to pass into the dense state of black phosphorus. Binoxide of manganese and the sulphides of zinc and lead in powder weld when compressed, and exhibit the appearance, respectively, of natural crystallized pyrolusite, blende, and galena."

"A number of pulverized salts solidify through pressure and become transparent, thus proving the union of the molecules."

Our intention is not to investigate the ingredients of the several compounds that are at present in the market, but is particularly for the benefit of our clients as regards the use they may be brought to, so we shall

simply go into the past experience of others, who have utilized dry lubricants in their several callings. The longest periods for which journals have as yet been run in graphite mixtures—say ten years—have developed no heating or wear, if the bushings have been properly cleaned and the mixture replaced once in two or three years. A "shakeless fit" can be secured with the mixtures, which will render movement improbable with any mere interposed lubricant. Journals in most of these bearings, under the heaviest weight or at high rate of speed (as in polishing lathes), and even hot, as in the case of calendaring and laundering rolls, or coffee-roasters, seem from inquiry to run perfectly dry the year round, without attention, without heating unduly or being injured by external heat, without perceptible wear or loosening, and with a usual reduction of power required, as compared with companion bearings running with oil under the same conditions.

We give as authority for these statements Messrs. Bagnall & Loud, the Boston manufacturers of pulley blocks, who certify that their planing machine was fitted with dry bearings, and has run without interruption for from four to five years at a speed of about 5,000 revolutions per minute, averaging six or seven hours a day. In this case no oil has been used, and the shaft shows an excellent polish. This firm, so far as we learn, use a dry lubricant entirely for the thousands of pulley blocks they manufacture. Day, Farrington & Co., manufacturers, Brooklyn, have used dry brushes on their emery grinders, with heavy journals running 1,600 revolutions per minute, for upward of three years, without oil or attention. "These journals," they have stated, "are a shakeless fit, and run cooler than other grinders running in oil." The Inman line of Atlantic steamships, we are informed, have used dry bearings in their wharf machinery with excellent results. The Excelsior Brick and Stone Company, Philadelphia, state that the dry bushings of their loose pulleys, 48 inches diameter, 12-inch face, 2½-inch bore, friction-clutch, and running 225 revolutions a minute, were as good after four years as when first put in, and fit the shaft as well, having had no lubrication or attention whatever. Numerous steam laundries state that they have introduced dry-bearings of different descriptions for the heated rolls of their ironing machines, resulting in complete relief from the constant difficulty, disadvantage and expense caused by such machinery running with oil. On Randall's Island, New York, the entire establishment is fitted with dry lubricants, and the Commissioners have much to say in their favor.

One of the most extreme pressures that could be placed on any lubricant was that to which the leading blocks were subjected in hoisting granite and iron during the construction of the New York & Brooklyn Bridge. We are informed that this work frequently caused a strain of four tons on a sheave. Before introducing a graphite lubricant, the bushing and hardened steel rollers of a patent sheave would be cut completely out in four or five days.

With the foregoing classification, in which dry-bearings seem to have given every satisfaction, we think our readers will be in a position to form a fairly accurate idea of what they can expect in filling their own special requirements. There are, however, two or three points which have to be considered. Our investigation shows us that all manufacturers claim duration of bushes and perfect coolness in the case of ordinary shafting and machinery; but so far we have only been able to satisfy ourselves in one particular as regards a lubricant that will resist external heat. This lubricant has, undoubtedly, proved its efficiency in the running of Jabez Burns & Sons' Coffee and Spice Mills. The coffee mill is also a roaster, in which the shafting comes into almost direct contact with the flame, and so highly does this firm hold the dry lubricant which they use that they state that without a commodity of that kind their invention would be of little value.

It therefore occurs to us that mines and smelting establishments would do well in considering the adaptability of graphite bearings for bullion-pots and slag-buggies. All concerned in such work are fully aware of the great waste of oil that occurs in lubricating externally heated axles. Then again with rollers for the support of "paddles" in the working of reverberatory furnaces, and the sliding of feed-doors in very many others. In fact, wherever high heat is detrimental to the ordinary lubricant, graphite in some shape is almost sure to correct the difficulty.

Again, in underground workings, where hoisting appliances have to be carefully lubricated, graphite bearings may be considered as perfectly reliable, particularly in the case of guide-pulleys and rollers on inclines, and over which wire ropes are run at a considerable speed, and when a jammed pulley or roller, from want of attention, often causes the destruction of a sound and good rope. Also in the case of underground trucks, where so much waste in oil goes on in the dark during the greasing operation, and of which not so much as a spot remains to tell the tale of the continuous loss. In conclusion, we feel certain that many of our readers on considering their wants will find it to their advantage to look well into the matter of dry lubricants for special purposes, and we can only add that we will be most happy, if applied to, to assist and advise in the selection of such compounds as seem to us most suitable to do the work required of them.

Electric Transmission of Water-Power.—If the project relating to a new canal at Rheinfelden be carried out, an enormous stimulus will be given to electrical engineering, since the power rendered available through the construction of this canal will amount to not less than 11,000 H. P., and will have to be transmitted electrically to Basel, Säkingen and other places. The project has been worked out, and the undertaking is promoted by three of the best Swiss engineering firms, viz., Escher, Wyss & Co., of Zurich; the Oerlikon Engineering Works, and Zchokke & Co., of Aarau. The plans are ready, the capital is available, but the concession has not yet been obtained. Since part of the works will be on the frontier, and part of the power will be delivered to Säkingen, a concession is required not only from the Swiss, but also from the German governments, the necessary steps for obtaining which were taken some time ago. If obtained in time, work will begin in the coming autumn, and the whole undertaking will be completed in 1891. The length of the canal is 1½ miles, its width is 165 feet, and there will be erected a turbine house containing 23 turbines, each of 750 H. P. Each turbine will drive its own generator. The pressure adopted will be sufficiently high to enable the distribution of power to be effected economically within a distance of 15 miles. The power of the turbines being 17,000 H. P., a total of 11,000 H. P. will be available to the consumers.

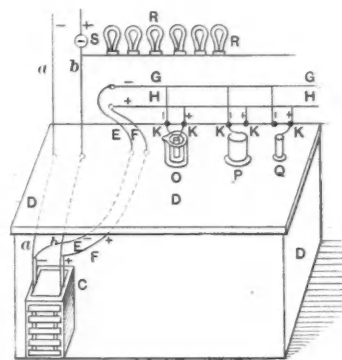
THE STORAGE BATTERY FOR ELECTROLYTIC DETERMINATION OF COPPER.

Written for the Engineering and Mining Journal by Wm. C. A. Ferguson, Ph.B., Chemist.

The method of determining copper in ores, cinders, mattes, etc., used in the laboratory of G. H. Nichols & Co. for the past few years, was the electrolytic deposition from a nitric acid solution on a platinum cylinder suspended in a small beaker. The current for each determination was derived from two cells of a battery composed of zinc and copper in a neutral solution saturated with sulphate of copper and containing crystals of the latter in excess. The quantities used for each determination were of ore or cinder, averaging 5 per cent. copper, 2 grams; for matte containing about 50 per cent. copper, ½ gram. Experience proved these batteries to be somewhat unsatisfactory, as they required frequent cleaning, the zincs becoming coated with copper, and occasionally they would work very badly indeed, so that on the whole, taking also into consideration the fact that very frequently considerable copper would be left in solution, sometimes an amount too small to be determined and sometimes so much that a new assay was necessary, it was determined to try and find some better way of generating the current necessary for our copper analyses.

Having an electric light plant on the premises, we naturally turned to it as the source of current, and at first thought of using it direct from the dynamo by placing resistances in the circuit until the current suited the purpose; but as the dynamo did not run during the day, only while it was dark, it was not practicable, as when the dynamo stopped in the early morning the deposited copper would be dissolved by the nitric acid solution.

A prominent firm of New York chemists uses the Edison current for copper analysis, placing lamps in the circuit as resistances, so arranged that by turning off all the lamps the full current strength can be obtained and by successfully turning the lamps on the current may be gradually reduced. The advantage of this is that by turning on one, two, three, or more lamps currents of different degrees of strength are obtained. The full current is turned on and off by a switch. These gentlemen speak



a b are wires from dynamo. C is storage battery. D is table for copper work. E F are wires from storage battery. G H are connected with E F, and also with small wires shown in diagram, these small wires being introduced into binding screws K, where they are brought into contact with the platinum foils. O shows breaker and + foils. P shows - foil on which copper is deposited. Q shows + foil. R is resistance of six lamps. S is switch for turning current on and off from dynamo.

very highly of the convenience of this arrangement, which the writer has seen in their laboratory and which, by making the necessary connections, can be made to run any number of analyses at one time.

On talking the matter over, Mr. Herreshoff, superintendent of the Laurel Hill Works, and the writer resolved to try a storage or secondary battery, reasoning that such battery could be charged at night and then be used as needed, and our experience has more than equaled our best expectations. We were told that a single "Gibson" cell would be best for this purpose. We now have one of these cells in our laboratory connected with the dynamo, and provided with a switch for turning the current on and off, as required. By turning on the current for one night the battery is in condition to deposit about eight grams copper. The deposits are fine and bright, and only a trace of copper is usually left in solution. (Of course, the solution must always be tested for copper.) With this battery we use for analysis 5 grams of ore or cinder containing five per cent copper, or 2 grams of matte containing fifty per cent copper. The writer has left on over night four assays, two of ore and two of matte, and in the morning all of the copper was deposited. Duplicates usually vary from nothing to .02 to .05 per cent.

When the current grows weak simply turn on the switch over night and the battery is ready for another campaign. The battery, being a single cell, takes up very little room, the glass jar being about 8 inches in diameter and 14 inches high. It is perfectly clean, requiring no attention, and is more of an ornament than otherwise. The advantage of the above form is in its construction, making cross circuits about impossible. Other makes, however, may be just as efficient.

The following is a brief description of the battery's connections: The dynamo is a 75-volt machine with 200 sixteen-candle-power lamps. The circuit in the laboratory has 10 lamps. Wires are run from this circuit through a switch and then through six 90-volt sixteen candle-power lamps, these latter acting as resistances, and finally connected with the storage battery, the positive and negative wires connected respectively to the positive and negative poles of the battery. From the battery wires are run to the table where the analyses are to be performed. The copper will deposit on the connection made with the negative pole. If the battery works too strongly a good resistance can be put in the circuit by using insulated German silver wire No. 22, trial telling the length to use; though by charging two nights in succession it was not too strong with our apparatus.

Never having heard of storage batteries being used in this connection, after an experience of three months I take pleasure in bringing the results of this investigation before those who may have many copper analyses to make.

LAUREL HILL CHEM. WORKS, }
Long Island, N. Y., August 20, 1889. }

IMPRESSIONS AND REMINISCENCES OF THE ENGINEERS' EUROPEAN TRIP.—I.

By One of Them.

One of my correspondents writes that my letters show that I can now get my hat on my head without the aid of a shoe horn, referring to the case of "swelled head" which the "stay-at-homes" think those who went abroad were afflicted with. The head being reduced to normal size, there may remain in it some memories of the trip which may be of interest to readers of the ENGINEERING AND MINING JOURNAL.

Did it pay?—It cost \$500. Results: 5 pounds increase in weight, stronger nerves, better digestion, had a good time for two months, gained some knowledge, had some Yankee conceit knocked out of me, yet became prouder than ever of my American citizenship and of the engineering profession; met many distinguished men, saw many wonderful works, and had so many delightful experiences that the memory of them will be a life-long pleasure. Yes; it paid.

The Trip Across.—The one hundred and seventy engineers, ladies and guests who went on the "City of Richmond," the slow boat, had a better time than the one hundred who went on the "City of New York," the fast ship. The former party had the first cabin all to themselves, and had a good opportunity to become well acquainted with each other; while the latter were only a fraction of the five hundred and odd who crowded the saloon of the faster vessel, and the crowd, the shorter time and the rougher passage prevented the welding of the party into one homogeneous body.

Liverpool.—The landing stage, 2,600 feet long, which rises and falls 30 feet with the tide, was one of the prominent objects that attracted our attention. Also the enormously costly docks, with their gates and locks, which let the vessels in and out during high tide only. No such landing stage and docks are to be found in America. Why? Because we do not need them. With only five feet rise and fall of the tides, the wooden structures, built on piles, which disfigure New York are good enough. But we are amazed at the extent and the costliness of the docks. The Yankee question, What did it cost? naturally arises, and we think we would have found some makeshift in America to get around the necessity of these docks and save expense.

The Mersey Tunnel.—A dark hole under the river between Liverpool and Birkenhead. Quite admirable as a piece of engineering, and very convenient for the two cities. If England had four cities like New York, Brooklyn, Jersey City and Hoboken in such close proximity as we have, she would have had them connected by tunnels long ago. In great works of civil engineering, especially for municipal convenience, the English are ahead of us—not from superior ability as engineers, for we can build just as fine works as they can, but there the civic authorities are more progressive and far-sighted than here; they have more money, possibly, or they are more willing to tax the public for improvements for the public benefit; but they do seem to give more employment to the civil engineers than we do.

Laird's Shipyard.—Not being a shipbuilder, this yard is beyond the writer's criticism. As far as he can see, it is as perfect as the present state of engineering knowledge can make it, and has turned out some of the finest vessels in the world. But he has no patience with the remark ventured by many American-Anglo maniacs: "We cannot build such ships in America." We can, and will. It is only a matter of dollars and cents. Roach's or Cramp's shipyards on the Delaware can build just as fine ships as any that are afloat. They may cost more on the Delaware, but only because labor costs more here, for the principal cost of a ship is the cost of the labor that is in it.

The steamship of the future, that is the immediate future, is a twin-screw steamer, as the records of the "City of Paris," the "Columbia" and the "Teutonic" prove. Do many of your readers know that a twin-screw steamer was built in America in 1804, three years before Fulton made his great success in ascending the Hudson? The twin screws and the engine of that steamer, built by Col. John Stevens, are preserved in the museum of the Stevens Institute of Technology in Hoboken.

A Night Ride to Glasgow.—Liverpool has about as large a population as Chicago, Glasgow nearly as large as Philadelphia. They are about six or seven hours apart by rail, practically a night's ride. I heard there were sleeping cars between the two cities, and as I had to make a call in Glasgow, to save time, of course, Yankee fashion, I would go at night. Bought a first-class ticket, paying more than double the fare per mile than the New York Central would charge, but they charged me only five shillings, say \$1.25, for a sleeping berth. An officer of the station showed me to my car, or carriage, I should say, as it was in England. It was a regular English compartment car, with one of the compartments made into a sleeping room, with two single beds in it—regular beds, not berths nor bunks. I took possession of one of them, and I might have had both, for no other sleeping passenger was in that train that night. Think of it. Two cities of such a size, a night's ride apart, from 11 P. M. to 6 A. M., and only one sleeping passenger! And he was not a sleeper either, for whether from the stuffiness of the compartment or from the vibrations of the wheels on the track—for the wheels were directly under the compartment, and the shocks were not distributed as in our "bogey" system—or from the change from a steamer's berth to a luxurious bed, I scarcely slept a wink all night. I told the story in Glasgow the next morning, but my hearers thought it not astonishing. "Why should any one wish to travel at night? We prefer to travel by daylight." I then told them how a few weeks before, while convalescing from a slight fever, and desiring a rest from business, I took a 2,000-mile ride from New York to Texas, three days and three nights in a sleeping car, and came back by another route, stopping at a few places by daylight, sleeping five nights in succession in sleeping cars, and reached home rested and strengthened. Then they were astonished. "What; get rested in a sleeping car! Impossible." This is something of a digression, but I know of nothing which more clearly shows the difference between English and American habits.

Glasgow.—There is, probably, no city in Europe of greater interest to engineers than Glasgow. It has had a phenomenal growth the last thirty or forty years, and it is now in the full tide of prosperity. Its chief source of wealth is the vast stores of coal and iron ore in its immediate vicinity. The Clyde at Glasgow is about such a river as the Schuylkill at Philadelphia. Originally a narrow and shallow stream, it has been dug out by the engineers, till it now floats the largest vessels. Its banks are lined with shipyards, making it the largest shipbuilding center in

the world. Iron and steel works, foundries and heavy iron manufacturing establishments of all kinds here abound. Scotland and England together could not have caused Glasgow to grow to its present size. The whole world pays it tribute, in buying from it its famous Scotch pig-iron, and more famous Clyde-built steamships. If those "students of maxims rather than markets," who think America could manufacture iron and build ships for the "markets of the world," would study the industrial resources of Glasgow, I think they would have cause to modify their opinions. I know of no location in America which could ever compete with Glasgow in supplying the world with iron and steel and steamships, not even if our tariff were removed, and our workmen were paid as low wages as in Scotland, and our capitalists would furnish money to build works as cheaply as it can be obtained there. To place us on an equality with Glasgow we would need to find a location on tide water which has iron and coal deposits as near to it as Glasgow has them. There is no such location in America, and geographical reasons, therefore, make our competition with Glasgow impossible.

The Sewing Machine Works Near Glasgow.—As an evidence of the advantages of Glasgow for manufacturing, the case of the Singer Sewing Machine Company may be cited. This company has long been famous as the largest sewing machine concern in the world. Until recently the plant at Elizabethport, N. J., was its principal works, and from there it exported machines over the whole world. They could compete in the markets of the world with the best factories of Europe, and the reason they could was no doubt that they had introduced, to its extreme limit, the American system of making all parts on the interchangeable system, and by machinery which was as near automatic as possible. Wages in the United States were high, therefore inventive talent was employed for years to dispense with high-priced labor as much as possible, and make the steam engines and the machine tools tended by men of limited skill, and at moderate wages do the work of manufacturing. The company was wonderfully successful. It paid big dividends, accumulated a large surplus, gave employment to 3,000 men in its Elizabethport works alone, and in its whole business, including the distribution of machines over the whole world, it gave employment to 40,000 persons. The foreign demand for sewing machines increased, so that its works in New Jersey, besides a smaller works it leased in Glasgow, could no longer turn out enough machines, and it became necessary to enlarge its producing capacity. In 1882 I was present at the ceremony of breaking ground for a new factory at Kilbowie, a few miles from Glasgow, and now, in 1889, I visited that factory in complete running order. The factory and equipment cost over \$2,000,000; it employs 5,000 men, and it turns out sewing machines at so much less cost, both of labor and material, that the Scotch factory now does the bulk of the export trade. The new factory is thoroughly American in its ideas. It is equipped with American machinery, some of it built by our famous makers, as Pratt and Whitney, and some by the company in its New Jersey works. I doubt not that if there were not a tariff on sewing machines in the United States, the Singer Company could afford to close its American works and make machines for the American trade in Glasgow.

The Babcock & Wilcox Co.'s Boiler Works.—The history of the sewing machines has been repeated by the Babcock & Wilcox boilers. Both in the United States and in Glasgow they are made for the Babcock & Wilcox Company by the Singer Manufacturing Company by contract. The invention was developed in the United States, and gradually obtained a small export demand. A few years ago the manufacture was started in Glasgow, and now the boiler works in the Singer Company's factory in Glasgow excel those in Elizabethport, and nearly all the foreign orders for these boilers are now filled by the Scotch factory. The boiler made there is even better than the American boiler, for it is made entirely of wrought metal, the objectionable cast-iron parts being dispensed with. The work done in making forged wrought-iron headers and saddles for these boilers is a veritable triumph in forging and welding. Samples of the work shown in the Paris exhibition attract great attention.

(TO BE CONTINUED.)

VACATION NOTES FROM NORTHERN NEW YORK.—I.

The scenery of this region is full of beauty, rare in its variety, yet thoroughly harmonious in its entirety. North of Saratoga the single track road of the Delaware & Hudson Canal Company's Champlain Division is the only connecting link between Montreal and Saratoga. This line was constructed at great expense and despite engineering difficulties innumerable. The route is deservedly popular among tourists.

Leaving Saratoga, the vista becomes one of unbroken farm lands in various stages of cultivation, with only an occasional undulation. As historic Ft. Edward is passed the stately mountains on the eastern shore of Lake George loom into view on the left, while to the right is the quaint old Rensselaer Canal, and after a while numberless little ponds and streams which soon are shown to be a part of Lake Champlain. Space, however, will permit no further thefts from the guide book, and I content myself with saying to the Eastern readers of the ENGINEERING AND MINING JOURNAL that for a vacation ramble happily combining interest, pleasure and profit this route can scarcely be surpassed. The air itself is a veritable "elixir of life," so much so that my friend Cyrus Butler, of the Horicon Iron Company and well known in New York iron circles, swears that it has postponed Greenwood for him at least twenty years. Writing as I do, therefore, with the abandon of one thoroughly under these delightful influences of atmosphere and scenery, and in the full enjoyment of a vacation from onerous though pleasant duties on the ENGINEERING AND MINING JOURNAL, these must be accepted simply as vacation notes.

THE TICONDEROGA GRAPHITE DEPOSITS.

Plumbago is very plentiful in this region; mining for it has been carried on over an extensive area, but rather unsystematically, the object of all operations apparently being to get the ore as cheaply as possible, and not to develop any great reserves, until latterly, when under the direction of Mr. Wm. Hooper, than whom no one is better informed on the subject of graphite mining, and who is a man of experience, ingenuity, and skill, the aim has been to connect the various workings.

At present work is confined exclusively to the deposits on Hague Mountain, four miles by road from the town of Hague, a prosperous little summer resort on the shores of Lake George, ten miles from Ticonderoga.

Work has been carried on here for six years on a vein of considerable size, but the operations have been on a comparatively small scale, and consequently the developments do not reveal as much as might be expected from the period during which work has been carried on steadily. Only thirty-five men are employed. Moreover, no mining is done in the winter months, the season opening in May. In 1886 a drift was started on the northeastern slope of the mountain, which has been extended to a length of 550 feet. No ore has been taken from this drift during the present season, since ore of as good a grade has been obtained from surface workings with less cost. Most of the operations at this point have been carried on in precisely this way. Outcroppings are plentiful, and as soon as a shaft or tunnel reaches such a depth or length as to become expensive, it has been abandoned and new openings have been made. The vein is strongly defined. Since the opening of the present season most of the ore has been taken from an open cut at what is apparently the extremity of the vein. This cut is now nine rods long by three rods broad across the vein, and is being opened up to the southwest, following the course of the vein in the direction of the old workings. The vein has a northwesterly pitch at an angle of perhaps 15 degrees, and the ore "pockets" "dip" in the vein to the southeast.

Conveniently situated at the mines is a ten-stamp mill, run by a five H. P. engine, equipped with a Blake Challenge crusher, 9 by 15, two batteries of stamps, separators, etc. The ore comes from the workings in tram cars, which are run into the mill, where the ore is dumped, broken by hammer and fed to the crusher. The ore averages about 7 per cent of pure plumbago at this point. In this mill it is concentrated to an average grade of from 40 to 50 per cent. About seventy bags, of 150 pounds each, of this product are turned out per day, and carted five miles to Lake George and boated to Ticonderoga, recarted two miles more to another mill, where it is reconcentrated, ground, sized, dried and barreled. Two tons of the finished product are turned out per day in two grades, one of 85 per cent and the other 97 to 98 per cent purity. It is evident that one of the main items of the cost of production is the inaccessibility of the mines and the costly means of transportation, involving, as it does, frequent rehandling.

For the past six years the mining has been done on contract by Mr. Hooper, who mines, mills and delivers the ore to the American Graphite Company. This company is still in corporate existence, although owned by the Joseph Dixon Crucible Company, of New Jersey.

Speaking of the Dixon Company reminds me that en route to this region of delightful scenery, towering mountains, picturesque valleys, placid lakes and fertile farm lands, I encountered one of the stockholders of the company, from whom I learned that ere long another great contest for the control of the corporation will be inaugurated. Chancellor McGill, of the State of New Jersey, has ordered an election of a new board of directors, to be held on October 15th. Mayor Orestes Cleveland, of Jersey City, was president of the company until it went into the hands of a receiver in 1881. The receiver, Mr. Edward F. C. Young, president of the First National Bank, has since then conducted the business. A feeling has now arisen that a receiver is no longer necessary, and it is said that Mr. Cleveland will seek to regain the presidency. My informant protested very vehemently against such a step.

J. R. B.

TICONDEROGA, N. Y., August, 1889.

IS A FAULTED FISSURE ALWAYS THE OLDEST?—A STUDY OF FAULTS.

Written for the Engineering and Mining Journal by Carl Henrich, M.E.

It is the generally accepted theory that folds and faults are the result of tangential pressure in the crust of our earth, which pressure is generally supposed to be the result of the gradual cooling and shrinking of our earth. Whether the supposed cause of this pressure is really the true cause or not, all the observed phenomena of faults and folds, changing wherever excessively folded to faults, leave hardly any doubt that we must regard a tangential pressure in our earth's crust as the primary cause of folding and faulting.

It has also been recognized that nearly all fissure veins, or at least their majority, occupy fault fissures or owe their origin and existence to previously formed fault fissures.

While some of the old theories of faults have undergone considerable modifications and changes, the old axiom, that a faulted or displaced fissure is always the older one, has so far remained intact and generally accepted.

In the course of extended observations in the Aspen district, Colorado, where two systems of faults cross each other, I had frequently occasion to doubt the correctness of this theory, and I have since come to the conclusion that not only does this rule not always hold good, but that in many cases just the reverse is true, i. e., that the apparently faulted fissure is the younger one, and is in reality not one disjointed faulted fissure, but several independent originally separated fissures.

Let us suppose we have in Fig. A, giving plan of what would be generally considered a fissure or vein, $B_1 B_1, B_2 B_2, B_3 B_3$, which has been apparently faulted by the cross fissures or faults $A_1 A_1$ and $A_2 A_2$ and $A_3 A_3$ into the three separate parts $B_1 B_1, B_2 B_2, B_3 B_3$.

We will consider that the tangential pressure A , acting in the direction of the arrows A in our earth's crust, produces the system of parallel* faults or fissures $A_1 A_1, A_2 A_2, A_3 A_3$, and so on. Not only will these fissures be formed, but the rock masses between these fissures will be dislocated toward each other, making these fissures real faults.

After the tangential force A has spent itself and the part of the earth's crust, which by this force has been disturbed and faulted, has come to rest, and after an interval of rest the same part of the earth's crust is subjected to another tangential pressure, acting this time in the direction of the arrows B in Fig. 1, and if this pressure be strong enough to fault, break up and dislocate this part of the already fissured and faulted earth's crust, what will be the result?

The faulting will occur along the lines or planes of least power of resistance to the tendency to break. But this line of least resistance will not be, as in the case of the undisturbed not-faulted earth's crust, when the pressure A was acting on it, in one continuous line or plane, but this line or these lines of least resistance will have been disconnected and shoved apart by the faults $A_1 A_1, A_2 A_2$, etc., so that the new break

*Or nearly so.

or fault resulting from the force B will occur at a different place in each separated rock mass included between two of the older faults.

If $m n$ in Fig. 1 represents the horizontal pressure exerted by the pressure B at the point m of the fissure $A_3 A_3$, this pressure $m n$, according to the well-known law of the parallelogram of forces, will divide itself into the force $m p$ acting still horizontal, but square to the line $A_3 A_3$, i. e., square to the strike of the fissure, and in the force $m o$, which will try to shove the rock mass, contained between $A_3 A_3$ and $A_4 A_4$, from o toward m horizontally. But as the resultant force $m p$, although square to the strike of $A_3 A_3$, is oblique to the plane $A_3 A_3$, this force will divide again (in Fig. 2, the elevation) into $q m$, which will be square to the plane $A_3 A_3$, and will thus be taken up by the rock mass on the other side of $A_3 A_3$, while the other resultant force $m r$ will try to force the rock mass between the two faults $A_3 A_3$ and $A_4 A_4$ upward in the direction from m towards r . Thus we will have finally as the resultant of the force $m n$, and of the force $m p$, a force acting parallel to the old fault $A_3 A_3$, and obliquely upward or downward, according whether it is exerted on the hanging-wall side or on the foot-wall side of the fissure $A_3 A_3$. As the same will be the case at fissure $A_4 A_4$, we see that the force B (in part) will be applied on the rock mass between $A_3 A_3$ and $A_4 A_4$, in an obliquely upward direction parallel to $A_3 A_3$ along $A_3 A_3$, and in an obliquely downward direction parallel to $A_4 A_4$ along $A_4 A_4$. This must have a twisting tendency on the rock mass between $A_3 A_3$ and $A_4 A_4$, the results of which twisting we see frequently in nature.

Thus we see that an apparently faulted fissure may be really much

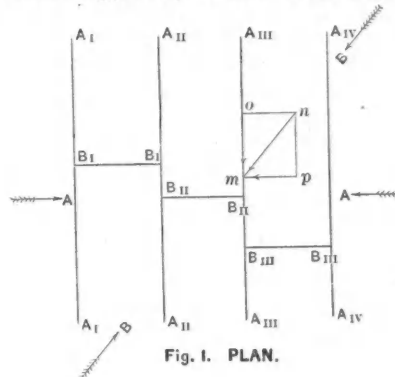


Fig. 1. PLAN.

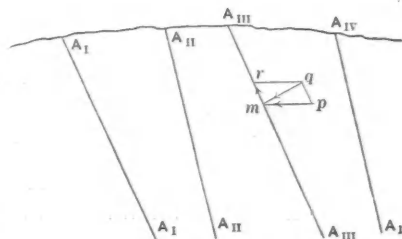


Fig. 2. ELEVATION.

younger than the apparently faulting fissures. And in such cases the same force which creates the new fissures or faults $B_1 B_1, B_2 B_2$, will also open again and possibly enlarge the old fissures A_1, A_2, A_3 , etc.

Anybody acquainted with the very numerous faults of the Aspen District in Colorado must have noticed that the beautifully preserved striae of some of these faults always point in a slightly inclined direction. They are usually from 20 to 35 degrees from the horizontal. The Aspen District will be a splendid field for testing the correctness of the view and theory here given, as in this district we have the two systems of faults caused by the tangential pressures at different times and in different directions, which led to the elevation of the Sawatch and the Elk Mountain ranges respectively.

MEXICAN POTTERY GLAZE.

In the current number of Harper's Monthly Magazine is an interesting announcement of a discovery of a band of Mexican Indians who manufacture a pottery glaze, which, in an introduction to the article, the expert in potteries, Mr. William C. Prime, compares to the wondrous old glazes of Gubbio and the Florentine potters. "The fact stands," he says, "that to-day in San Felipe unskilled Indians are producing and selling for daily use in Mexico wares decorated with a luster incomparably finer than any metallic luster produced in Europe, and which, if potters can by experiment learn so to use it that different colors can be produced as desired, will practically restore to modern uses the lost Saracen and Italian lustres."

As much of the secret as the San Felipe Indians possessed is out, for at some risk Miss Y. H. Addis has penetrated to where the pottery was made and has secured the entire process of firing, etc., adopted by the makers of these beautiful wares. She thus describes it: "The vessels once moulded, are fired, and when thoroughly cold are glazed with a mixture of (1) oxide of lead; (2) broken glass, which they buy from the refuse of shops; (3) "peacock copper," and (4) a very fine sand found near San Felipe. It was impossible to obtain even an approximately accurate idea of the proportions employed, because the potters have so long worked by the rule of thumb that they are really incapable of describing the quantities. Therefore, this point would have to be determined by examination during their practical working. After application of the glaze comes a second firing—the one in progress at the time of the visit. The ware emerged from the kiln at this stage dull and clouded, of a thick muddy brown or greenish color. As rapidly as pos-

sible the potter buried the pieces in a great heap of stable manure, and after from one to two hours they were disinterred, transformed by the ammoniacal fumes to a lustrous brilliance, with the shifting, varying hues that gleam on the breast of a peacock. The secret, if secret there be, seems to lie in two of the elements of the glaze, in combination with the ammonia treatment, for I am skeptical as to the potter's assertion that the effect is due to peculiar properties in the clay of San Felipe."

COST OF TUNNELING AT THE HOGSBACK MINE, PLACER COUNTY CAL.

Written for the Engineering and Mining Journal by W. C. Balston, M.E.

This property, known as the Hogsback Consolidated Mining Claim, was purchased by the Compagnie des Mines d'Or du Forest Hill Divide, a French corporation whose office is in Paris, France; and from the data and surveys, besides work done in adjacent mines, an ancient gravel channel was known to exist in the ridge, and supposed to be the same channel that is now being worked with such good results by the Golden River Mining Company at Red Point (also a French corporation in charge of Chas. F. Hoffmann, M.E), nine miles west of us.

The Hogsback mine is situated about 21 miles northeast of Forest Hill. A tunnel was started 80 feet lower than an old tunnel (which proved to be too high) on the side of a very precipitous mountain; the estimated length of the tunnel was 1,400 feet, when we would be under the channel, and would there make an upraise and prove our ground.

The tunnel is 7 feet by 8 feet in the clear, with the grade of 3 inches to the 100 feet; it has a double track for the first 100 feet, to be used as a switch, with water drain between the two tracks; after that, only a single track, with drain on the side.

Sixteen-pound steel rails were used; gauge of track, 20 inches; ties, 4-inch by 6-inch timber, placed every 3 feet; walking plank between rails 2 inches by 17 inches by 20 feet. Switches of 100 feet in length are placed every 500 feet.

The air compressor, which is an Ingersoll Class A Straight Line Compressor, cooling by injection, is situated 175 feet above vertically and 350 feet from the mouth of the tunnel, air being carried down through a three-inch iron pipe; besides this, there is a one-inch pipe in the tunnel for water to be used when drilling.

Work on the tunnel was commenced by hand on May 18th, 1888. A distance of 248 feet was run by hand, three shifts, of five men each, laying their own track and removing their own dirt. Below is a statement of our greatest week's work by hand. The average distance made per week by hand was 35.4 feet.

| WEEK ENDING JUNE 9TH, 1888. | | |
|--|-------|----------|
| Progress 487 feet. | | |
| 12 men, 7 days (84 days), @ \$3.00 | ..... | \$252.00 |
| 3 " 7 " (21 " @ \$3.25 | ..... | 68.25 |
| 1 " 7 " (7 " @ \$3.50 | ..... | 24.50 |
| 114 lbs. safety nitre powder No. 2 3/4, @ 18c. per lb | ..... | 20.52 |
| 350 feet triple taped fuse @ 72c. per 100 ft. | ..... | 2.52 |
| 50 lbs. chemical wax candles, 14 oz., @ 13 1/4c. per lb. | ..... | 6.62 |
| 2 boxes x x x blasting caps, @ 80c. per box | ..... | 1.60 |
| 224 feet lumber, @ \$22.50 per M | ..... | 5.04 |
| 1,040 lbs. steel rails (16 lb.) (195 ft.), @ 4c. per lb. | ..... | 41.60 |
| Bolts and fish plates, @ 50c. per pair | ..... | 4.00 |
| Car oil | ..... | .15 |
| 40 bushels charcoal, @ 20c. per bushel | ..... | 8.00 |
| Wear and tear, etc. | ..... | 1.00 |
| Total cost | ..... | \$435.80 |
| Cost per foot = | ..... | \$8.94. |

Not a timber was used in this ground, and it is still standing without any.

The compressor was started on the 8th day of July, 1888, and on the 27th day of December, 1888, the tunnel had reached a length of 1,559.6 feet. At a distance of 1,320 feet we broke through into a hard mountain cement, and anticipated making greater headway, but found it was very nearly as costly as the rock. During the time we were in bed-rock our average progress per week with machine drills was 58.94 feet, for 1,320.7 feet of tunnel; requiring but 21 sets of timbers, showing that the ground is not soft.

Average numbers of holes per shift, 10; blasting the cut and top holes first, bottom holes afterward.

The two largest runs made for two consecutive weeks were 73.6 feet for the week ending August 4th, and 66.9 feet for the week ending August 11th, or respectively 10.51 and 9.55 feet per diem.

The tunnel runs diagonally across the strike of the rock (the strike, however, varying very much, sometimes being at right angles with the tunnel), which is composed of alternate strata of slate, diorite and some white barren quartz.

The regular force of men employed (when full) consists of 15 miners, working 8 hours per day; 2 engineers, working 12 hours per day; 2 drivers, working 12 hours per day; 2 blacksmiths, working 10 hours per day; 1 timberman, working 10 hours per day; divided into three shifts, and working two 3 1/2-inch Ingersoll Eclipse drills on columns.

We have three 3 1/2-inch Ingersoll Eclipse drills, and the total cost for all extras for 1559.6 feet of tunnel was \$132.75. A stringent rule was enforced, requiring each drill to be taken out and thoroughly cleaned once a week.

| COST OF SURFACE IMPROVEMENTS AND PLANT. | | |
|---|-------|-------------|
| Road, 4,000 feet long; average grade, 1 foot in 11 feet; total cost to December 27th, 1888 | ..... | \$944.50 |
| Yards, dump and trails, etc., total cost | ..... | 544.00 |
| Boarding-house, office, blacksmith shop, stable, powder house, framing shed and snow sheds; total cost | ..... | 2,722.50 |
| Water Works. Running tunnel 80 feet, timbering, etc.; 2,000 feet 1/2-inch pipe-laying, etc. | ..... | 376.77 |
| Air Compressor; commenced erection June 5th; completed with pipe-line to tunnel July 1; average force of men per day, 3.9; total cost of grading, etc. | ..... | 900.17 |
| One (No. 263) Ingersoll Straight Line Compressor, 16 + 16 + 24; one 34 + 16 steel boiler, complete; air tank, pump; three 3 1/2 Eclipse drills and columns, connections, extras, freight and building, 30 + 40 feet | ..... | 7,579.21 |
| Eight iron cars | ..... | 963.00 |
| Two tunnel horses and harness | ..... | 275.00 |
| Total cost of plant, etc. | ..... | \$14,395.15 |

ACTUAL COST OF 1559.6 FEET OF TUNNEL SEVEN FEET BY EIGHT FEET, EXCLUSIVE OF MANAGEMENT UP TO DECEMBER 27TH, 1888.

| | Cost per running foot. |
|---|------------------------|
| Total labor (including timbering) | \$12,131.49 = \$7.77 |
| Powder, 10,021 lbs. at 1 1/4c. (delivered) | 1,478.10 = .90 |
| Fuse, 23,045 feet at 5 1/2c. per 100, and caps, \$40 | 165.59 = .10 |
| Wood 522 cords of wood at \$2.75 (delivered) | 1,435.50 = .92 |
| Charcoal, 1,580 bushels at 20c. | 316.00 = .20 |
| Candles, 1,755 lbs. at 13 1/4c. net. | 232.53 = .14 |
| Gang planks and ties, 7,624 feet at \$22.50 per M. | 171.54 = .10 |
| Timbers, 21 sets at \$1.80 per set. | 37.80 = .02 |
| Steel rails, etc. (16-lb.) 20,048 lbs. at 4c. net. | 801.92 = .51 |
| Air and water pipes (1,800 ft. 3 in. at 29 1/4c. = \$531.00; 1,700 ft. 1 in. at 6 1/4c. = 106.25; Freight on same = 124.18) | 761.43 = .48 |
| Horse feed, Hay, 2c.; barley, 3c. per lb. | 349.60 = .22 |
| Materials, steel drill parts, oil, tools, etc. | 916.33 = .58 |
| Totals | \$18,797.83 |
| Actual cost per running foot | \$11.94 |

SPECIMEN WEEKLY REPORT COMPAGNIE DES MINES D'OR DU FOREST HILL DIVIDE, HOGSBACK MINE, August 4, 1889.

| Report for the Week ending August 4, 1889, 9 a. m. | |
|--|-------------------|
| Total number of holes drilled | 150 |
| " " " " " " " " | 11 |
| Total depth of holes drilled | 758 feet |
| Average depth of holes drilled | 5 feet |
| Number of pounds of No. 1 powder used | 344 |
| " " " " " " " " | 135 |
| Time occupied in drilling | 26 hours |
| Average time per shift | 1 hour 15 minutes |
| Number of car-loads of rock extracted | 458 |
| " " " " " " " " | 65.42 |
| " " " " " " " " | 21.8 |
| Tunnel advanced for the week | 73.6 feet |
| Previously reported | 404.1 feet |
| Total tunnel built to date | 477.7 feet |
| Number of working days | 7 |
| Actual number of shifts | 21 |
| " " " " " " " " | 20 |
| Average progress per shift | 3.5 feet |
| " " " " " " " " | 10.51 feet |
| Number of sets of timbers | None |
| Wood consumed | 21 cords |

This form was adopted from Big Bend Tunnel, and closely resembles the Sutro Tunnel forms.

AN AUTOMATIC DUMPING-CRADLE FOR MINE-CARS.*

The accompanying figures illustrate the dumping-device used at the new dressing works of the St. Joseph Lead Company, at Bonne Terre, Me. It is a dumping-cradle, of a type much used abroad, permitting the car to be turned upside down to discharge its load. The main advantage of this type of dumping-apparatus is that it permits the use of cars of simple construction, not weakened by hinged doors or bottoms.

The wheels of the mine car run between the upper and lower arms of the curved rocker-irons B, the lower arms forming a continuation of the track. The apparatus is so constructed that the axis D is below and back of the centre of gravity of the loaded car, but above the centre of gravity of the empty car. The dumping of the car, and its return to a normal position are both automatic. A chain, not shown in the sketch, prevents the cradle from turning too far, and the catch permits the car to be held upside down till the load is completely emptied.

The dimensions of the car for which this apparatus is designed are as follows:

| | |
|--------------------------------|----------------------|
| Height over all | 3 feet. |
| Width of car-body | 2 feet 9 inches. |
| Length of car-body | 3 feet 3 inches. |
| Depth of car-body | 1 foot 8 inches. |
| Bottom of car-body above track | 1 foot 4 inches. |
| Diameter of wheels-tread | 11 1/2 inches. |
| Diameter of wheels-flange | 14 1/2 inches. |
| Distance between axles | 1 foot 3 inches |
| Gauge of track | 2 feet. |
| Capacity of car | 1,400 pounds of ore. |

The body of the car is made of 3/8-inch boiler-plate, the sides and ends in four separate pieces, bent at the corners and riveted. The top edge is strengthened by a 3-inch piece of strap-irons 3/4-inch thick, riveted to side and ends. The bottom is attached to the sides by a piece of angle iron riveted through flanges and placed inside the sides and ends and below the bottom-plate. The car-body is supported on two oak sills 4 inches X 8 1/2 inches by 22 inches long. These raise the bottom of the car high enough to allow it to project over the wheels.

The dumping-cradle used at the Chapin mine, as described by Mr. Edward F. Wickes, is an example of a type in common use abroad. Like the one used at the St. Joe mill, it dumps the car by turning it upside down, avoiding the necessity of gates in the side or bottom of each mine-car, and thus permitting the cars to be made light, stiff and strong at reduced cost.

One disadvantage of dumping-cradles is that, as ordinarily constructed, they are fixtures. A separate cradle has to be erected at each dumping place. This difficulty is overcome at the Chapin mine by the simple device of mounting the cradle on wheels.

The cars, loaded from ore-chutes in a foot-wall drift at the sixth level, are conveyed to the foot of the shaft, through a cross-cut tunnel, by a slow-moving endless rope, to which they are attached singly, by very simple and effective grips. At the surface, the cars are run into the dumping-cage, and the ore is dumped into the bins from which the railroad cars are loaded.

The ore-cars, 6 feet 1 inch long, 3 feet 4 inches wide at the top, 2 feet 4 inches wide at the bottom, and 2 feet 4 inches deep, are made of 1/2-inch plate-iron and have a 1/2-inch strip riveted around the top, and also one around the sides and bottom at the middle. The wheels, of 8-inch radius, 3 feet gauge, are set 2 feet apart. There are two 3-inch by 3-inch iron bumpers, 4 inches long, at each end of the car. The capacity of the car is two tons.

The endless wire rope used for hauling the cars, 1/2-inch in diameter, and moving about three-quarters of a mile per hour, is carried between the rails on grooved rollers, four inches wide and eight inches in diameter, and is guided around the curve from the cross-cut into the drift by seven grooved wheels, one side of the groove being 14 inches and the

* Paper by Professor H. S. Munroe, Transactions of American Institute of Mining Engineers.

other 12 inches in diameter. The first of these wheels is set inclined, the second horizontal, the third inclined, the fourth horizontal, etc.

The motive power, located in an excavated room on the right of the cross-cut and near the shaft, consists of two 12-inch by 36-inch Corliss engines, run by compressed air. There are two sheaves or drums, one fixed to a cog-wheel which receives the motion, and the other set in a frame, held down by bolts working in slots, 15 inches by 1½ inches. A three-inch jack screw is set between the end of the frame nearest the first sheave and a cross-piece firmly bolted to its foundation. By this the distance between the two sheaves can be varied as the stretching of the rope may require. The rope passes around these two sheaves four times.

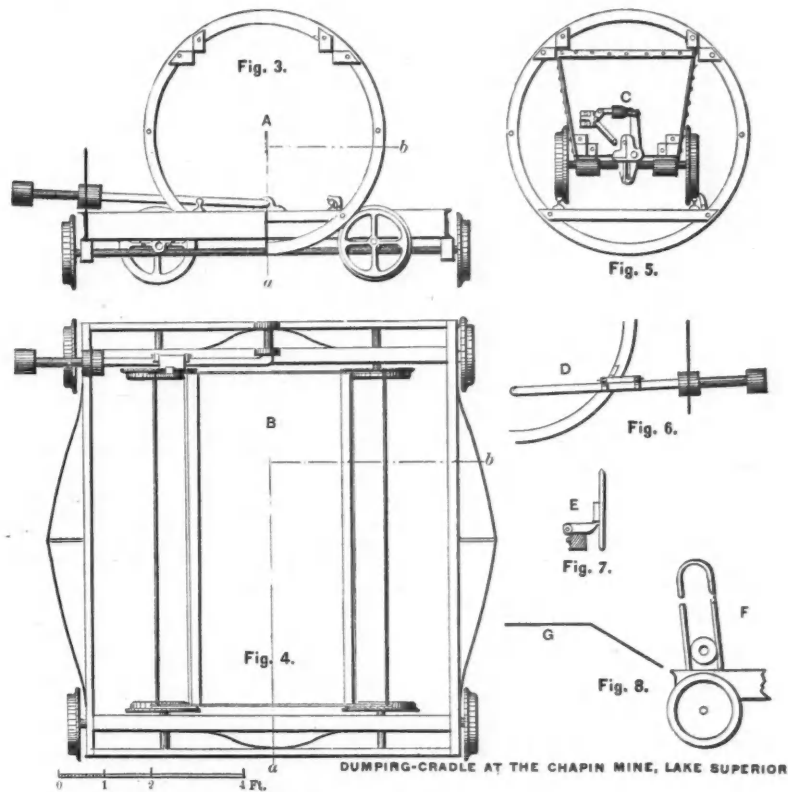
The cars are attached to the rope by a clutch or grip (Fig. 5), which extends 7 inches below the car-bottom. The rope is gripped between a piece bolted to the car and a lever (short arm 7½ inches, long arm 11½ inches), held in position by an elbow joint.

The cars are held in place in the double shaft, on cages 6 feet by 7½ feet in size, by two clutches, which, when in place, rest upon the rails and between the wheels.

At twenty feet above the ground-level a trestle, about 120 feet long, leads from the shaft-house to an ore pocket. From about twenty five feet in front of the shaft to directly over the ore pocket, extends the automatic dumping cradle, shown in Fig. 3, which is an end-view, with the portion *a b* removed and Fig. 4, which is a plan. The frame (8 feet 4 inches wide and 9 feet 8 inches long, made of 7½ inch by 2 inch channel-beams with two 4 inch I-beams of the same depth set across the

tread of the moving car-wheels moves a piece of angle-iron, hinged directly alongside of the rail, and, when in place, having its free end 5 inches above the top of the rail. The motion of this angle-iron, by means of a wire and bell-crank, rings a bell at the shaft, announcing the approach of the car in time to insure its proper detachment from the rope. The car is pushed by hand a few feet to the cage, and sent to the surface, where it is pushed off the cage and upon a truck 5 feet long, running at right angles to the track, and is then shifted to a track midway between the two cages. From this track it is pushed upon the cradle (the track projecting over and just clearing the cross-beams of the cradle frame, and meeting the rails in the cradle). The cradle is now moved on its track until directly over the ore-pocket, at which point the wheel on the end of the rod projecting beyond the side of the cradle, strikes an incline *G*, Fig. 8 (the incline is not drawn to scale), which gives it a sudden upward movement and starts the cradle revolving. The centre of gravity of the loaded car and cradle being above the axis of the cradle insures the completion of at least a half revolution, which would dump the ore; but the momentum carries the cradle beyond this point. A workman, who always rides out on the platform of the frame, now rights the cradle, and it immediately returns to the shaft. The incline mentioned above is made of wood covered with a piece of inch half-round iron, which acts as a track.

It is unnecessary to describe the manner of returning the empty cars into the mine, since it can easily be inferred from the foregoing description, the process being practically reversed.



AUTOMATIC DUMPING CRADLE.

frame 7 inches from each end) rests on four wheels of 8 inch radius, running on a track of 8 feet 11 inch gauge. The cradle proper consists of two iron rings 5 feet 4 inches outside diameter, 3 inches wide, and ½-inch thick, held apart by two angle-irons, so set that the horizontal distance between them shall be the width of the top of the car (see Fig. 3). The track-rails are carried on iron cross-pieces. The cradle, which is also strengthened by two iron rods diametrically opposite each other, rests between the I-beams, on four wheels of 9-inch radius, the axles of which are supported in bearings on the under side of the two end cross-beams. The distance between the centres of these wheels is such that the rails in the cradle correspond with the rails which project over and rest upon the frame, when the cradle is in position to receive a car. The cradle is free to revolve on these wheels.

There is also a catch for the wheels of the car similar to that on the cage. Fastened to one end and revolving around the central axis of the frame, with the bearing shown in Fig. 4, is a square iron rod, which projects 18 inches beyond the side of the frame. On the end of this rod is a wheel 5 inches wide; and over the side channel-bar is another wheel of the same size. The part of the rod between these two wheels is round. At a point on this rod opposite the end-wheel is a hinged piece which projects under a catch on the cradle-ring (see *D* and *E*, Figs. 6 and 7); the inner wheel is confined in an inverted U shaped guide, fastened on the side channel and beam set inclined; a plank running lengthwise, on the other side of the frame, acts as a platform. An endless 5-inch wire rope, carried from each end of the frame over a system of pulleys to the engine-house, more than 750 feet away, moved the apparatus. The 12-inch by 36-inch Corliss engine, driven by compressed air, runs the truck at shaft B and the cradle at shaft C.

In the cross-cut underground, at some distance from the shaft, the

In the platform back of the shaft house is a second cradle, into which the cars are run in order to be turned bottom side up for oiling.

No hoisting is done at night, the cars being loaded and stored on the track under the chutes until morning, when they are sent to the surface.

The ore from the upper levels is trimmed by hand to the ore-chutes, which are located at the end of each cross-cut. The cars used for this purpose are 3½ feet long, 2 feet wide at the top, 1½ feet wide at the bottom, 1½ feet deep, and open at one end. The wheels are of 6-inch radius, axles 15 inches apart, and the forward axle 18 inches from the front of the car. Each car holds about 1½ tons, and dumps over the front axle.

The system of handling ore above described is followed during the shipping season only; at other times, one-ton cars are used in place of the two-ton cars, and the ore is dumped from a trestle, running between the two shafts, upon an immense ore-wharf, about 1000 feet long and about 100 feet broad (estimated), from which it is loaded into the railroad-cars when shipments begin.

New Use for Sheet Steel.—Hon. Abram S. Hewitt, who has just returned from Europe, mentioned in an interview of a new use for steel as displayed at the Paris Exposition that is attracting the attention of engineers. It is the making of engine and car frames from steel cut by hydraulic pressure from large sheets. An ordinary frame rots in ten years, and it is estimated that this will last a century. Mr. Hewitt further said that abroad he saw steel made from low grade pig iron at a cost of \$4 a ton, and that the process of producing aluminum cost but \$1 a pound.

While Mr. Hewitt's last statement may be true, it is equally true that the Alliance Company and the Aluminum Company are far from being in a prosperous condition, and notwithstanding the fine plants that they have established they have been thus far run at a positive loss.

CONSULAR REPORTS ON MEXICAN TRADE.

Mr. Mackey, the American Consul at Paso del Norte, or Ciudad Juarez, as it is now called, reports as follows: The chief difficulty which now presents itself is the lack of means of transportation to and from the mines of the Sierra Nevada and of other places removed from the few railway lines which traverse the country. When branch lines are constructed from the Mexican Central a new impetus will be given to mining in this state by affording an outlet for the ore produced by the rich veins in which the Sierra Madre abounds. During the last six months of the year just ended mining in the state of Chihuahua has been characterized by less activity than during the first half of the year. This is due to the apprehension of a prohibitory tariff on Mexican lead ores as proposed in the Senate tariff bill. The same cause has had the effect of diminishing the quantity of American mining machinery recently introduced into Mexico. The agitation of this duty on lead has also affected disastrously the mining interests of Arizona and New Mexico, for the dry ore produced by those territories requires admixture with the Mexican lead ores to convert them into bullion.

The German Consul at Guadalajara reports the following: In iron and steel goods, Rhenish-Westphalia continues to assert its position among the sources of supply, and it competes with England and France in the following articles: Enamelled hardware, japanned and plain tin-plate goods, lamps, bronze goods, chandeliers, candelabras, table candlesticks, iron wire, wire nails, table knives and forks, chest, draw and door locks, Britannia metal goods, and leather goods, as pocket-books, purses, hand and traveling bags. The following articles are obtained from England: Tools, brass wire, steel pens. From the United States: Cast-iron goods, cut-nails, iron and zinc shoe pegs. Of the greatest importance is machinery for mining, agriculture, factories and workshops of all sorts, but for these competent engineers are necessary, who can fit up and repair the machinery, and when the sellers are in a position to satisfy these requirements, the results cannot fail of being satisfactory. Under present conditions the machinery business with Germany in the past year was of little importance; the continual facilitation of the intercourse with the United States by means of direct railway connection, the efforts of farmers and other interested parties here and the exertions of American manufacturers and engineers to study local wants and to fall in with the reforms necessitated by the conditions and peculiarities of the country, all help to promote intercourse with the United States, and for the same reasons, German manufacturers hardly come into account at all, although some small requirements in machinery are drawn from Germany. The prices of the leading articles have recently become weaker, which may be attributed to the railways, and the reopening of the interior.

SANITARY PRECAUTIONS IN THE CONSTRUCTION OF MINERS' HOUSES.

Written for the Engineering and Mining Journal by H. Douglas.

Three things are essential to health: Pure air, a dry soil and pure water. Provide these and half the maladies disappear. Let us venture to offer some practical hints upon the sanitary needs of the miner's cottage to this end, and to assist in controlling disease in both healthy and unhealthy localities.

In every household the kitchen and laundry slops are the chief source of trouble. They are of varying volume, according to the size of the family, and they are not always easily got rid of. Yet this must be done, and quickly, or they will cause trouble. The soapy water from the washbuds contains much dirt and animal matter thrown off from the skin, and when exposed to heat and allowed to decompose it will create very offensive and noxious gases.

Then there are the waste products of cooking, scraps of meat, vegetables, and greasy water, all equally capable of fermentation. These may be fed to hogs, but they must be got rid of promptly and at a safe distance. Under no circumstances should they be thrown out upon the ground near the back door, as heedless and careless housekeepers so often do. They will surely create a wet, mucky spot, and under the sun's rays will spread miasma, while if the soakage gets into the well great harm may follow. If nothing else will serve, keep a tight-covered barrel on wheels close at hand to receive such slops, and convey them away to a safe distance. They may be buried at a distant point, but not too much in one spot, and earth should be carefully covered over afterward. If a drain is provided to receive such slops it should be tight, and when possible made of tile pipe, as a substitute. Well-fitted wooden troughs thoroughly tarred within and without may be used; these should be given a good fall, and allowed to discharge at some place where the material will not putrefy and create a stench. Do not empty them into a stagnant ditch or shallow pond, or along a road gutter, where they will be exposed to the hot sun to decompose and create malaria. If the ground is sloping a safe outfall can easily be obtained; but the chief difficulty is when the ground is flat and of tough clay, which holds water for a long time. In such cases we would advise the laying of the drain close to the surface with open joints, so that the liquid contents can soak away through the joints into the soil and be absorbed by the roots of the grass, and furthermore be oxidized or burned up by the action of the air getting down through the interstices of the ground.

The whole theory of cheap drainage is to diffuse the material over as large a space as possible, so as to promote its rapid soakage and to prevent its saturating the soil in excess, or backing up and causing an overflow at any point. The possibilities of drainage in ordinary soil are shown by the rapidity with which the rain-fall is absorbed. In order to assist soakage, however, there must not be too much grease or other solids. The former chills and chokes up the drain pipes in a solid mass, especially if they are laid without enough fall, and therefore it is necessary to clean them out at least once a year. When a little additional expense is possible, this necessity may be avoided by providing a grease-trap; this will catch the grease and keep it out of the pipes. If a cess-pool is dug to receive the kitchen slops alone, it should be as carefully planned as any other cess-pool. Where the soil is very porous and there is no well within 200 feet, and if the cess-pool is 100 feet distant from the house, then the bottom may be left open, but the top should always be open for ventilation.

The drain from the house should be carefully laid and be tight, espe-

cially where it passes by a cistern. A most common defect in kitchen drains is that they are carried close around the house foundations, and so near the ground that they get cracked or crushed by wagons crossing them. Then their contents soak into the cellar, and an outbreak of typhoid fever or diphtheria may follow.

A private vault is a necessary evil in the country, but none the less a source of possible danger. It attracts flies and mosquitoes, pollutes the soil, and is troublesome to clean out. The ordinary vault can readily be converted into an earth closet by constructing a strong wooden box, tarred inside and out, if possible, and arranged to slide under the rear of the out-house for convenience of removal. Then provide a supply of sifted ashes or friable earth, and the appliance is complete. It will insure security against well contamination, destroy odors, eradicate insects, and secure some valuable fertilizers for the garden. But no house slops or wash-water should be thrown into this receptacle, nor any garbage or other refuse.

The next essential for a safe and comfortable habitation is to have a dry cellar, and who requires this more than the family living in the country, who are far removed from the general markets of commodity? One of the chief essentials of a healthy house is that it should be dry. The presence of damp leads to the decaying of the timbers, and to a disintegration of masonry and brickwork, saltpetering of the walls, growth of fungus and other vegetation, and serious injury to the health of the inmates.

The prime causes of damp buildings are: (1) An excess of moisture in the soil or atmosphere; (2) Porosity of the material of which it is constructed; (3) Lack of ventilation and sunlight. Among the means to cure dampness are: first, proper construction of cellars and foundations, damp course to check the rise of moisture through walls, coating the outer surface of walls with some substance that will exclude moisture, interior lining of tarred paper and thorough ventilation by windows and other means. To cure a damp cellar, first find out the source of the evil. It may be due simply to lack of ventilation or to moisture condensing on the cellar floor, or rain may enter through windows during heavy storms. All these defects can easily be removed. Additional openings may be made in foundation walls to admit air. A piece of curved earthenware or wooden pipe, technically called a bend, will serve very well for the purpose. Such inlets for air should be placed nearly opposite to each other to secure a current. It is so common to find windows placed only on one side of a cellar, that neither light nor air can get entrance. Such gloomy, underground caverns are not desirable under any circumstances, and a light, airy cellar is both a comfort and a safeguard.

One more hint. We have found from experience, when connected with some copper reducing works using a wet method, that the iron residues, which still contained a little salt and sulphate of iron, when mixed with lime instead of sand made the best imaginable mortar for binding and plastering purposes, and the amount of moisture absorbed by the mortar, without effecting any damage to the structure, was quite noticeable, keeping the outer air dry and free from impurities.

In conclusion, we would say that many large mining and smelting companies have well considered the importance of housing their employes in good, durable structures. It is not only desirable from a point of humanity, but is almost necessary from a point of economy, so far as good labor is concerned. We think it is an established fact that managers, under nearly all circumstances, prefer to keep as many married men in their employ as possible. What better inducement can they offer such class of labor than comfortable and safe homes in which to house their families? We are heartily glad that these sanitary changes are taking place, and honestly say, "Let the good work go on and prosper!"

HOW PIG IRON FORMS IN THE BLAST-FURNACE.

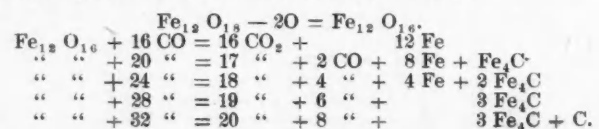
Written for the Engineering and Mining Journal by A. D. Elbers.

In abbreviated text-books of elementary chemistry the most essential reactions that take place in making pig iron are only briefly referred to, and usually in such terms as: "The carbon removes the oxygen from the ore, thus reducing it to metallic iron, according to the equation: $Fe_2O_3 + 3C = 2Fe + 3CO$." . . . "After the iron is reduced to the metallic state it takes up 'more' carbon, becomes fusible, melts, runs down to the bottom," etc.

In the more elaborate text-books the above equation (which neither indicates the beginning nor the final result of the possible reaction) is now supplanted by the formula: $Fe_2O_3 + 3CO = 2Fe + 3CO_2$; but even that does not explain how the metallic iron thus formed is to unite "on its way down" with carbon, so as to become changed to carbides of iron.

The theory that carbon could unite directly with metallic iron while the latter is in the solid state is entirely untenable, nor is the explanation that "graphite dissolves in melted iron" quite satisfactory. It seems more logical to assume that metallic iron and carbides are not only formed by the same re-agent (CO) but also at the same time, and that they melt together while going down in the furnace, the proportion of carbides increasing, of course, in the measure in which unreduced ore sinks to the region where the production or supply of the carbonous oxide is most abundant. For merely reducing the ore, this supply is usually always in excess; the excess may, therefore, be supposed to split up according to the equation: $8CO = 4CO + 2CO_2 + 2C$, the segregated carbon (2C) uniting with the de-oxidizing ore in the proportion of $8Fe + 2C$ to $2Fe_3C$ and $4Fe + Fe_3C$ becoming later on, by fusion, Fe_3C .

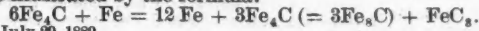
The following formulæ are construed after this theory:



The last-named result—pig iron containing 5 per cent of combined, and 1½ per cent of uncombined carbon, is not likely to occur because the carbon that has just emerged from a chemical combination is much more readily taken hold of by the CO_2 than that of the coal or coke. For a similar reason the dioxide, derived from the split of carbonous oxide into

C, CO and CO₂, abstracts more readily carbon from the fuel than the dioxide does which has been produced by combustion.

In conformity with these assumptions, the change of white iron to gray iron may be illustrated by the formula:



HOBOKEN, July 29, 1889.

Elevator for Loading Iron Ore in Sweden.—The great elevator built on the quay at Lulea, by the Swedish-Norwegian Railway Company, for loading iron ore direct into ships, has now been finished, and its operation is reported to be a success, the elevator raising three trucks simultaneously in two minutes, the same being moved along the rails to chutes leading into the hold of the ship and emptied. The whole arrangement is said to be so perfect that a ship of some 2,500 tons may be loaded in a day. In the engine room are two engines of 60-horse power each, steam being supplied by three boilers.

The Transportation of Acids.—There has been patented in Germany a process by means of which sulphuric acid for manufacturing purposes can be safely transported. The inventor takes advantage of a property of certain salts—of which alkaline sulphates are representatives—by which they give up their water of crystallization when heated and take it up again when cool; and he does so by mixing the salts in an anhydrous condition with a calculated quantity of sulphuric acid. The whole mass becomes granular, or may be formed into cakes, and when heated the whole liquefies, and may be used as if it were sulphuric acid, for the presence of bisulphate of soda does no harm.

Electric Welding of Rails.—Prof. Elihu Thomson has perfected an invention by which the rails of street or steam railways may be welded together by electricity after being placed in position. A dynamo propels over the tracks an electric welding machine, which welds the rails into one continuous line after it passes over them. It is proposed to have at every 100 feet a break, to allow for expansion. Any kind of rails can thus be welded, and in the event of such operations in the West End lines in Boston power can be obtained from the wires now in use, as but a 500 voltage will be required.—*Manu acturers' Gazette*, Boston.

A New Roofing Material.—A new roofing material is mentioned in the German papers, in the shape of a sort of metallic slate, somewhat similar to those used among us, but enamelled so as to be proof against moisture or acid vapors. Metallic slates of tin and galvanized iron have long been used in Germany, and galvanizing has been pronounced by the highest scientific authority there to be the best protection against rust that has yet been applied to iron, but it is acknowledged that the bending necessary to form the locking joints of the metallic tiles is apt to throw off the protecting covering, leaving the iron exposed to corrosion. In order to provide against the bad effects of this, the new plates are made of sheet-iron, stamped into shape in the usual manner, and are then dipped into an enamel paint which, when heated, forms a continuous coating, unaffected by acids or alkalis. It is too soon to say how long a roof laid with such a material will last, but it promises to be of considerable value.

Silvering Iron.—A new Austrian patented process for silvering articles of iron is thus described: The article is first plunged in a pickle of hot dilute hydrochloric acid, whence it is removed to a solution of mercury nitrate, and connected with the zinc pole of a Bunsen element, gas carbon or platinum serving as the other pole. It is rapidly covered with a layer of quicksilver, when it is removed, washed and transferred to a silver bath and silvered. By heating to 300 degrees C. (572 degrees F.) the mercury is driven off, and the silver firmly fixed on the iron. To save silver the wire can be first covered with a layer of tin; 1 part of cream of tartar is dissolved in 8 parts of boiling water and one or more tin anodes are joined with the carbon pole of a Bunsen element. The zinc pole communicates with a well-cleaned piece of copper, and the battery is made to act till enough tin has deposited on the copper, when this is taken out and the ironware put in its place. The wire thus covered with tin chemically pure and silvered is much cheaper than any other silvered metals.

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 page of the Journal.]

The Engineers Hourly Log Book. By Robert Grimshaw. Publish by the Practical Publishing Company, 21 Park Row, New York. Price, 50 cents.

The purpose of this book is readily indicated by its title, and it consists of a series of printed tables arranged to record for each hour of the twelve or twenty-four the totals and averages of the following: Boiler pressure, fuel fired, ashes and unconsumed combustible, up-take temperature, feed temperature, turns per minute, throttle opening, average cut-off, average vacuum, hot-well temperature, injection temperature, quantity of injection, indicated horse power and similar factors. Its author says: "I do not expect slouch engineers to use this book, like it, or speak well of it; but to engineers who are a credit to the community and to their chosen calling I confidently recommend it." If an engineer can be induced to use the tables they will undoubtedly prove of value, and information will be acquired by means of which a more economical management of the engine will ensue.

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 AUGUST 13TH, 1889.

- 408,685. Bending Roll. Chas. A. Bertsch, Cambridge City, Ind.
- 408,711. System of Transportation. Benjamin S. Henning, New York, Assignor to the Henning Gravity Tunnel Company, of West Virginia.
- 408,714. Injector for Steam Boilers. Lovren E. Hogue, Greenville, Mercer County, Pa.
- 408,719. Pipe Joint. Henry Johnson, Jersey City, N. J.
- 408,720. Method of Rolling Axles. John R. Jones, Philadelphia, Pa.
- 408,724. Dry Kiln Furnace. Wm. Ketcham, Gladewater, Tex.
- 408,728. Tubing. Alexander H. Limont, Waterbury, Conn., Assignor to Holmes, Booth & Haydens, New York, N. Y.
- 408,733. Process of Making Duplex Tubing. Alexander H. Limont, Waterbury, Conn., Assignor to Holmes, Booth & Haydens, New York, N. Y.

- 408,733. Conveyor. Frederick H. C. Mey, Buffalo, N. Y.
- 408,748. Buoyant Subaqueous Tunnel for Railways, etc. Edward J. Reed, London, England.
- 408,753. Electric Motor for Street-Cars. Wilbur S. Salisbury, Chicago, Ill.
- 408,756. Brake. Wolfgang Schmid, Munich, Bavaria, Germany.
- 408,757. Center-Bearing Plate for Railway Cars. Charles T. Schoen, Philadelphia, Pa.
- 408,768. Dynamo-Electric Machine. Jean T. Van Gestel, New York, N. Y.
- 408,772. Soldering Iron. Charles L. Wagandt, Baltimore, Md., Assignor of one-half to Keen & Hagerty, same place.
- 408,774. Machine for Making Sheet Metal Vessels. Francis A. Walsh, Milwaukee, Wis.
- 408,777. Automatic Cut-Off for Water Gauges. Richard A. Weidman, Geneva, N. Y.
- 408,781. Grinding and Crushing Mill. James F. W. Winchell, Springfield, Ohio, Assignor to the Foss Manufacturing Company, same place.
- 408,784. Compressed Air Engine. Benjamin F. Wright, Lovingson, Va.
- 408,791. Centrifugal Separator. Chas. L. Cairus, Jersey City, N. J.
- 408,794. Car Brake. James H. Clark, Flatbush, Assignor to Chas. E. Harris, Brooklyn, N. Y.
- 408,832. Machine for Tinning Copper Sheets. David Evans, Ansonia, Conn., Assignor of one-half to Rufus C. Alcott, same place.
- 408,836. Lubricator. Wm. J. Faul, Brooklyn, N. Y.
- 408,843. Process of Rolling Steel or Iron. Arthur J. Woxham, Johnstown, Pa.
- 408,844. Process of Rolling Iron or Steel. Arthur J. Woxham, Johnstown, Pa.
- 408,855. Electric Railway. Wm. M. Schlesinger, Philadelphia, Pa.
- 408,859. Centrifugal Lubricator. Philip M. Sharples, West Chester, Pa.
- 408,867. Coal or Rock Drill. John L. Williams and Thos. H. Williams, Shenandoah, Pa.
- 408,875. Method of Electric Metal-Working. Mark W. Dewey, Syracuse, N. Y., Assignor to the Dewey Corporation, same place.
- 408,878. Steam Rock-Drill. Joseph C. Githens, New York, N. Y., Assignor to the Rand Drill Co., of New York.
- 408,880. Car-Axle Box. Harley M. Johnson, Chicago, Ill.
- 408,881. Clutch. Willis H. Johnson, Springfield, Ill., Assignor by direct and mesne assignments of one-half to Harry L. Ide, same place.
- 404,906. Guard-Rail for Railways. John Waterhouse, New York, N. Y.
- 408,931. Driving-Gear for Cars. Edward Samuel, Philadelphia, Pa., Assignor to Wm. Wharton, Jr. & Co., Incorporated, same place.
- 408,933. Machine for Reducing Rails. Wm. Scholl and Theo. G. Wolf, Scranton, Pa.
- 408,940. Fish Plate and Joint. John N. Valley, Jersey City, N. J.
- 408,941. Elevated Railroad. John N. Valley, Jersey City, N. J.
- 408,953. Shaft-Coupling. John Chivill, Chicago, Ill., Assignor to the Webster & Comstock Manufacturing Co., same place.
- 408,957. Apparatus for Conveying Coal and Discharging the same in Piles. James M. Dodge, Philadelphia, Pa., Assignor to the Dodge Coal Storage Co., Nangatuck, Conn.
- 408,958. Chain Conveyor for Forming and Removing Piles of Coal. James M. Dodge, Philadelphia, Pa., Assignor to the Dodge Coal Storage Co., Nangatuck, Conn.
- 408,964. Metallic Railway Tie. Walter T. Forbes, Atlanta, and Robert C. Kerr, Augusta, Ga.
- 409,008. Laying Submarine Pipes. Geo. H. Breymann, Toledo, Ohio.
- 409,015. Electric Welding. Chas. L. Coffin, Detroit, Mich.
- 409,018. Axle-Lubricator. Edward S. Coyle, Ballston, N. Y.
- 409,047. Method of Making Strap or Hoop Iron. David Larkin, Pittsburg, Pa., Assignor to himself, John B. Larkin, and Frank D. Larkin, same place.
- 409,048. Rolling Mill for Hoop or Strap Iron. David Larkin, Pittsburg, Pa., Assignor to himself, John B. Larkin, and Frank D. Larkin, same place.
- 409,049. Method of Rolling Metal. Wm. J. Lewis, Pittsburg, Pa.
- 409,050. Rolled Metal Plate. Wm. J. Lewis, Pittsburg, Pa.
- 409,081. Coke Furnace. Adam Weber, New York, N. Y.
- 409,083. Dumping Wagon. Wm. E. Welch, Bushton, Ill.
- 409,084. Ore Crusher. Giles W. Weller, Baker City, Ore.
- 409,091. Ore-Concentrator Belt. John M. Adams, San Francisco, Cal.
- 409,092. Ore-Concentrator Belt. John M. Adams, San Francisco, Cal.
- 409,095. Adjustable Gear for Crushing Roll. Hans C. Behr, San Francisco, Cal., Assignor of one-half to Benjamin T. Lacy, same place.
- 409,099. Ore Separator. Samuel E. Griscom, Philadelphia, Pa.
- 409,110. Bolt Heading and Forging Machine. Michael D. Luehrs and Daniel S. Coe, Cleveland, O., Assignors to the Acme Machinery Company, same place.
- 409,134. Water Coil Boiler. Rufus W. Applegarth and Everett D. Moore, Baltimore, Md.
- 409,138. Cutter for Mining Machines. Edwin E. Carter, Allegheny, Pa.

PATENTS GRANTED AUGUST 20TH, 1889.

- 409,186. Machine for Separating Gravel from Clay. Samuel Friend, Assignor of one-half to William B. Chambers, same place.
- 409,219. Car-Wheel. Waitman M. Morgan, Kansas City, Mo.
- 409,229. Car-Coupling. Albert Paul, Berlin, Germany, Assignor of two-thirds to Simon Ehrenwerth, same place.
- 409,226. Car-Brake. William R. Zeigler, Waverly, N. Y., Assignor of one-half to Miles S. Hoadley, same place.
- 409,272. Apparatus for Operating Rotary Drills. Matthew T. Chapman, Aurora, Ill.
- 409,276. Process of Preventing the Oxidation of Metals while in a Heated Condition. Geo. W. Cummins and James H. Coleman, New Haven, Conn.
- 409,290. Cross-Head. Lowell H. Kenyon, Allegheny, Pa.
- 409,304. Steam Boiler Furnace or other Furnace. William R. Roney, Chicago, Ill., Assignor to the Westinghouse, Church, Kerr & Co., of New Jersey.
- 409,330. Conveyor. George W. McCaslin, New York, Assignor to the McCaslin Machine Company, of West New Brighton, N. Y.
- 409,343. Car Coupling. James Allen and Edmond Hackett, Florence, Ala.
- 409,348. Brick Machine. William R. Cunningham, Frankfort, Ind., Assignor to the Wallace Manufacturing Company, same place.
- 409,349. Dynamo-Electric Machine. Sebastian Z. de Ferranti, Hampstead, County of Middlesex, England.
- 409,357. Solder Iron Heater. John S. Hull, Baltimore, Md.
- 409,361. Log-Conveyor. Evan S. Jones, Sykeston, Dak.
- 409,366. Process of Obtaining Electricity from Gas-Batteries. Ludwig Mond, Northwich, County of Chester, and Carl Langer, London, County of Middlesex, England.
- 409,368. Glass-Melting Pot. Asa G. Neville, Lazeurville, V. Va.
- 409,382. Ammonia Soda Apparatus. Joseph P. Barrum, Louisville, Ky., Assignor to himself, Charles Godshaw and John S. Cain, same place.
- 409,393. Riveting Machine. Leon Delaloe and Albert Piat, Paris, France.
- 409,394 and 409,395. Dumping Car. Joseph Duff, Lansing, Ontario, Canada.
- 409,414. Combined Bevel, Protractor, Gauge, Centre-Square, etc. Alphonzo E. Meek, Dallas, Tex.
- 409,419. Machine for Grinding and Polishing Stone. John McEnnerney, New York, N. Y., Assignor of one-third to Moses Rodh, same place.
- 409,430. Anti-Friction Bearing. Wm. E. Ross, Sparta, N. J.
- 409,446. Method of Sinking Wells. Hiram W. Blaisdell, Yuma, Ariz.
- 409,474. Method of Manufacturing Metal Wheels. James R. Little, Quincy, Ill., Assignor to the Quincy Metal Wheel Company, same place.
- 409,500. Pump Governor. John T. Fine, New York, N. Y.
- 409,519. Mold for Casting. Emma C. Standiford, Chicago, Ill.
- 409,541. Smelting Furnace. John J. Williams, San Francisco, Cal.
- 409,567. Apparatus for the Manufacture of Coke. Richard de Soldenhoff, Cardiff, County of Glamorgan, England.
- 409,568. Process of Removing Piles of Coal. James M. Dodge, Philadelphia, Pa., Assignor to the Dodge Coal Storage Company, Nangatuck, Conn.
- 409,579. Pulverizing Mill. James K. Griffin, Brooklyn, N. Y.
- 409,583. Refractory Compound. James L. Hastings, Philadelphia, Pa., Assignor, by mesne assignments, to the Welsbach Incandescent Gas Light Company, of New Jersey.
- 409,584. Plastic Mineral Composition. James L. Hastings, Philadelphia, Pa., Assignor to the Welsbach Incandescent Gas Light Company, of New Jersey.
- 409,586. Friction Clutch. Harry W. Hill and Louis J. Hirt, Cleveland, Ohio.
- 409,589. Dry-ore Concentrator. Christian F. Jacobson, San Francisco, Cal.
- 409,604. Conveyor for Piling Coal. James M. Dodge, Philadelphia, Pa., Assignor to the Dodge Coal Storage Company, Nangatuck, Conn.
- 409,639. Process of Piling Coal, or Analogous Material. James M. Dodge, Assignor to the Dodge Coal Storage Company, of Conn.
- 409,653. Process of Obtaining Zirconium Nitrate. Carl A. Von Welsbach, Vienna, Austria, Hungary.

PERSONALS.

Captain James Cundy, of the Champion mine, Marquette County, Mich., has sent in his resignation, to take effect September 1st.

Mr. A. F. Wuensch, the mining expert, has left Denver for the Las Cerillos district in New Mexico, where he goes to examine some properties for Mr. D. H. Moffat.

Mr. S. G. Brock, of Missouri, is to be appointed, according to press reports, to succeed Colonel William F. Switzer as Chief of the Bureau of Statistics of the Treasury Department.

Luther Wagner, C. E., has been appointed by the State Engineer to survey the Yosemite Valley from the head of Stanislaus River to Merced for the purpose of locating suitable sites for reservoirs.

Mr. James S. Leeds, well known in New York financial circles and a trustee of the El Cristo Gold and Silver Mining Company of the Republic of Colombia, has returned from a six weeks' stay in Denver, Colo.

Mr. T. E. Schwarz, who for five years past has been superintendent of the Yankee Girl mine, in Ouray Co., Colorado, has resigned, and has taken the management of the new Guston Mining Company, Limited, Red Mountain, Colo.

Mr. Thomas A. Edison has been made a count and his wife a countess by King Humbert of Italy. Mr. Edison will visit the Krupp Works at Essen, Germany, before the termination of his visit. He will return to America by way of England.

Superintendent of Census Porter has appointed Charles E. Taft, of Little Rock, Ark., a special agent on ship building. Mr. Taft is a native of the State of New York, a civil engineer by profession, and has made ship building a special study.

OBITUARY

Wm. C. Morris, Jr., for many years general auditor of coal accounts for the Lehigh Valley Railroad Company, died on the 8th inst. at Mauch Chunk, Pa.

Hon. William Milnes, Jr., died on August 14th, at Milnes, Va. He was born in England, and was 61 years of age. He was elected to Congress in 1870 from the Shenandoah district, and served one term. He was for a number of years the leading proprietor of the Gem Furnace, at Milnes.

Ex-Governor of Tennessee John G. Brown, late receiver of the Texas & Pacific Railway, and at the time of his death President of the Coal and Iron Company, died on the 17th inst. at Red Boiling Springs, Tenn. He was Governor of Tennessee for four years from 1870, and had for years been one of the leading and most influential Democrats in the State, though he has never taken an active part in politics since his connection with railroad business.

William Thaw, the millionaire philanthropist of Pittsburg, died in Paris, France, on August 17th, aged nearly 71 years. He was born in Pittsburg on October 12th, 1818, of Scotch-Irish parents, and was educated at the Western University, to which he afterward gave nearly \$400,000. Mr. Thaw was a director in the Pennsylvania Railroad Company, second vice-president of the Pennsylvania Company, and second vice-president of the Pittsburg, Cincinnati & St. Louis Railroad Company.

INDUSTRIAL NOTES.

The Baltimore Twine and Net Company, recently an advertiser in this journal, has gone out of business.

The strike at the Carrie Furnace at Pittsburg is over. About half the old men resumed their places. They were assured of a voluntary advance in the near future.

The puddlers' wages of the Potts' Bros. Iron Works, in Pottstown, Pa., are to be increased from \$3.25 to \$3.50 per ton on September 2d. Other employes in the puddle mill will also receive an advance.

The blast furnace of Eckert & Kauffman, at Top-ton, Pa., was lighted on the 19th inst., after an idleness of several months. At the same time the furnace of the Clymer Iron Company, at Templeton Station, was also lighted, after a still longer idleness. This will make four out of nine furnaces between Reading and Allentown in blast.

We learn from a Baltimore exchange that the blast furnace of the Talladega Iron and Steel Company, at Talladega, Ala., is about completed. It will blow in between August 20th and September 1st. Its size is 18 x 72 feet, and it is equipped with three Ford and Moncur stoves, each 26 x 65 feet. This equipment is claimed to give the furnace more heating power than any other furnace in the South. Its daily capacity is estimated at 150 tons of pig iron. The nearest coke furnaces to this plant are those of the Woodstock Iron Company, at Anniston, Ala. The Talladega Iron and Steel Company is an English corporation, whose head office is at Rose Hill Hall, Cosely, Staffordshire, England.

The fifty-eighth exhibition of the American Institute will open at the exhibition building on Third avenue, between Sixty-third and Sixty-fourth streets, on Wednesday, October 2d, and will close on Saturday, November 30th. The attention of inventors and manufacturers is called to the fact that the success of the exhibition last year, at the reduced price of admission, was an increase of more than 100 per cent in the number of visitors, and the managers have every reason to expect a correspondingly good showing for this year's fair. Applications for space should be made

without delay to Mr. Charles Wager Hull, General Superintendent, at the offices of the Institute, Astor Place, New York City, where all information may be had.

Six weeks ago, says a press dispatch, Austin Corbin, President of the Reading Railroad, gave notice to the 2,500 employes of the Reading Iron Company, which was reorganized out of the defunct Reading Iron Works, that they could only expect to get back their old positions upon condition that they severed all connection with labor organizations and agree to leave strong drink alone, especially when on duty. Up to the 21st over 2,000 men had signed the agreement, and on this date the company's sheet mill resumed operations, after being idle for six months. The puddle furnaces have been idle since February 26th. By September 1st the company's 2,500 men will be at work in every department. All the real estate that belonged to the old Reading Iron Works, and actually not needed by the new company to carry on their works, will be sold. The old company owned considerable property, from which no revenue was derived, but, on the contrary, was a burden, on account of the taxes having to be paid. It is expected that when the affairs of the old Reading Iron Works come to be settled the dividend for distribution among the creditors will amount to about 40 per cent. The proceeds of the sale of the real estate will be about sufficient to satisfy the judgment of the Reading Railroad Company and the accrued interest on the mortgage.

A deed of assignment was executed on the 21st inst by the Keystone Furnace Company, of Reading, Pa., in favor of the Reading Trust Company. The assigned property consists of two large anthracite blast furnaces on the outskirts of the city, together with fifteen acres of land, furnace, machinery, franchises, etc. The corporation has been in financial difficulties for some time. The company gave a mortgage of \$250,000 to George D. Stitzel and George W. Bruckman, in trust, March 23d, 1874, and this was canceled December 20th, 1888, the company giving a mortgage to the Reading Trust Company for \$175,000, and an additional mortgage to Herbert M. Bushong for \$5,000. There is a large floating debt, estimated at \$75,000, and this is one of the direct causes of the failure. The furnaces were built and equipped about eight years ago, at a cost of several hundred thousand dollars. Henry Bushong, president of the company, was a member of the banking firm of Bushong Brothers, who failed in November, 1877, for over \$1,000,000. Their depositors never realized a cent, though the firm was given an extension. This extension has expired, and recently a large number of suits have been entered against Henry and Jacob Bushong for the recovery of the face value of the notes and interest given by them to their creditors. These financial difficulties may have hastened the furnace failure. It is believed in Reading that the furnaces will now be merged into the Reading Iron Company plant, which has been reorganized out of the suspended Reading Iron Works, and whose entire plant, with 2,500 employes, will be in operation in ten days. One of the furnaces went out of blast last week. Henry Bushong then announced that trade was too dull to keep both running. The product of the furnaces was exclusively pig iron, of which the company produced on an average 450 tons per week. Iron ore from Eastern Pennsylvania, New York and New Jersey is used. Foundry pig for heavy and light castings and stove plate, etc., was turned out for the Eastern markets. Seventy men were employed. The Keystone Furnace Company is a direct successor to the business established in 1869 by Henry and Jacob Bushong, George Merkle and Jacob K. Spang. They incorporated under the present title in 1873. Henry Bushong is president and George B. Connard secretary and treasurer. Henry Bushong had full control of the business.

CONTRACTING NOTES.

The acting Secretary of the Navy on Thursday opened proposals for constructing five steel cruisers, three of 2,000 tons and two of 3,000 tons displacement. Bids for the construction of the smaller vessels were received from the Bath Iron Works, of Maine, and for all five from the Wm. Cramp & Sons Co., of Philadelphia. All the bids were in excess of the appropriation, and the work will be readvertised. It is thought, however, that Congress will be asked to increase the limit of cost of the vessels.

The bids were as follows: The Bath Iron Works, of Maine, proposed to build the three two thousand ton vessels for \$780,000 each, but with the addition of six months to the advertised time of two years; Cramp & Sons, of Philadelphia, proposed to build the same vessels at \$875,000 each. The same firm offered to build the two three thousand ton vessels at \$1,225,000 each. The result of the bidding was a disappointment to the naval officers. As the appropriation is limited by the act of Congress to \$700,000 each in the case of the two thousand ton vessels and \$1,100,000 for each of the three thousand ton vessels, of course none of the bids can be accepted.

As announced in last week's ENGINEERING AND MINING JOURNAL, an advertisement for machine tools has been issued by Col. J. M. Whittemore, of the ordnance department, United States army, at Watervliet arsenal, New York. The tools are required for the equipment of an army gun factory at West Troy, and the 27 classes into which the series is divided include eight lathes for turning and boring hoops, two cylinder machines for boring hoops, eight vertical and turning and boring mills, 12 lathes, 36 to 20 inch, two slotters, four planers, six shaping machines, one universal

radial drilling machine, three vertical drills, one horizontal boring and drilling milling machine, one automatic gear cutting machine, one universal milling machine, two universal grinding machines, one tool grinding machine, one emery wheel grinder, two cutter and reamer grinders, single frame steam hammer and one steel pressure blower. Bidders are invited to make two bids, one for the machine tools, delivered at the arsenal, and the other for the delivery and erection in place, ready for operation in the new gun factory at the arsenal, delivery to commence not before January 1st next nor later than January 31st. A specification is made that the tools must be manufactured in the United States. The proposals will be opened September 5th.

Judgments for \$59,516 have been entered against Comegys & Lewis, contractors, at No. 15 Cortlandt street, N. Y. City, in favor of the following creditors: Schickle Harrison Howard Iron Company, of St. Louis, \$26,635; Wing & Evans, \$15,635; Coffin & Stanton, \$11,955; Thomson-Houston Electric Company, \$3,128; Penn Iron Company, \$1,163. Execution was issued to the Sheriff, but it is said there was nothing to levy upon. Messrs. Comegys & Lewis have been in business for about ten years, principally as water-works contractors. Mr. Lewis is at present in Chili, from which country the firm about a year ago, it is said, obtained a contract to extend the railroad system for \$17,000,000. The North and South Construction Company was formed to carry out the contract. In explanation of the judgments the representatives of the firm said this week to a reporter for a daily paper that they were taken with a view of settling up the partnership of Comegys & Lewis. The firm would be dissolved, and Mr. Comegys would continue the water-works business on his own account. The dissolution was mutually agreed upon by the two partners, as Mr. Lewis would remain in Chili probably four years, and the creditors understood all about it. The firm had some securities which they could not dispose of without sacrifice, and these securities had been given to the creditors as collateral for their claims. Arrangements had been made with a firm so sell these securities as speedily as possible for the creditors, and the proceeds would go toward paying off their claims. The firm did not owe \$5,000 unsecured.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

106. Wanted, addresses of parties who manufacture a boxing or lining that can be used without oil or greasy lubricator.

107. Shingle machine—wanted full description and prices for the complete outfit delivered. South Carolina.

108. Electric motors, 1/2 to 1 H. P., second hand. New York.

109. Clay-working machinery, especially brick and tile presses; full particulars. Colorado.

110. Water motors; one small motor. Michigan.

111. One 45 H. P. engine and boiler. Alabama.

112. One self-feed cut-off saw. Alabama.

113. Ten slot machines. Alabama.

114. One saw-mill for cutting cedar for pencils. Alabama.

115. Three blocking machines. Alabama.

116. About 100 feet shafting. Alabama.

117. About 30 pulleys. Alabama.

118. Conveyors and elevators. Alabama.

119. A blower fan for a factory for making cedar pencil slats. Alabama.

Nos. 111 to 119, inclusive, are for one concern in Alabama.

120. Electric Light Plant. Wanted estimates complete for lighting two tunnels, one 600 feet and one 1,500 feet; two shafts, average depth 600 feet; mill, office and store. Wyoming.

121. Engine. Wanted prices on a 70 H. P., high-speed, common slide-valve engine.

122. Cable Railroad. Bids on three miles overhead cable railroad, double, or six miles single, for a Western coal mining company.

123. Exhaust fan and pipe for shavings and dust for a lumber company. Georgia.

124. Molding machines, slab cutters, dry kilns, etc., for a lumber company. Georgia.

property as reported, it seems strange that a working test has not been made to demonstrate clearly the value of the ore, about which there appears to be some doubt. The New York company which has advanced the money to develop the mine, erect the 60-stamp mill and put the enterprise upon a working basis, has surely lost courage at a critical moment. A few runs of the mill would assure them of the success or failure they are disposing of to an English company, apparently prepared to "go it blind."

BUTTE COUNTY.

THE GOLDEN GATE MINING COMPANY, LIMITED.—This company, which was organized in London by Major Frank MacLaughlin some two years ago, for the purpose of mining on the Feather River, has now completed its engineering operations of cutting out a portion of the river, and will at an early date proceed to washing the gravel from the river, which contains a large amount of placer gold.

PLACER COUNTY.

On Forest Hill Divide drift mining is being done with great success.

The successes at the Mayflower and Red Point have had the effect of stimulating operations which are now being actively carried on along the "divide."

GOLDEN RIVER MINING COMPANY.—This company, a French venture, has run its bedrock tunnel into the main channel at Red Point and already extracted enough gold to pay the expense of driving it. The company had banded about four miles of the adjoining ground in which the channel was supposed to run, and have now completed their purchase of what is a valuable property. After the disastrous venture made in the purchase of the Succor Flat mine by this company, the management set to work to, if possible, offset the loss incurred, and it is a matter for congratulation that such a successful outcome is the result. At the Hog's Back claim, operated by the same company, the first tunnel driven was too high and another deeper one is being run from which it is expected to successfully work the channel.

MAYFLOWER MINING COMPANY has been working lately in exceptionally rich blue gravel, and at the present moment, although the pay is somewhat lowered it is very satisfactory. There are some negotiations going on to place the stock in the Paris market, but nothing definite has so far been concluded.

SHASTA COUNTY.

The assignees of W. T. Coleman have made a transfer of the mining interests of the estate, situate in Shasta and Trinity counties, to W. A. St. Aubyn, an English mining engineer, representing a syndicate of German capitalists, who propose to operate the mines on a large scale. The properties have hitherto been worked under the name of the Niagara Mining Company, and include the well-known Niagara mine in this county and a large area of undeveloped ground in the French Gulch district, purchased by W. T. Coleman and esteemed of great value. Negotiations for the disposition of these properties to the purchasing parties had been in progress for some time prior to the failure of W. T. Coleman & Co. The embarrassment of the firm rendered it impossible, for the time being, to give a satisfactory title. This difficulty has been overcome, and the transaction was satisfactorily concluded a day or two ago.

SIERRA COUNTY.

The Mountain Mine Claim, of Sierra County, owned by Sunderhaus, one of the partners of the Young America, is reported under bond to George M. Pinney. The property is situated in the same district as the Sierra Buttes, and may, upon development, prove valuable. Up to the present it has only been prospected.

COLORADO.

WOLCOTT MINING COMPANY.—The strike which was made recently in the Lucy B. Hussey mine, of this company, is probably one of the most important that has been made in Leadville for many months, says the *Herald-Democrat*. The shaft is about 225 feet deep. From the bottom a drift was started northward, and five feet from the shaft the ore was encountered. It is argentiferous iron and heavy lead carbonate ore. An average sample of the latter assayed 40 ounces in silver and 38 per cent lead. A sample of the best ore assayed 160 ounces in silver and 60 per cent lead. This ore lies below and in the midst of the iron. The latter is very good ore itself, having averaged from 22 to 26 ounces silver and 40 per cent excess in iron and manganese. This iron ore shows in roof, sides and floor of the drift, as well as in the breast which is now 35 feet away from the shaft. Of the lead carbonate ore there is several feet. The ore body is apparently running northeast, and dipping with the contact southwest. The north drift has already been driven 35 feet from the shaft in the ore, and will be continued in that direction. From it another drift is now to be started in an easterly direction, crossing the ore body, so that, with these two drifts, something may soon be determined regarding its extent. The ore lies in the second contact of Carbonate Hill, west of the carbonate fault. The first contact is about 50 feet overhead, between the first and second there being the usual gray porphyry. Below the second is quartzose gray porphyry, just as in the other mines of Carbonate Hill further east. Shipments will probably be commenced from the Lucy B. Hussey next week. The workings of the mine are making considerable water, and its volume is increasing somewhat. The pumps in the bottom are at present handling it very nicely, throwing about 250 gallons per minute. The mine is being worked by Major Bohn and ex-Governor Tabor.

BOULDER COUNTY.

NI-WOT.—The oldest and largest producer at Ward, in this county, is the Ni-Wot. It is on the Columbia

vein, and in the property there is more than a mile of underground working. Probably the Columbia vein is next to the largest free gold ore opened in the State, the body of milling ore varying all the way from ten to twenty feet, says the *Boulder Sentinel*. Ward has for a year past begun to assume new life and activity and the credit is largely if not chiefly due to Mr. L. Seaman, through whose sagacity and energy capital was induced to resurrect the old Ni-Wot property and bring it again to the front as a large producer. Mr. Seaman has acquired for his company since starting the Ni-Wot, the No. 7, now called the Madeline shaft and the Columbia, of Mr. Hulings. The 50-stamp mill of the Ni-Wot is constantly running, and Hendrie & Bolt-hoff are now erecting for Mr. Seaman's company a 30-stamp mill for Madeline ore. The frame is up, a part of the machinery is on the ground, and the mill will probably be operating within six weeks. J. C. Edwards is foreman of construction. The Columbia has a mill of 20 stamps also controlled by the Ni-Wot company, so that in a short time this company will be operating 100 stamps. The Ni-Wot mill, with its 50 stamps, treats 50 tons a day. The Ni-Wot Company also have the C. & M. and the Colorado lodes not on the Columbia vein and situated to the north of town. These two properties, in conjunction with the Madeline, are expected to furnish the new 30-stamp mill with ore.

CLEAR CREEK COUNTY.

YARMOUTH MINING COMPANY.—This company was incorporated on the 4th inst., and will operate the Mary Foster lode in the Cascade mining district. The capital stock is placed at \$5,000, divided into as many shares. The principal office of the company is at Idaho Springs.

CONEJOS COUNTY.

MERRIMAC.—Two thousand one hundred pounds shipped to Denver yielded \$192 in gold and \$172 in silver per ton. The vein iron-stained quartz showing telluride of gold calaverite and sulphuret of silver and imperfect crystals of galena imbedded in quartz, average width of vein about 20 feet. The country rock is principally granite and porphyry. Mr. C. W. Raymond is manager for the Merrimac Company.

MAMMOTH.—The ore averages from \$200 to \$300 per ton in gold and silver. The vein is being systematically developed by Mr. John Palmer. Messrs. Arms, Hyman & Hallam, owners. Platoro is destined to be a promising camp. A branch railroad is talked of. Numerous prospectors are staking locations.

EAGLE COUNTY.

GOLD PARK MINING COMPANY.—After an idleness of nearly six years the company is enabled to ship from mine to railroad for \$8 per ton, from Tennessee Pass to Denver at \$6.70 per ton, against \$10 per ton in 1882; smelting charges \$4 to \$12 per ton in 1889, \$20 to \$35 in 1882. Mr. J. W. Bailey is superintendent for the company. Trial lots of sorted ore from the Pelican and Grand Trunk mines have been shipped to the Colorado Sampling Works, Denver; the returns show 2 86 to 6 30 ounces in gold and 1 53 in silver. One car load of concentrates from Rouse Table gave \$52 per ton. The company owns 14 claims, 10 patented, one 20-stamp mill, one concentration or dressing works to be supplied with Gilpin County tables.

GRAND TRUNK.—Shaft 80 feet, connect with 400 feet tunnel, shows quartz vein about four feet carrying sulphurets averaging in value \$20 per ton.

PELICAN.—Developed by 80-foot shaft, one drift north 50 feet west, one south 50 feet east, country rock, porphyry and granite and mica schist.

LAKE COUNTY.

MIKE & STARR.—In the last week of July a new strike was made in this mine, which bids fair to be quite as important as any ever made in the mine, and in any case has already made it a large producer again, says the *Herald-Democrat*. Shipments were commenced on the 1st of August, and have now reached the rate of 40 tons per day, which rate can probably be maintained. The ore was opened in the main ore chute, south and east of the shaft, and at a distance of about 150 feet from the latter. The ore just opened has been cut in two places. By a raise 35 feet high made from the south drift, through the limestone to the vein, and also by a cross-cut drift, and driven eastward through the limestone from the south drift, these two points are about 75 feet apart, and it is probably the same ore body extending between them. The ore is of the same character as that usually found in the Mike & Starr mine. It is of rather low grade, but still good enough to be broken for shipment. It assays from four to five per cent in copper, but carrying only a few ounces of silver. The raise from the south drift has not yet reached the top of the ore body, nor has the breast of the east drift, so that its extent is yet undetermined. There is no doubt, however, but that this ore body is in the extension of the Stone-Minnie-Moyer ore chute. Where cut by the east cross-cut drift in the Mike & Starr, the ore dips below the level. The ore lies under the porphyry and above the blue limestone. The porphyry is quartzose and grey, and is probably an intrusive sheet, and it is not unlikely that another ore body will be found above it. At any rate, some exploration work is to be done for that purpose. A force of twenty-four men is now employed in the Mike & Starr Work is being done at present only in these two places where ore has been just opened, but in a few days work will be commenced in the breast of the south drift, driving that further ahead. The amount of water made in the mine is increasing, but has not yet gained such volume that it gives any particular trouble, nor adds much to the operating expense of the mine. Before the next six months pass, the lessees of

the Mike & Starr will begin an important piece of exploration work. This will be the sinking of a new shaft. It will be located about 500 feet south of the present shaft, and, in all probability, will be sunk to a depth of 700 feet. It is not expected that the contact will be reached at much less than that depth.

The output of the mines of Leadville has increased considerably during the past month, owing partly to new strikes made in July and partly to the increased shipments from some of the older mines. At the present time the daily productions of the mines of the district is much greater than it was six weeks ago, for during that time the Evening and Morning Star mines, the Tip Top, the Silver Cord, the Adams and the Colonel Sellers have all increased shipments largely, while the Mike and Starr mine from its new and important strike has commenced. The only notable falling off, on the other hand, has been on the part of the Nisi Prius Company, the old ore bodies of which are now practically exhausted. The mines of Sugar Loaf are producing but very little ore this year, but the reduction of output from that tributary camp is more than made up by the increase in that of its neighbor, St. Kevin. The daily production of the most important mines of Leadville, says the *Herald-Democrat*, at the present time is approximately as follows:

| FRYER HILL. | | Tons. |
|---------------------------------------|--------|-------|
| Chrysolite..... | 10 d | |
| Little Chief..... | 15 d | |
| Robert E. Lee..... | 10 d | |
| Dunkin..... | 80 c | |
| Matchless..... | 40 cd | |
| Bankok..... | 20 c | |
| Olive Branch..... | 10 c | |
| Tip Top..... | 30 ac | 215 |
| YANKEE HILL. | | |
| Denver City..... | 30 d | |
| Small Hopes..... | 35 c | 65 |
| CARBONATE HILL. | | |
| Carbonate..... | 5 a | |
| Morning Star..... | 135 da | |
| Evening Star..... | 35 c | |
| Catalpa..... | 30 da | |
| Crescent..... | 30 da | |
| Henriett and Maid..... | 270 a | |
| Castle View..... | 5 a | |
| Big Chief..... | 25 a | |
| Adams..... | 5 a | 475 |
| Wolfstone..... | 5 a | |
| IRON HILL. | | |
| Mikado..... | 30 a | |
| Iron Silver..... | 80 ca | |
| Silver Cord..... | 30 a | |
| Houghton Mines..... | 30 a | |
| Colonel Sellers..... | 40 b | |
| A. Y. and Minnie..... | 130 b | |
| Louisville..... | 30 c | 370 |
| Colorado No. 2..... | 30 c | |
| ROCK HILL. | | |
| La Plata..... | 10 a | |
| Lillian..... | 5 a | |
| Nisi Prius..... | 5 a | |
| BRECEE HILL. | | |
| Mike & Starr..... | 40 c | 40 |
| MOUNT SHERMAN. | | |
| Continental Chief..... | 40 c | 40 |
| ST. KEVIN. | | |
| St. Kevin..... | 15 c | |
| Reed..... | 5 c | 20 |
| Other mines..... | | 25 |
| Grand total, tons..... | | 1,265 |
| a Lead carbonate ore. | | |
| b Lead sulphide ore. | | |
| c Dry silicious and dry sulphide ore. | | |
| d Argentiferous iron ore. | | |

Thus it will be seen that the mines of Carbonate Hill are producing by far the greater amount of ore, their total being a little more than 87½ per cent. of the total of the whole district. The mines of Iron Hill come next, producing about 30 per cent. The daily production of lead carbonate ore is about 470 tons, or very nearly what it has been throughout the whole year. The production of lead sulphide ore is also about the same, being 170 tons. Rather more argentiferous iron is being shipped now, the total being 325 tons. The great increase has been in the class of dry silicious ores, and pyritous or dry sulphide ores, of which 280 tons daily are being produced.

The prospects are now that the output of the district will be somewhat increased before it is diminished, as there promise to be several new shippers before the end of this month. The Marian will commence with a production of 50 tons per day, and as soon as the new boilers at the Lucy B. Hussey are set up that mine will produce 10 tons daily. The Silver Cord, in which an important new strike of lead sulphide ore has been made, may also be expected to make an increase, while there will also be an increase from the Adams under the Moffat lease when the ground is sufficiently opened by the workings from the Maid of Erin. The large producers, the Henriett and Maid, the Minnie, the Evening and Morning Stars, Iron Silver, Colonel Sellers, Dunkin, Matchless, and others maintain a very regular output, and, with the exception of the Iron Silvers, the grade of their ore remains very constant. The grade of the Iron Silver's shipments is rather lower than formerly, although the tonnage continues about the same. The Henriett and Maid is doing about the same as last year, while the Minnie, Mikado and Continental Chief mines are making big increases. The ore produced by all these mines is comparatively rich. That of the Continental Chief averages 100 ounces per ton in silver; that of the Minnie from 50 to 100 ounces; and the Mikado's is probably much richer than either. On the other hand, the falling off in production this year has been mostly on the part of mines producing ore of lower

grade, like the Nisi Prius, Lillian and Louisville. In addition to the ore shipped to smelters, about 800 tons of low-grade ore is broken and hoisted daily for the dressing works, and 80 or 90 tons daily for the Antioch gold mill. Nearly every blast furnace at the smelting works at Leadville is running and has been continually since January 1st, and the American Company is now building another. Both the American and Arkansas Valley companies have been building roasting furnaces for the treatment of sulphide ores. Few idle men are now seen on the streets, and real estate is as valuable as ever. These are all evidences of Leadville's prosperity.

PITKIN COUNTY.

[From an Occasional Correspondent.]

ARGENTUM-JUNIATA, ASPEN MOUNTAIN.—An additional contract for 100 feet has been let on the incline, making a total depth of 200 feet, or vertical depth of 155 feet below the bottom of M. & Y. or Cameron shaft.

ASPEN PUBLIC TRAMWAY COMPANY'S TRAMWAY.—Tourtelotte Park to Aspen, distance $1\frac{1}{2}$ miles due north, with a fall of about 2,400 feet; 59 supports, one long span 500 feet, the other 600 feet apart, the remaining 57 spans 170 feet apart. Two tension stations for tightening rope and loading, one at Spar Ridge, the other 3 145 feet above. At the discharge terminal a series of six bins, capacity $68\frac{1}{2}$ tons, arranged so as to load six cars at once; every alternate bin discharges at opposite sides, also discharges into six bins which supply the Hewitt-Wheeler sampler on tram cars running on a level with the crushers. Mr. J. B. Wheeler is the promoter of the tramway. The Trenton Iron Company, of Trenton, New Jersey, is supplying the iron work for the Bleichert system. Construction is in progress.

BUSHWHACKER & ALPINE.—On Smuggler Mountain, 350 feet west of the Park-Regent shaft, the Bushwhacker, in sinking a 500-foot shaft, encountered debris and wash 380 feet, solid blue lime 40 feet, talc and shale 20 feet, ore and contact matter, assaying from 5 to 75 ounces silver per ton, 10 feet; cross-cut of ore chute, about 5 feet, assaying 262 ounces silver in the bottom of the shaft.

PITKIN COUNTY RAILROAD.—From Aspen to Ashcroft, a distance of 20 miles south, two-foot-gauge single track; intermediate station at Tourtelotte. Park and sidings at shipping mines. The officers are: H. A. Tabor, President; L. M. Babcock, Secretary. Final location survey now in progress.

IDAHO

CLEVELAND AND ANCHOR LODE MINING COMPANY.

—It is reported that several rich veins have been struck in this company's property, to which we referred in the *ENGINEERING AND MINING JOURNAL* of June 15th. The following is condensed from the *St. Louis Republic*: The Cleveland and Anchor lode property is situated in Alton mining district of Idaho, and consists of two full claims, one known as the Cleveland lode and the other as the Anchor lode. This property was discovered by some poor miners, who, after working until their supplies had exhausted, running a tunnel 112 feet, finally concluded to organize a company, and by floating treasury stock, obtain sufficient money to develop the mine thoroughly. With this view, a company was organized and incorporated under the laws of Montana Territory, the capital stock being placed at 400,000 shares, par value \$5 per share, full paid and non-assessable. The secretary of the company, Mr. Jas. B. Leahy, came to St. Louis and floated 40,000 shares of the treasury stock, at 25 cents per share, to prosecute development work. The stock was readily subscribed to at this figure, principally owing to the favorable report made by Mr. J. M. Merrell.

CUSTER COUNTY.

CLAYTON MINING & SMELTING COMPANY.—This company has been organized with a capital stock of \$2,500,000, divided into 2,500 shares of \$100 each. The first subscribers are Edward W. Nash, Omaha; William Wallace, Omaha; A. J. Crook, Clayton, Ida.; L. Green, Clayton, Ida.; A. Hanauer, Salt Lake; W. S. McCornick, Salt Lake. The capital stock is represented by the following mining and smelting properties situated in Custer County, Idaho: The Overland, Ella, Climax, Crown, Faithful Boy, Silver Monitor, Deltifce, Red Bird, Silver Rule and Carbonate mining claims and extensions and the Clayton Mill Site and Smelting Works, situated in Clayton Mining District; the Redemption, Silver Bell, I Know, You Know, Hood, Sky Lark, Silver Wing and Queen of the Hills mining claims, situated in Baybors mining district. The officers of the company are Abraham J. Crook, President; Edward W. Nash, Vice President; William Wallace, Secretary and Treasurer, and these gentlemen with the other stockholders form the board of directors.

MICHIGAN.

BOUGHTON COUNTY.

CALUMET & HECLA MINING COMPANY.—At the annual meeting of the stockholders in Boston on the 21st inst., 71,950 shares were represented. The old board of directors was re-elected, with the exception that F. L. Higginson was chosen to succeed George Higginson, deceased. President Agassiz, in his report, stated that the water supply was becoming low, and that a plan is under consideration to tunnel to Lake Superior and pump water from that source. The expense of sinking the new vertical shaft and of the execution of the tunnel plan will be about \$20,000 per month for the next three years. The company will next year put in two new engines on the southern part of the property. The fire in the old mine in August, 1888, reduced the product of the mine 25 to 30 per cent, and

since the second fire there has been no product from it at all, but an expense of \$45,000 per month in clearing the mine of water and in repairing. The product of the new mine, in which the straight shaft is being sunk in contrast with the inclines of the old mine, is 25 per cent larger than that of the old when in order. The man engines in the old mines have been burned out, and are to be replaced. Until this is done not much work can be accomplished. At a meeting of the directors, A. Agassiz was re-elected President and C. W. Seabury Secretary and Treasurer.

MONTANA.

DEER LODGE COUNTY.

ALPS MINING COMPANY.—The company is but recently organized. John Caplice, of Butte, is president and secretary; James Hammond, of Philipsburg, is vice-president; and J. J. Hammer, of Butte, is secretary. The mines are located at the head of Harvey Creek, about 35 miles northwest of Philipsburg. The properties are three in number, the Alps, the Golconda and the Etna. On the Alps, according to the Butte *Inter-Mountain*, a perpendicular shaft has been sunk 42 feet, and a ledge carrying 4 feet of ore is exposed at the bottom. On the Golconda there are two leads. On one of them a shaft has been sunk 65 feet, and a level run at that depth 50 feet. This shows up a four-foot vein. On the second lead a perpendicular shaft has been sunk 40 feet and a cross-cut run for 20 feet. This shows up a vein carrying 12 feet of ore. The ore is all free milling gold and the assays are said to run as high as \$40 to the ton. The leads are strong, and on the Alps there is a surface showing all along the lead. The Etna is developed by a tunnel which is run 80 feet, and exposes a vein 22 feet in width. The first work to be done by the company is to build a road to Philipsburg. A force of men will be set to work at this immediately. The company is incorporated and has a treasury stock of 100,000 shares.

ARGENTINE MINING COMPANY.—The officers of this company, to which we referred in the *ENGINEERING AND MINING JOURNAL* of June 29th, are: Joe Klaffki, president; John M. Dunbar, secretary; Jos. Chapleau, vice-president and treasurer; and Joe Klaffki, D. C. McLaren, A. J. Marchland, Jos. Chapleau, and John L. Martin, trustees. At the Grand Republic mine, a small discovery shaft, according to the Butte *Inter-Mountain*, showed a vein of great breadth, carrying stringers of very high grade silver ore. A perpendicular shaft $4 \times 6\frac{1}{2}$ in the clear was started a short distance away from the lead and is now at a depth of 90 feet. A cross-cut will be run to the lead at the 100 foot level. Six men are now at work on this development. From the 100 the shaft will be 4×8 in the clear, as the company expects to strike water with 75 feet and will have to put in machinery. The Mastodon is on the same lead as the Grand Republic and the lead crops out the entire length of both claims. It is the intention of the company to begin sinking on this claim on Monday morning. Adjoining these claims and on two parallel leads are the Argentine, the Moquel and the Contact, through which two leads run. The ore is of the same character, and little development has been done.

NEVADA.

ELKO COUNTY.

[From a Special Correspondent.]

COMMONWEALTH CONSOLIDATED MINING COMPANY.—The following resolution was unanimously adopted at a meeting of directors of this company, held in San Francisco August 12th:

Resolved, That whereas the result of milling operations since starting the mill have not been satisfactory, and show a loss of 20 per cent. of the value of the ores, we consider that the continuance of milling with such results is so detrimental to the interests of the shareholders that the extracting and milling of ore should be suspended until such time as may be required to overcome existing defects. The grade of ore worked has been about \$125 per ton, but a higher grade of ore would work to a better percentage, owing to its containing less calc spar or lime, and a higher per cent. of sulphurets. To obtain that grade at present would necessitate the extraction of only the highest grade, leaving large masses of ore assaying from \$15 to \$75 per ton to be mined hereafter, which from the nature of the ground would add materially to the expense over and above what it would cost if it were all extracted at the same time and if mined in that manner that class of ore would represent 75 per cent of the daily hoist, and as it cannot be concentrated at the present time, its mining expense stands against the milling results of the higher grades. In order to obtain immediate returns from the whole output and grade the ores for the most profitable results, the company has been constantly experimenting to find the cheapest and best means of doing so. While rolls for crushing and the jig principle of concentrating was found to be successful on ores containing coarse sulphurets, it was not found applicable to the characteristics of the ores of the Commonwealth. We think we have in the plant now being erected by the Grand Prize Company (batteries and Frue vanners) discovered the system of concentration best adapted to Commonwealth ores. The product from the Frue vanners, which will be high grade ore, will contain the required per cent. of sulphurets to mix with the milling ores to insure their successful treatment to a high per cent. of their value. Under the circumstances we deem it advisable to suspend the extraction of ore until the best methods available can be put in operation to economically extract and reduce with the greatest amount of profit the large reserves now developed, and in the meantime an economical

extension of the present development to the north end of the mine will continue.

NORTH COMMONWEALTH MINING COMPANY.—The Navajo mill is about to start on ore already developed in this company's ground. The Tuscarora camp has just been visited by some of the leading mining superintendents of the Comstock lode; they give most encouraging accounts of the future prospects of the camp.

NYE COUNTY.

MA ALTA MINE.—This at Tybo mine is being worked by a full force of men and ore steadily extracted. There is at present on the dump 700 or 800 tons of high-grade ore. The ore will be shipped to Eureka for reduction.

STOREY COUNTY—COMSTOCK LODE.

ALTA SILVER MINING COMPANY.—At the annual meeting of the stockholders of this company, held in San Francisco on the 15th inst., 100,493 shares were represented. The following officers were elected for the ensuing year: President, Monroe Thompson; Vice-President, R. N. Graves; Trustees, J. P. Martin, S. G. Whitney, and L. Osborn. L. Osborn was re-elected Secretary and E. D. Boyle Superintendent. The Secretary's financial statement showed a credit balance of \$15,825.97.

JULIA MINING COMPANY.—At the annual meeting of this company in San Francisco, on the 14th inst., 53,056 shares out of 69,500 shares of outstanding stock were represented, and the following officers elected for the ensuing year: Thomas Cole, President; R. E. Wilson, Vice-President; C. W. Kellogg, Charles Hirschfeld, and D. Gorham, Trustees. J. Stadfeld, Jr., was re-elected Secretary, and his financial statement showed a cash balance of \$4,626.70.

NAVAJO MINING COMPANY.—At the annual meeting of this company in San Francisco on the 14th inst., 76,784 shares were represented, and the following elected for the ensuing year: President, E. Scott, Vice-President, F. A. Berlin. Directors: H. Pitcher, T. J. Shackelford, and J. W. Pew. J. W. Pew was re-elected Secretary, and his financial statement showed an indebtedness of \$18,463.87. W. C. Price was re-elected Superintendent and the Bank of California a Treasurer.

QUARTERLY YIELD OF THE COMSTOCK.—Following are copies of Superintendents' sworn statements of the ore and bullion yield of Comstock mines during the quarter ended June 30, 1889, not included in the report published in the *ENGINEERING AND MINING JOURNAL* last week:

Crown Point produced 10,200 tons of ore, yielding bullion valued at \$152,139.09; total cost of extraction, transportation, and reduction, \$161,175.12; average yield in bullion per ton, \$14.90. Cost of production above yield, \$9,035.17. No tax.

Overman produced 3,360 tons of ore, yielding bullion valued at \$26,574.22; cost of extraction, \$13,369.49; cost of transportation, \$3,360; cost of reduction, \$20,160; total cost of extraction, transportation and reduction, \$36,889.49; average yield in bullion per ton, \$7.90; cost of production above yield \$10,306.27. No tax.

Justice produced 2,650 tons of ore, yielding bullion valued at \$42,233.95; cost of extraction and reduction, \$44,206.42; average yield in bullion per ton, \$10; cost of production above yield, \$1,972.44. No tax.

WHITE PINE COUNTY.

OSCEOLA GRAVEL MINING COMPANY.—At a meeting of the directors of this company, held in Salt Lake City July 27th, the new directors were elected. At a subsequent meeting of the board of directors held in New York City August 9th the following officers were elected: President, George W. Maynard; Vice-President, Charlton T. Lewis; Treasurer, Gustav E. Kisse; General Manager, Benjamin Hampton. The New York office of the company is at 35, Broadway.

(Special Correspondence.)

For some years past the existence of deposits of nitrate of soda and potash have been known of, but upon an examination made some few years ago by an expert from the Chili fields, they were found to be in small irregular veins or deposits in such limited quantities that it was found unprofitable to work them. The recent successes of Colonel North's operations in the Chili fields have attracted the attention of an English prospecting party to these neglected deposits in Nevada. The result has been that while the original discoveries have been pronounced of doubtful value to work, new discoveries have been made of a bed in the neighborhood of Loreiochs station on the Central Pacific Railroad, which bear evidence of the existence of a lateral deposit covering a large area. It would be premature, with the limited amount of prospecting done, to place any positive value upon the discovery, but should further operations develop such a deposit as it is claimed exists, the present imports of nitrates from the Chili beds to the Pacific Coast will be materially curtailed, if not absolutely dispensed with.

NEW YORK.

SICILIAN ASPHALT PAVING COMPANY.—This company has been incorporated under New York State laws, with a capital of \$250,000. The principal office is to be in New York City. Howard Carroll, Louis P. Mead and Henry Bolze are the incorporators.

PENNSYLVANIA.

COAL.

An explosion of fire-damp occurred in No. 2 Colliery of the Delaware and Hudson Canal Company, near Scranton, Pa., on Thursday, and Andrew Nichols, the superintendent; Richard Mason, inside foreman; John Lavern, Samuel Williams and John Jones

were fearfully burned, Nichols probably fatal. There had been a cave in the mine and the men were on their way to repair it, when the gas ignited from one of the miners' lamps.

OIL.
Exports of refined, crude, and naphtha from the following ports, from January 1st to August 17th:

| | 1889. | 1888. |
|--------------------|-------------|-------------|
| | Gals. | Gals. |
| From Boston..... | 3,051,269 | 2,085,448 |
| Philadelphia..... | 89,430,648 | 79,614,681 |
| Baltimore..... | 3,591,975 | 4,888,065 |
| Perth Amboy..... | 11,911,514 | 14,591,732 |
| New York..... | 271,122,006 | 215,180,325 |
| Total exports..... | 379,107,423 | 316,350,251 |

UTAH.

BEAVER COUNTY.

HORN SILVER MINING COMPANY.—The Superintendent's report for July, which has just been received in New York, shows that during the month 840 carloads, or about 900 tons of ore, have been extracted, from the sale of which \$25,000 was realized. Deducting cost of treatment, Secretary Harrison says that a profit for the month of \$16,000 is shown. Sales of other material will bring the net receipts up to \$18,000, making the cash surplus of the company on August 1st, \$239,000. Most of the ore has been taken from the 4th, 6th and 7th levels. A steam hoist is being erected at shaft 5.

SUMMIT COUNTY.

WASATCH MINES.—This group, situated in Blue Ledge District east of the Ontario, according to the Park City Record, is developing into a bonanza. It is owned by S. P. Hoyt, of Kansas, who a few months ago gave Messrs. E. C. Williamson, Jas. McCune and John Fattish a seven years' lease on this and other properties, and also a bond for \$100,000 on them. It required some time to clean out the tunnels, drifts and other openings to get the mine in shape for advantageous working. The vein in the old workings has been explored into new ground and connection made between the upper and lower tunnels. A fine vein is exposed between well-defined walls, the pay chute averaging two feet in width. Assays show the ore to be high grade smelting, carrying over 80 ounces silver and about 50 per cent lead to the ton. A new road to facilitate ore shipments is being made, a large boarding house is in course of erection and the working force will be increased from time to time. In a short while enough ore will have been taken out to commence and continue shipments on a large scale. The mine workings are in immediate charge of L. N. Smith.

VIRGINIA.

STAFFORD COUNTY.

RAPPAHANNOCK GOLD MINING COMPANY.—The following officers have been elected for the ensuing year: J. A. Macpherson, President; Geo. Thompson, Vice-President; L. F. Bousersfeld, Secretary; George Phipps, Treasurer. These officers, together with Wm. Hoffman, constitute the board of trustees. At the annual meeting, held recently in this city, the usual annual reports were presented. The president reported that a number of minor improvements have been made on the property during the year; but, as heretofore, the operations of the company have been seriously hampered by a lack of capital.

FOREIGN MINING NEWS.

CENTRAL AMERICA.

SAN SALVADOR.

SAN SEBASTIAN GOLD MINING COMPANY.—In March last this company entered into a contract with the Salvador Reduction Company to work the ores of the San Sebastian mine. The Salvador Reduction Company then arranged with Mr. H. B. Davis, of Philadelphia, Pa., to erect at the mine an experimental plant to work the ores there by his carbon chlorination process, which had been successful in working 3,000 pounds of ore from the San Sebastian mine on a plant of a similar character in North Carolina. Mr. Davis, who has just returned from San Salvador, reports that after 70 tons of ore had been worked an accident to the machinery prevented further operations, but the success of the process has been proven. Mr. Davis says: "Seventy tons, 2,000 pounds each, were put through the cylinder in 14 days. Of this, 64 tons were tailings that had been treated by your former process of amalgamation, and six tons were ore I had taken from the mine. Bullion obtained weighed forty-three and forty-hundredth ounces before re-melting at mint; after melting, forty-three and thirty-five-hundredth ounces, 920 fine. Value, \$824.43, being a little over ninety-three and one-third per cent of the assay value. This cannot fail to satisfy the most skeptical that there is no difficulty in working the San Sebastian ore successfully by this method. Knowing it would be of advantage to you, I decided, without instructions to that effect, to take sixty tons of ore from what is known as the Posa Rica vein, in order to get an average of the value of the ore direct from the mine, and also to enable me to return you a greater amount of bullion. The ore was white quartz, containing about twenty per cent iron pyrites. There was no alternative but to pulverize it by Huntington mill, which requires a strong flow of water through it while at work, consequently, the way the tanks are arranged at your mill, all the slimes and whatever float-gold the ore contained passed out and into the river, only the coarser ore and gold remaining in the tanks. This ore was removed from tanks and roasted, and your representative, Mr. White, forwarded you samples taken from this ore for assay. The value of this ore, as reported to you by your assayer in New York, Mr. Wm. E. Gifford, is \$20.05 gold

per ton. From a number of assays I made of this ore, as it was being mined, I expected it to be worth at least \$40 per ton, not realizing such a great loss could occur by water carrying off the light gold in the slimes and the float-gold on its surface. My assays of this ore showed an average of \$80 per ton as it was being mined. I therefore wrote you from the mine that I believed the ore mined would average \$40 per ton after pulverizing, having allowed for fifty per cent loss in this process, but I see the loss was nearly seventy-five per cent. This goes to prove the absolute necessity of pulverizing your ore without the use of water. This necessity was well understood by you from previous tests made with your ore, and therefore can be no great surprise or disappointment. If the ore did not possess this peculiarity the San Sebastian mill would be running successfully to-day by amalgamation on the surface ores, but the gold being so light, and also more or less rusted, it passes over the amalgam plates without coming in contact with them, which accounts for your obtaining only 10 per cent of their assay value. My idea would be to put up a six-cylinder mill with a capacity of 30 tons per day. At present I favor putting in two sets of Krom rolls, which will pulverize the ore without the use of water, and prevent any loss in this direction. From the work I have done on your ore I am safe in saying upwards of 90 per cent of the assay value of the ore can then be obtained. A mill of this capacity will cost about \$30,000. An additional \$12,000 will be required to open up the Steele tunnel and put the mine in good shape, and say \$8,000 for working capital. If you propose carrying the enterprise through in about this manner, I desire to take an interest in the company, as I am confident success will follow. The cost of mining, hauling ore to the mill, chlorinating, and obtaining bullion you can put at \$10 per ton.

The necessary orders for machinery, etc., should be given as soon as possible, so as to leave New York not later than December 1st, as it will then be the dry season and easy to haul from sea port to mine. Three months after machinery reaches mine the mill will be running. The results of the two tests made by me of the San Sebastian ore are as follows: North Carolina, November, 1888—2,949 pounds of decomposed quartz and iron pyrites assaying at U. S. Mint, Charlotte, N. C., \$178 per ton; total value, \$262.46; bullion recovered, 13.32 ounces, 917 $\frac{1}{2}$ fine; value, \$252.63, or 96 $\frac{1}{2}$ per cent assay value. Salvador, Central America, June, 1889—64 tons tailings, 8 tons quartz and iron pyrites, average value of 70 tons, assay of Mr. W. E. Gifford, New York, \$12.61 per ton; total value, \$822.70; bullion recovered, 43.35 ounces, 920 fine; value \$824.43, or 93.38 per cent of assay value."

Inasmuch as the mineral resources of this country are comparatively undeveloped, this experience of one of the pioneer American companies will no doubt be of interest to many readers of the ENGINEERING AND MINING JOURNAL, who may at some time be obliged to treat the ores of this region.

CHINA.

The Hupao says: There are gold mines in Manchuria which may give a better account of themselves than any of our coal or iron mines. Some of the latter, as for instance the Ch'ih-chow mines of Anhui, and the Si-uh-chow mines of Kiangsu, have so far been anything but a success, owing to difficulties of transporting the mineral to the places where it is required. What has stood in the way of successful gold-mining in China, is want of method. The Ping-to gold mines on the Shantung Promontory employ about 10,000 persons, and the working expenses are Ts. 800 a day; but there is a very different state of things at the Amur gold mines. When Prefect Li assumed the direction six months ago, the working of these mines was commenced with sudden and wonderful energy, and a subsidiary mine was opened at K'i-kan Ho. Here where the gold brigands had worked at their forbidden mines before they were so disastrously scattered by the Chinese government troops, gold mining is now actively proceeding under the sanction and encouragement of the government. At first the output was very small, but it has since so increased that during the last 10 days of the third moon (20-29th April, 1889) the joint production of both mines was between 50 and 60 ounces of gold dust. There are from 500 to 600 miners employed, and each is finding now about a tenth of an ounce of gold every day, and it is expected that before many more months there will be 3,000 miners working there, and producing 300 ounces of gold a day.

These mines of Hei-lung Kiang lie near the frontier between that Chinese Province and the Russian Amur territory. There are the Tung Kin Shan and the Si Kin Shan. Here stretches a gold vein 400 to 500 li long. It must be confessed that the way these mines were managed before Prefect Li came along was anything but reassuring to investors; but now we may hope that more confidence will be felt, and that these noble mines may be properly developed.

According to the first clause of the Russian treaty, the range of hills called the Hing An Ling, separates our territory from the Russian, the gold country of Tung Kin Shan lying to the south, and that of Si Kin Shan, or Moh Ho, to the north of that range. The mines under Prefect Li's superintendence are on these mountains, some 70 or 80 li from Moh Ho. All provisions for the mines must be imported overland from Ai-hun (otherwise called Saghalin Via, or "Black River"), a distance of 1,500 li through Moh Ho, passing Russian territory on their way. Prefect Li intends to effect a reform in this respect, and partly by the employment of steamers and partly by opening of new roads, to render it possible to bring from China everything necessary for the proper working of the mines

and the supply of the personnel with provisions, without the aid of Russian roads.

MEXICO.

SONORA.

A correspondent sends us the following:

The Santa Ana mine, located at San Juan, near Nacasari, in the State of Sonora, is shipping some fine high grade ore, a carload recently settled for in Denver returning over \$800 per ton net. This is one of the old historic mines of Sonora, and is described as being in bonanza and producing largely by both Humboldt and Ward at the times of their visits. It was soon afterward abandoned, and remained idle until some three years ago, when a strong St. Louis company was organized to unwater and reopen it. The only evidence of its former value were the extensive surface openings, then filled with water and debris, the statements of Ward and Humboldt, the so-called church records and the general traditions of the country. The statements and records are probably correct, and show that many millions of dollars were taken from the property by the ancient workers, but the traditions, which stated that the miners had been forced to abandon work by the great flow of water, and had left the mine in bonanza, proved to be, as is generally the case, entirely false.

The St. Louis company erected a fine pumping and hoisting plant and sunk a shaft to the depth of 300 feet in the country rock of the hanging wall. From the bottom cross-cuts and drifts were run under the old works, which were drained and fully explored. It was then found that the vein was faulted in the bottom and all the ore taken out above the fault by the old-time miners, who had also endeavored to find the vein below the fault.

The present company continued their search from the bottom of the shaft and about six months ago, after the expenditure of nearly \$200,000, encountered the vein below the fault. They are now drifting on stringers of rich ore, from which shipments are being made in sufficient quantity to more than pay expenses. It is expected that these stringers will lead to another ore body, and the Santa Ana will again become one of the largest producers in Mexico.

The San Pablo and the San Pedro mines in Nacasari District are being steadily worked by American companies in which considerable St. Louis capital is invested.

The San Ricardo Mining Company, of Cleveland, Ohio, has been for some time operating the San Ricardo mine, located in Sonora near the Guaymas Railroad. Lately they have become involved in a peculiar litigation which may prove serious. A former manager of the company, as the story goes, began cutting timber for fuel and mining purposes in whatever direction he could most easily secure it without stopping to inquire whether it was legal or not. The report further says that the manager cut a great deal of timber on a private land grant, the owner of which instituted suit in the courts at Hemisillo, and was awarded \$40,000. As the company had already exhausted its working capital in the erection of machinery and subsequent alteration of the original plant, which was not found fully suited for the ore, the decision of the court will prove a serious loss.

The Underwood Mines, near Lampazos, District of Moctezuma, State of Sonora, Mexico, which were examined last Spring by Mr. Chas. M. Rolker, have recently been visited and examined by a number of engineers in the employ of a strong American syndicate. The result of their investigations is not yet known.

The machinery was purchased of Fraser & Chalmers, and is unloaded at Fairbanks on the S. P. R. R. in Arizona, and hauled 120 miles to the mines on heavy freight wagons. The machinery has all reached its destination and the mill building will be finished as rapidly as possible. Messrs. Gage, Durkee & Leech, of Tombstone, Arizona, are largely interested, but the work at the mine is in charge of Chris. Batterman, an experienced mine manager.

STATE OF CHIAPAS.

A press dispatch says: An important transfer of mining property has been effected in the sale of the famous ore body known as the Santa Fe Copper Mine, situated in the State of Chiapas. This was sold to English companies, one being called the Mexican Company, of London, and the other the Chiapas Copper Company, for \$125,000 in gold and several hundred thousand dollars in shares, the new companies putting in \$450,000 in gold as a working capital.

Another company, the Santa Fe Prospecting Company, of London, with a capital of \$300,000 in gold, will at once begin exploring the country around, the Santa Fe Copper Mine region having been acquired by purchase and concession therefor of the original holders here. The aggregate capital of the companies which are going to operate copper properties in Chiapas is \$2,500,000.

ORE MARKETS.

Leadville. Aug. 16th.

(From our Special Correspondent.)

A notable feature of the market since my last review is a sharp decline in dry ores. Heretofore this class has sold with a deduction of \$11.50 to \$13 working charge, whereas now these range from \$13 to \$16 working charge. This change has come about, not from any concentrated action on the part of the smelters, but is probably owing to the influx of Aspen dry lime ores, which are a desirable substitute, together with the fact that the valley is so well supplied with dry ores and so poorly supplied with lead fluxing ores, that those smelters are not competing at all actively for dry ores in the Leadville market; again the Leadville smelters are unable to obtain lead fluxing ores at less than the old rate of 40c. per unit for the

lead and \$3.50 W. C. so the situation resolves itself into a question of continuing the old prices that left little or no profit, or running their stacks at a profit or blowing them out, with the result that dry ores had to take a tumble.

During the past thirty days there have been no large contracts in lead-zinc sulphides, and the schedule given in my last report is the basis for the small transactions, with a shading in favor of the buyer on account of the grade and shipments being less reliable than the output of the large regular productions. There is more inquiry for iron sulphides low in zinc and silica, as this product can be advantageously roasted, and take the place of iron oxide fluxing ores. The change will come about slowly, as reverberatory furnaces are an expensive addition; still all of the Valley smelters, and several Leadville smelters, are steadily enlarging their capacity in this direction, for they recognize the fact that the supply of iron oxide fluxing ores is decreasing, while that of iron and lead-zinc sulphides is increasing.

During the past week there has been considerable activity in iron oxide fluxing ores, caused by several smelters seeking contracts about the same date; there has been no marked advance in prices, but sellers have the market in their favor to the extent of being able to place undesirable grades, and, in a few cases to exact a trifle more for the very best grades, for limited tonnage, that was required to tide over from the expiration of old contracts until deliveries from new contracts should begin.

MEETINGS.

Cameron Iron and Coal Company, Rooms 7, 8, 9, 10, No. 114 South Sixth street, Philadelphia, Pa., September 4th, at twelve o'clock, noon.

Southwark Foundry and Machine Company, 430 Washington avenue, Philadelphia, Pa., October 15th, at eleven o'clock.

DIVIDENDS.

Charleston, S. C., Mining and Manufacturing Company, quarterly dividend, two dollars and a half per share, and an extra dividend of one dollar per share, payable September 2d, at No. 132 Walnut street, Philadelphia, Pa.

Daly Mining Company, of Utah, dividend No. 30, twenty-five cents per share, or \$37,500, payable August 31st, by Messrs. Lounsbury & Co., 15 Broad street, city.

Ontario Silver Mining Company, of Utah, dividend No. 159, fifty cents per share, or \$75,000, payable August 31st, by Messrs. Lounsbury & Co., 15 Broad street, New York City.

ASSESSMENTS.

Table with columns: COMPANY, No., When levied, D't'nt in office, Day of Sale, Am't per share. Lists various mining companies and their assessment details.

MINING STOCKS.

For quotations see pages 174 and 175.

New York.

FRIDAY EVENING, Aug. 23.

While the inquiry for mining shares this week has been of a more or less fitful character, in comparison with other weeks it has been of liberal proportions and more interest in speculation has been shown.

The Comstock shares have received considerable attention. Cons. Cal. & Virginia sold at \$7.50@\$8.50, closing at \$7.75. Stockholders who suffered the passing of the dividend this month are beginning to figure on the probability of getting a little interest on their investment in September. On this point the Virginia City Chronicle has the following: At the present rate of production, and the assay value of ore extracted maintained at the present average, the bullion yield of the Con. Cal. & Va. mine for the current month will exceed \$300,000. With the surplus carried over from the July account added to the August yield there will remain in the company's treasury a sufficient sum to pay operating expenses and a September dividend, leaving a small balance of about \$12,000 to carry over to the credit of that month. The San Francisco Report on the other hand does not believe that a divi-

dend will be paid. Other sales included Gould & Curry at 190,300 shares, Hale & Norcross at \$3@\$3.10; 450 shares Ophir at \$4.80@\$5; 200 shares Sierra Nevada at \$2.60; Alta, \$1.35@\$1.40; Best & Belcher, \$3.65; Con. Imperial, 60c.; Exchequer, 75c.; Mexican, \$3.15@\$3.50; Occidental, \$1.85@\$2; 2,100 Oriental & Miller at 5@8c.; 2,400 shares Union Cons. at \$3.10@\$3.30; 2,600 shares Utah at \$1.05@\$1.15.

Dealings continue in old Sutro Tunnel Company stock at 4@5c. per share. For the sake of any one who does not know that these shares are worthless we again call attention to the fact that the old company has lost all legal title to its property.

There has been a steady inquiry for the trust certificates of the new Sutro Tunnel Company, and 11,820 shares have been sold at 54@59c. It is expected that the stock and bonds of the new company will be ready for distribution in about a month. They are now in the engraver's hands. Assistant Secretary H. H. Thayer informs us that as the company's net income has been gratifyingly large, the issue of bonds will probably not be so great as was expected.

A sale of Commonwealth at \$2.60 is recorded. It is stated that the shipments of bullion made by this company since the first of the month aggregate \$68,500. The mill has been closed down until the new concentrator is completed which, it is thought, will be in about five weeks. The present milling process saves only 80 per cent. of the value of the ore, but by the new method of concentration which is to be tried, it is hoped to save from 90 to 95 per cent. Further particulars are given in our mining news columns.

A sale of 200 shares North Belle Isle at \$1 is the only other sale of Tuscarora shares on record. In the early part of the week Plymouth Cons. was sold at \$4.35@\$4.38. Only 250 shares changed hands.

Astoria sold at 20c., Brunswick at 5c., and Excelsior at 74c.

The Bodie camp is represented by sales of Mono at \$1.10, Bodie Cons. at 85@90c., and Builwer at 17@20c. Standard Cons. was also dealt in at \$1.20. We are informed that the shipments of bullion by this company for the first two weeks of August amounted to \$11,229.

A small lot of Ontario changed hands at \$35.25. The company announces its 159th dividend, payable August 31st. This makes \$10,325,000 paid to date. Horn Silver fluctuated from \$1.15@\$1.25.

Among the Colorado shares Ward Consolidated has been the most active. Sales of 11,400 shares at \$1.35@\$1.75 are reported. The latter quotation was made to-day. It is officially stated that the July output of the Ward Consolidated properties amounted to 632 tons, running from 50 to 114 ounces silver to the ton and yielding cash returns of \$24,950.

Robinson Consolidated sold at 45c., Small Hopes at \$1.10, Iron Silver at \$2.10, Bassick at 8@9c., Silver Cord at 65@68c. A sale of 100 shares Aspen was made to-day at \$5.00.

The copper stocks appear on the list for the first time in some weeks. Atlantic sold at \$9.25; Boston & Montana, \$36.50; Tamarack, \$104.50, and Calumet & Hecla, \$226.25.

Among the "specialties" El Cristo is quoted at 95c. @\$1.05, closing at the former figure; Rappahannock at 5c., and United Copper at \$1@\$1.05.

In answer to its inquiries, the Committee on Mining Securities has received replies from the following companies: Sullivan Cons., Shoshone, American Flag, Santiago, Sutter Creek, Hector, Brunswick and Tornado. These replies are posted conspicuously on the floor of the exchange.

Boston.

Aug. 22.

[From our Special Correspondent.]

The better feeling indicated at the close of the market last week was short-lived. The sharp advance in Calumet & Hecla brought out more stock than buyers would take, resulting in a decline from \$230 to \$225. On the other hand, orders to buy Tamarack carried the price up from \$102 to \$105, with a reaction to \$103@\$104.

Boston & Montana was quite strong in the early dealings, and advanced to \$37; but reacted to \$36, the last sale being at \$36 1/2.

Quincy is very scarce in the market, and orders to buy even small lots result in an advance, the stock selling at \$54, against \$51 last week.

Osceola sold in a small way at \$11@\$11 1/2, and Atlantic at \$9 1/2. There were no sales of Franklin; \$9 1/2 is bid and \$10 asked. National sold at \$1. Santa Fe declined, from 72 1/2c. to 62 1/2c. on moderate transactions.

This tells the whole story. As usual at this season the market is dull, with very little desire on the part of operators to do anything; but we feel confident that later on, with the question of price of ingot and production settled among the companies, a more active and higher market will prevail.

Silver stocks are quiet, with sales of Dunkin at \$1 @97 1/2c.

At the afternoon call Calumet & Hecla declined to \$225. Tamarack advanced to \$105, and Kearsarge sold at \$6, same as last sale. Market fairly steady.

San Francisco.

August 23.

The following quotations were received in New York to-day by telegraph: Alta, \$1.25; Best & Belcher, \$3.60; Bodie, 85c.; Bulwer, 10c.; Con. Cal. & Va., \$7.75; Chollar, \$1.95@\$2.05; Crown Point, \$2.95; Commonwealth, \$2.60; Eureka, \$1.40; Gould & Curry, \$2.05; Hale & Norcross, \$2.05; Mexican, \$3.65; Mono, 50c.; Navajo, 25c.; N. Belle Isle, 75c.; Nevada Queen, 75c.; Ophir, \$5; Potosi, \$1.55; Sierra Nevada, \$2.60; Union, \$3.30; Utah, \$1.10.

PIPE LINE CERTIFICATES.

NEW YORK STOCK EXCHANGE.

Table with columns: Opening, Highest, Lowest, Closing, Sales. Lists stock prices for Aug. 17-23.

Total sales in barrels..... 827,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

Table with columns: Opening, Highest, Lowest, Closing, Sales. Lists stock prices for Aug. 17-23.

Total sales in barrels..... 3,551,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Aug. 23.

Statistics.

PRODUCTION OF ANTHRACITE COAL for week ended August 17th and year from January 1st.

Table with columns: Tons of 2,240 lbs., Week, Year, 1889, Year, 1888. Lists coal production for various companies.

Total..... 826,971 *21,597,851 21,611,998

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:

Table with columns: 1884, 1886, 1885, 1887. Lists coal production for 1884-1887.

*These figures are undoubtedly too large and some deductions have to be made for duplications. We are unable to make the necessary corrections this week owing to the reluctance of the carrying companies to furnish information, but we hope to do so in later issues.

PRODUCTION OF BITUMINOUS COAL for week ended August 17th, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Table with columns: Tons of 2,240 lbs., Week, Year, 1889, Year, 1888. Lists coal shipments for various locations.

Total..... 255,088 7,642,012 7,911,290

WESTERN SHIPMENTS.

Table with columns: Pittsburgh, Pa., Westmoreland, Pa., Monongahela, Pa. Lists coal shipments for western locations.

Total..... 68,955 1,493,100 1,439,027

Grand total..... 324,043 9,135,112 9,350,317

PRODUCTION OF COKE on line of Pennsylvania R. R. for week ending August 17th, and year from January 1st, in tons of 2,000 lbs.: Week, 63,506 tons; year, 2,678,538 tons; to corresponding date in 1888, 2,437,301.

Anthracite.

As we have from time to time recorded, the situation of the hard coal market is neither satisfactory nor encouraging. Very little new business is coming in, no one pretends to be getting circular prices, and production is steadily piling up in excess of current requirements. Some of the producers have curtailed their output, but the action has not been at all general. Producers realize the wisdom of such a step, but few are willing to inaugurate a policy of restriction unless they are assured that their example will be generally followed, and to get such an assurance at present appears to be next to impossible. One company this week went so far as to formally request in writing a neighboring producer to lessen shipments as the first company had itself decided to do.

At the meeting of the sales agents next week, as intimated last week in this column, an effort will be made to have prices advanced, but unless the demand improves more than now anticipated, or some vigorous plan of curtailing production is put into effect immediately, we fail to see a pretext or justification for such action, which under present circumstances would result simply in making schedule prices more nominal than heretofore. Sales of stove coal at \$4 alongside are reported, and even lower quotations are heard. Lehigh broken is quoted at \$4, and egg and chestnut are selling at corresponding prices. Pea, depending on quality, is offered all the way from \$1.85@\$2.50.

Bituminous.

The trade is without particular features of interest. All coming forward is steadily absorbed, and the old complaint of a scarcity of cars is heard. In consequence of the difficulty of securing coal to load, cars to the seaboard being scarce, vessel freights are rather

weaker, the latest quotations being from Baltimore to Providence, \$1.20 alongside; New Bedford, \$1.20 alongside; Boston, \$1.20@1.25 alongside.

Boston. Aug. 22.
[From our Special Correspondent.]

The market for anthracite coal is unchanged. The long dull spell almost breaks the record in this market. Leading jobbers are hardly selling three cargoes a week, and back orders are very well filled now. How on earth the companies expect to improve the situation by advancing prices at their meeting next week is a question which interests the local trade not a little. Coal is now selling all the way from 10 to 50 cents off circular, when it is selling at all. Prices are no especial object. The coal is not wanted; stocks on hand are unusually large. This clearly appears from the fact that the weakening in New York freights of late has induced no shipping activity, as it would if parties were waiting to reach a lower freight. Whatever the companies do on the matter of f. o. b. quotations will only have nominal effect until restriction of output shall have been effected. An early and cold fall might help out somewhat, but no one is disposed to anticipate that in the coal business so far as ordering coal goes.

In bituminous circles there is nothing out of the usual run. Small lots are taken at low figures, but no one wants much of this business.

It seems to be understood that the Chesapeake & Ohio have done the most business here this season, though opinions differ as to the good fortune of such a record. The Norfolk & Western had rather costly experience last year on their big business, which has made them a little more cautious this time.

The freight situation is unchanged, save at New York, where the almost total lack of new business has reduced freight to 80@90c. At Philadelphia \$1.25@1.35 still rules, and at Baltimore \$1.40@1.45 is paid readily. Large vessels getting \$1.45 and towage rebate at Baltimore are making a pretty good thing. It is strange more vessels do not go there; but many skippers who go to New York do not like to get out of their beaten, though at present unprofitable, track.

The retail movement here is very slight. Quotations are, however, maintained.

The receipts for the week were 58,554 tons anthracite and 13,406 tons bituminous. Since January 1st, receipts have been 953,438 tons anthracite and 561,749 tons bituminous.

Buffalo. Aug. 22.
[From our Special Correspondent.]

Look out for an advance of 25 cents per ton on anthracite coal at wholesale and retail on September 1st. The anthracite coal trade continues quiet and with out special features of interest. Stocks good.

The bituminous trade fairly active and market strong. The supply is light, especially for steamboat purposes. Cars scarce the principal cause.

A certificate of incorporation was granted last Tuesday to the Terminal Union Company, of Buffalo (capital \$100,000), to construct a railroad in this city through certain streets abutting on and near the water front. The promoters say that it is a move in the direction of aiding commerce, and will afford greater facilities at the elevators, docks, coal trestles, etc.

Lake freights on coal firm at unchanged quotations. Tonnage active, but shippers would not pay any extra rate for boats loading for docks above the tunnel at Chicago.

Natural gas in paying quantities has been struck in Canada, about six miles from Port Colborne, the Lake Erie entrance to the Welland Canal.

The antiquated notion of constructing a ship canal around the Falls of Niagara has been revived. If the parties now starting the project would come to Buffalo and see our coal docks, chutes, trestles, etc., and the propellers constructed with especial reference to the carrying trade in coal, ore, grain, etc., without a doubt they would be content to let the matter pass into oblivion, for it is not likely that the money expended here in hauling facilities and in railroad connections with the coal fields of Pennsylvania would be thrown away by the furnishing of such facilities on Lake Erie, or the mouth of the Oswego Canal and railroads.

The Pennsylvania Railroad Company has decided to order 1,000 more freight cars, principally hopper bottom.

The injunction asked for against the Washington street tunnel work, now in progress at Chicago, was not granted. It appears that very trifling hindrances to navigation have accrued thus far, and as the work is nearly finished, there was no necessity to obstruct its progress.

The shipments of coal from this port by lake from August 15th to 21st, both days inclusive, aggregated 85,979 net tons, namely: 37,000 to Chicago, 20,750 to Milwaukee, 5,600 to Duluth, 8,000 to Superior, 4,780 to Toledo, 1,500 to Gladstone, 3,000 to Detroit, 1,200 to Green Bay, 150 to Bay City, 550 to Menominee, 450 to Kelly Island, 800 to Escanaba, 800 to Sheboygan and 69 to Rowan; total for the season to date, 1,111,619 net tons.

The rates of freight were 60c. to Chicago, Racine and Menominee; 50c. to Milwaukee, Sheboygan, Green Bay, Escanaba and Houghton; 40c. to Duluth, Superior and Kelly Island, and 30c. to Toledo and Detroit.

The receipts of coal by canal here for second week in August, 2,594 net tons; the shipments, 458 net tons. The canal charters were seven loads of coal dust to Syracuse at 55c. per gross ton, free on and off.

An effort is being made to organize a our service association in this city. At a meeting held lately Mr. Thomas Loomis said "that he thought the railroad companies ought to have storage yards for coal, into

which coal could be put, a reasonable charge to be made, in order to enable them to always have a supply of cars." "At present," he says, "there is no encouragement for large dealers to maintain yards. If the railroads would make a rate of 10 cents lower to dealers who have yards than to those who have none, that would equalize the matter of tonnage charges and be fair to all."

Pittsburg. Aug. 22.
[From our Special Correspondent.]

Coal.—The situation shows but little change. Outside of the Fourth pool there is nothing doing worthy of note. The lower Southern and Western markets are abundantly supplied, and if the coal was loaded it would have to remain in the pools until there was a rise in the Ohio, which, from present indications, is not likely to occur for some time. In the Fourth pool the miners are all at work at two(2) cents, in the other pools a limited number of miners are working at 2½@2½ cents.

The nominal rates are:
PRICE OF COAL PER 100 BUSHELS = 7,600 LBS.
First pool.....\$4.75 Fourth pool.....\$3.25
Second pool..... 4.50 Railroad coal..... 5.00@6.00
Third pool..... 3.90

Connellsville Coke.—Prices are as unsettled as ever. For some unaccountable reason the coke producers have failed to come to a satisfactory arrangement among themselves. Facts are scarce in the absence of an agreement. We quote nominally f. o. b. at ovens at old rates. We hope the matter will be arranged in time for our next report.

FREIGHTS.

The long-drawn-out squabble over relative rates on anthracite coal between Toledo and Missouri River points and Chicago and the same points has been finally settled, it being necessary to call in General Traffic Manager Guilford, of the New York Central, as arbitrator. By a majority vote it was decided that the Toledo rate should be 50 cents higher than the Chicago rate and that after September 24th the following rates should govern: Toledo to Missouri River points, \$3.70; Chicago to Missouri River points, \$3.20; Mississippi River points to Missouri River points, \$2.15.

The following rates per ton of 2,240 lbs. for coal charters are reported:

From Baltimore to: Boston, Mass., 1.45; Bridgeport, 1.30; Charleston, .75; Fall River, 1.30; Gardner, Me., 1.50; New Bedford, 1.30; Newburyport, ...; New Haven, 1.25; New London, 1.25; New York, 1.00; New Haven, Conn., 1.30; New London, Conn., 1.30; New York, N. Y., 1.10; Portland, 1.45; Portsmouth, 1.50; Providence, 1.30; Richmond, Va., .70; Salem, Mass., 1.45; Savannah, .90@1.00; Somerset, \$1.30; Williamsburg, N. Y., 1.20.

From Philadelphia to: Alexandria, 85¢; Annapolis, .70; Baltimore, .60; Bangor, Me., 1.25@1.30; Fall River, .80@.90; Georgetown, D. C., .85; New Bedford, .80@.90; Newburyport, 1.35; New York, .90; Portsmouth, 1.25@1.35; Providence, .80@.90; Savannah, 1.30; Washington, .85.

From New York to: Boston, Mass., .90; Bridgeport, Conn., .60; E. Boston, .90; Fall River, .80; Marblehead, .85; New Bedford, .80; New Haven, .60; Norwalk, .55; Portland, .90; Portsmouth, N. H., 1.00; Providence, .80; Quincy Point, .90; Saco, 1.00; Salem, Mass., .90; Sangus, .95; Wareham, .90.

* And discharging. † Alongside. ‡ And towage.

METAL MARKET.

NEW YORK, Friday Evening, August 23, 1889.
Prices of silver per ounce Troy.

| Aug | Sterling Exchange | London Pence. | N. Y. Cts. | Aug | Sterling Exchange | London Pence. | N. Y. Cts. |
|-----|-------------------|---------------|------------|-----|-------------------|---------------|------------|
| 17 | 4.87½ | 42 5-16 | * | 21 | 4.87½ | 42 5-16 | ‡ |
| 18 | 4.87½ | 42 5-16 | ** | 22 | 4.87½ | 42 5-16 | ‡ |
| 20 | 4.87½ | 42 5-16 | † | 23 | 4.87 | 42 5-16 | ‡ |

*92¼@¾ †92¼@¾ **92¼@¾ ‡92¼@¾

United States Assay Office at New York reports total receipts of silver for the week 89,000 ounces.

The silver market has remained very steady this week. The applications for Council Bills on Wednesday much exceeded last week's tenders, so that the Council could only allot a much smaller percentage of each person's requirements. While this would naturally strengthen the silver market, it has been offset by a fall in exchange.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

| | Bid. | Asked. |
|---------------------------------------|-------|--------|
| Trade dollars..... | 72 | 73 |
| Mexican dollars..... | .75 | .73¾ |
| Peruvian soles and Chilean pesos..... | .72 | .73¾ |
| English silver..... | 4.85 | 4.90 |
| Five francs..... | .94 | .95 |
| Victoria sovereigns..... | 4.85 | 4.89 |
| Twenty francs..... | 3.90 | 3.95 |
| Twenty marks..... | 4.74 | 4.78 |
| Spanish doubloons..... | 15.55 | 15.75 |
| Spanish 25 pesetas..... | 4.90 | 4.95 |
| Mexican doubloons..... | 15.55 | 15.70 |
| Mexican 20 pesos..... | 19.50 | 19.65 |
| Ten guilders..... | 3.96 | 4.00 |

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting made no change in its minimum rate for discount, and it remains at 3 per cent. During the week the bank gained £198,000 sterling bullion, and the proportion of its reserves to its liabilities was

raised from 37.17 to 41.71, per cent against an advance from 39¾ to 43¼ per cent. in the same week last year, when its rate of discount was 3 per cent. Thursday the bank gained £5,000 on balance. The weekly statement of the Bank of France shows an increase of 8,675,000 francs gold and 3,250,000 francs silver.

Copper.—The tone of the market here is very quiet, and business is far from active. The higher prices recently established have checked demand to some extent, and at any rate for the present. Consumers seem to be reluctant to place many orders. Regarding the general situation and the arrangements recently entered into by the producing companies, and the holders of the stocks in warehouse, we refer our readers to our editorial on another page. Present quotations here are sustained at 12c. for Lake copper and 10½c. for casting kinds.

The London market for Chili Bars and G. M. B.'s has been rather erratic during the past week with almost continuous fluctuations. The closing quotations at the end of last week were spot, £43 10s. @ £43 15s.; futures, £42 15s. @ £43. On Monday the market opened at £43 7s. 6d. @ £43 10s.; spot at £42 7s. 6d. @ £42 12s. 6d., three months, closing about the same figures. On Tuesday the opening prices were: £43 2s. 6d. @ £43 7s. 6d. spot and £42 12s. 6d. @ £42 17s. 6d., three months, and the closing quotations that day were £43 @ £43 5s., spot, and £42 5s. @ £42 10s., three months. On Wednesday, the market opened at £42 15s. @ £43, spot, and £41 15s. @ £42, three months, closing that day at £42 2s. 6d. @ £42 7s. 6d., spot, and £41 7s. 6d. @ £41 12s. 6d., three months. On Thursday, the opening figures were £42 12s. 6d. @ £42 17s. 6d., spot, and £41 17s. 6d. @ £42 2s. 6d., three months, and the closing prices about the same; and to-day (Friday) the market opened at £42 17s. 6d. @ £43 spot, and £42 2s. 6d. @ £42 5s., three months, closing at £42 17s. 6d. @ £43 spot, and £42 2s. 6d. @ £42 5s., three months, so that whilst fluctuations have been considerable, the change in values for the week is quite insignificant. Mail and cable advices from Europe continue to be very encouraging, and the latest quotations for refined kinds in London are: English tough, £46 10s. @ £47 10s.; best selected, £47 10s. @ £48 10s.; strong sheets, £54 @ £55; India sheets, £51 @ £51 10s., and yellow metal, 5s. 5½d.

The following are extracts from Messrs. Vivian, Younger & Boud's report, dated London, August 8th:

Since the 11th ulto G. M. B. warrants have been more or less in daily demand for the settlement of contracts representing sales at fixed rates to deliver, made against the purchases of options at short notice, freely sold several months ago at lower prices, and extending over the entire year. G. M. B.'s advanced from £40 15s. to £42 10s. for cash and short prompts, and after a further rise to £44, closes at £43, with three months selling at 20s. per ton discount.

Consumers have steadily taken the current supply of refined, in tough and best selected at from £46 to £48, and smelters are absorbing what furnace material offers, American mattes being now more plentiful. Stocks are reducing at a satisfactory rate, while all branches of the trade are in full swing, thus demonstrating that so far the position is improving from natural causes. An incomparably better state of things than any idea of artificial support that was at one time projected, but seems now to be abandoned entirely.

Shipments from the Atlantic ports of the United States to Europe from January 1st up to July 25th shows a decrease of 7,799 tons as compared with the corresponding period of last year, and an increase of 7,151 tons as compared with 1887, as follows: In 1889, 15,539 tons; in 1888, 23,158 tons, and in 1887, 8,208 tons.

According to the Board of Trade returns for the United Kingdom, the imports and exports of copper during the first seven months of the following years, estimated in fine, were as follows:

| | 1889. | 1888. | 1887. |
|---------------------------------|--------|--------|--------|
| Copper in ores and pyrites..... | 24,138 | 20,045 | 17,653 |
| regulus..... | 29,399 | 20,474 | 18,887 |
| bars, etc..... | 22,296 | 27,979 | 18,354 |
| Tons..... | 75,833 | 77,496 | 54,894 |

EXPORTS.

| | | | |
|----------------------------|--------|--------|--------|
| Manufactured copper..... | 12,221 | 8,944 | 19,077 |
| Unmanufactured copper..... | 15,075 | 17,302 | 12,203 |
| Foreign copper..... | 6,527 | 20,967 | 7,091 |
| Tons..... | 33,823 | 46,913 | 38,371 |

The Swansea and Liverpool arrivals and deliveries of Chili bars, ores and regulus in fine were as follows during:

| | July, 1889. | July, 1888. | July, 1887. |
|-----------------|-------------|-------------|-------------|
| Arrivals..... | 800 | 2,900 | 1,700 tons. |
| Deliveries..... | 3,200 | 8,200 | 1,500 " |

Tin.—During the past week no important change has taken place in the quotations. Business has been very quiet and fluctuations light. Generally speaking, the London cable advices have ruled and regulated the daily values on this side. Demand on the part of consumers continues fair. We quote to-day: Spot, 20.25c.; September, 20.20c.; October, 20.20c.

The London market is virtually unchanged since our last report, and the closing quotations to-day are, spot, £92 2s. 6d. to £92 5s., and futures, £92 17s. 6d. to £93.

Lead.—The market has been very dull during the week, and business is much restricted at present. Consumers have been doing little or nothing in the way of buying fresh supplies for a few weeks past, and seem still to be supplied for two or

three weeks to come. Prices, however, have not given way much, as the offerings continue remarkably light, and if a moderate demand were to spring up it would doubtless have the effect of stiffening quotations. We quote to-day: Spot, 3 90; September, 3 92½; October, 3 95. The European markets are firm, and the latest quotations in London are: English lead £12 17s. 6d. @ £13; Spanish, £12 12s. 6d. @ £12 15s.

The Chicago Market.—Messrs. Everett & Post telegraph us to day as follows: Under more liberal offerings values are easier, spot being quoted at 3 75c. Some 300 tons have been sold at this figure. The market closed very quiet, 3 75c. being asked and 3 70c. bid.

The St. Louis Market.—Messrs. John Wahl & Co. telegraph us as follows to-day: Business has been light and the market is practically unchanged. Probably some 400 tons changed hands at 3 70c.

Antimony.—The great firmness recently reported in this article gives no signs of weakening, and we quote, to-day, Halletts at 16½ and Cooksons at 18½.

Spelter.—The spelter market is quiet, but firm, and the present quotations for prime Western are 5-15 to 5-20.

Reports from Europe are that the markets there are very strong indeed, and the tendency of values is decidedly upwards, the demand for galvanizing and other purposes being exceedingly active. The latest quotations are: Ordinary, £21; Specials, £21 5s.; American sheet zinc is 6½.

Nickel is still scarce at 65@70c. per pound.

Quicksilver.—The London market is slightly lower, 49 5s. being the latest cable quotations. In New York prices remain at \$48 per flask and 65@66c. per pound in a jobbing way. Trade is reported as fair at the quotations.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Aug. 23.

Pig-Iron.—The week has developed no change in the situation in this market as outlined in our last report, with the possible exception that the continued increased consumption of manufactured and finished iron of all kinds is naturally increasing the confidence and strengthening the position of holders of raw iron. So far as a careful canvass of the market reveals, no large orders have been booked during the week, but the consumption continues liberal and prices may fairly be termed firm. The feeling throughout the trade is apparently a healthy one; no surplus appears to be pressing the market, and holders this week at least seem to be able to wait for buyers to come to terms. As to prices, No. 1 Foundry iron of the Tennessee Coal, Iron & R. R. Co. can be obtained, it is thought, at \$16.50, but other Southern brands are held at \$17. A fair range of quotations is as follows: Northern brands \$17.50@18 for No. 1 Foundry; \$16@17 for No. 2 and \$15@15.50 for Gray Forge; Southern standard brands \$16.50@17.50 for No. 1 Foundry, \$15.50@16.50 for No. 2 and \$14.75@15 for Gray Forge. Only the best Southern brands are commanding top figures.

Scotch Pig.—Values are still held very high both here and in Scotland. A lot of Summerlee, 200 tons, changed hands this week at \$22.25, but the regular demand has of course been checked by these high quotations. The latest quotations are: Dalmellington, \$20.25@20.50; Eglington, \$20; Langloan, \$22; Summerlee, \$22.25@22.50; Shotts, \$22.25@22.50; Coltness, \$22.50.

The following are latest cable quotations: Scotch Warrants, 46s. 3d.; Coltness, 60s. 6d.; Langloan, 53s. 6d.; Summerlee, 59s.; Gartsherrrie, 59s. all at Glasgow; and Glengarnock, 55s.; Dalmellington, 49s.; Eglington, 47s. 9d., all at Ardrossan.

Makers of Ohio "Scotch" brands quote \$19 per ton.

Spiegeleisen.—As noted last week, buyers' wants now seem to be well supplied, and no new business of importance can be recorded. Prices continue firm and even higher, in sympathy with the foreign market. Local holders now ask \$29.25@29.50 for 20 per cent. spiegeleisen, and \$61 for ferro-manganese, 80 per cent., which is also firm, although in light demand.

Billets, Slabs and Rods.—An excellent demand for American billets, blooms, tank and nail slabs, and wire rods is reported at unchanged prices. Both nail slabs and billets are held at \$29.50. Foreign quotations are still so high as to be almost nominal.

Steel Rails.—In point of activity this week has been an improvement over last. Judging from the reports we have received, sales for the week by Eastern mills will aggregate 10,000 tons, and there are other inquiries which, it is estimated, will aggregate 50,000 tons. These, we understand, are inquiries from parties having purchases under consideration. At Eastern mills the quotation is pretty generally maintained at \$28 per ton, but it is estimated that in some quarters \$27.50 will be accepted for deliveries about a month or six weeks ahead. We can learn, however, of no actual sales at this figure. At Pittsburg, \$30 per ton at mill is asked.

Structural Iron and Steel.—The season for architectural work will soon close, but new inquiries for bridges, cars, locomotives, etc., and work of like character, are plentiful and there has apparently been no relaxation of activity at any of the mills.

Prices for structural material continue as follows, at mill: Bridge plate, 2 1c.; angles, 2@2 1c.; tees, 2 5@2 6c.; steel angles, 2 5c.; beams and channels, on wharf, 2 8c.

Steel plates are held as follows: Tank and Ship, 2 25; Shell, 2 4@2 5; Flange, 2 8; Fire-Box, 3 50@4.

Iron Plates are quoted as follows on wharf: Common tank, 2 25c.; refined, 2 3@2 4c.; shell, 2 4@2 5c.; flange, 3 5@3 7c.; extra flange, 3 ¾@4c.

Bar Iron.—A moderate inquiry is generally reported. At mill common is quoted at 1 6@1 7c., and refined at 1 75@1 9c. Deliveries from store are quoted as follows: Common, 1 9c. base; Refined, 2c. base; "Ulster," 3@3 1c. base; "Norway," 5c. shapes, and Norway nail rods, 5c.

Merchant Steel.—Nothing new has transpired concerning the reported attempt to revive the Merchant Steel Association. Trade during the week in this city has been rather light. Prices are unchanged: Best English tool steel, 15c. net; American tool steel, 7 ½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3 ¾c.; Bessemer machinery, 2 ¼@2 ½c. Bessemer spring, 2 ¼@2 ½c. Open hearth standard grades and spring steel range from 2 ½ to 3c. Tire steel at 2 ½c.

Pipes and Tubes.—The demand continues good. Rates of discount on wrought-iron pipe remain as follows: Butt-welded, plain and tarred, 50 per cent. discount; galvanized, 42 ½ per cent. discount; lap-welded, plain and tarred, 62 ½ per cent. discount; galvanized, 50 per cent. discount. A discount of 57 ½ per cent. is allowed on boiler tubes of 2 inches and larger, and 52 ½ per cent. on 1 ¾ inches and smaller.

Cast-iron pipe remains at \$25.50@30, according to size.

Rail Fastenings.—A generally excellent inquiry for these articles is apparent, and during the week a number of transactions have been closed. Many of the big roads are making extensive repairs, and the consumption is liberal. In the matter of prices, however, there has been no improvement owing to the competition among the mills. We continue to quote as follows: Spikes, 1 95c.; angle fish-plates, 1 7c.; bolts and sq. nuts, 2 70@2 75c.; bolts and hex. nuts, 2 9@3c.

Old Material.—The most noteworthy feature in this line is a marked advance in old T-rails, for which \$25 is now asked. Double heads are quoted nominally at \$26.50. We learn of an inquiry for 1,000 tons at \$23, which has been offered through the trade without finding a seller.

Wrought scrap iron, No. 1, has been thoroughly absorbed by large dealers, who are holding for an advance, and are at present practically out of the market at the ruling quotation, \$21, which is based on small sales of 100-ton lots. Machinery cast scrap is quoted at \$15.50. One hundred tons of old car wheels were offered on Thursday at \$18.

Circular No. 1,019, issued by the Joint Committee of the Central Traffic Association, announces an advance in the pig-iron and special iron tariff to 25 cents for carloads and 30 cents for less than carloads. The advance takes effect on September 1st, and is between New York and Chicago, both ways. This makes the rate from Pittsburg to Chicago 12 ½ and 15 cents, whereas it was formerly 11 and 14 cents.

It is reported that the Cambria Iron Company will probably re-establish its steel plant permanently at Johnstown. An official of the company said on Tuesday that no attempt had yet been made to restore the wire department of the Gautier Steel Works, but that temporary accommodations for the rest of the steel plant are nearly completed, and are likely to be made permanent. Within a week or so the rolling mills will be in operation.

The Pennsylvania Railroad Company's recent large order for the building of freight cars, to which we referred last week, has been distributed as follows: Altoona shops, 1,000 cars; Pensular Car Company, Detroit, 500; Murray, Douglass & Co., Limited, Milton, Pa., 400; Pardee, Snyder & Co., Watson, Pa., 200; Erie Car Works, Erie, 300; Harrisburg Car Company, 200; Michael Schall, York, 100; Schall & Shoop, Dauphin, Pa., 100; Carlisle Manufacturing Company, Carlisle, 200 cars. Most of the cars are hopper gondolas.

Most of the car works in Pennsylvania are busy with orders. According to Philadelphia advices, the Lebanon Manufacturing Company has recently furnished 210 60,000-pound cars to the George's Creek & Cumberland Railroad, 250 coke cars to the Bell's Gap Railroad, and 100 coal cars to the Westmoreland Coal Company. The Jackson & Woodin Manufacturing Company, of Berwick, Pa., is building 50 hopper-bottom coal cars for the Delaware, Lackawanna & Western Railroad, and 400 cars for the New York, Susquehanna & Western Railroad. The Harrisburg Car Company has recently taken orders for 400 oil-tank cars for private shippers.

California capitalists, who have built large refineries at San Diego, on Thursday placed an order for 75 steel oil-tank cars with a Pittsburg firm, the contract price, according to a press dispatch, being \$87,000.

Cleveland.

[Special report for the ENGINEERING AND MINING JOURNAL.]

Sales of iron ore during the last two weeks have been constant, particularly in small blocks of from one to five thousand tons each. The Champion mine, which produces 200,000 tons of Bessemer ore, is entirely sold up.

The Lake Superior Iron Company, whose annual product averages 240,000 tons, one-quarter of which is strictly Bessemer, and the other three quarters a non-Bessemer low in phosphorus, is also out of the market.

The Minnesota district, which will this year produce

900,000 tons of ore, almost all of which is strictly "Bessemer," and the Pittsburg & Lake Angeline Iron Company, whose output this year will be 200,000 tons, all "Bessemer," are both out of the market, having sold their entire product early in the season.

There is still a small amount of "Bessemer" ore for sale from the "Gogebic" range, also a little from the "Republic" Iron Company's mines in the Marquette range, and possibly a small amount from the Menominee range.

All Bessemer ores are now held with confident firmness, the recent rise in Bessemer pig having greatly strengthened the position of iron-ore dealers.

The shipments of iron ore for week ending August 14th for the first time gave signs that from now on the weekly shipments will decrease. The maximum weekly output has evidently been attained. Quotations are unchanged from last week.

Louisville.

Aug. 21.

(Special market report by Hall Brothers & Co.)

In view of the light offerings by the furnaces, transactions have not been so large, though the market has remained firm. Trading has been mainly in small quantities for near-by deliveries, though transactions are reported for shipment extending several months into the future. The report that the coke strike is ended removes all apprehension of the banking of furnaces drawing their supply from that district.

We continue to quote f.o.b. cars at Louisville.

Hot Blast Foundry Irons.

| | |
|-----------------------------------|---------------|
| Southern Coke No. 1 | \$14.75@15.25 |
| " " No. 2 | 14.00@14.50 |
| " " No. 3 | 13.75@14.25 |
| Mahoning Valley, Lake ore mixture | 17.50@18.00 |
| Southern Charcoal No. 1 | 16.50@17.00 |
| " " No. 2 | 16.00@16.50 |
| Missouri " No. 1 | 17.50@18.00 |
| " " No. 2 | 17.00@17.50 |

Forge Irons.

| | |
|--------------|-------------|
| Neutral Coke | 13.25@13.75 |
| Cold Short | 13.00@13.25 |
| Mottled | 12.00@12.25 |

Car Wheel and Malleable Irons.

| | |
|----------------------------|-------------|
| Southern (standard brands) | 21.50@22.00 |
| (other brands) | 17.50@18.00 |
| Lake Superior | 22.00@22.50 |

Philadelphia.

Aug. 23.

[From our Special Correspondent.]

Pig Iron.—As compared to last week, this week's volume of business is considerably larger. Makers are very strong in the belief that prices, 30 days hence, will be stronger than at present, and are declining to make concessions on new business coming in. They are, of course, assisted in this determination, first, by the well sold-up condition of the market; second, by the increasing requirements, and third, by the moderate and almost insignificant offerings of Southern irons which have any show of sale in this market. The facts of the situation, briefly stated, are these: that there is a slight increase in production; a slight expansion in requirements, a little increase in inquiry since Monday, and very little offering from the South. No. 1 Foundry has been taken in small lots all week at \$17.50, with best brands at \$18 to \$18.25; No. 2 is bringing \$17 for all except a few makes. Gray Forge will bring \$15.50 without difficulty, and there are very few good brands now to be had for prompt delivery. Southern forge was offered here this week at \$14.75, and at present writing there are offerings of good Southern makes at that figure.

Blooms.—The demand for blooms, billets and slabs has not been checked as yet by the advancing tendency. It is difficult to buy at the same rates as were named 30 days ago. Some makers are asking 50 cents to \$1 more, and certain it is that sales have been made at these advances. Nail slabs are held at \$30, but business has been done at 50 cents to \$1 less. Tank slabs, \$31; sales at \$30; shell slabs, \$33; charcoal blooms, \$53; anthracite, \$42, and scrap, \$32.

Muck Bars.—Several makers are holding muck bars, for 30 days' delivery, at \$29.50. Mills are filling up, and the outlook is favorable for still stronger prices.

Merchant Iron.—The entire situation is better than even a week ago. Car iron orders have helped to fill up a good many mills that two or three weeks ago were on the market. Some makers claim that they are getting 1 90 without difficulty. There are very few mills willing to deliver refined iron under 1 80. One trouble in common and medium iron is, that old rails are away up. There are a good many inquiries on the market this week for bars. Cost of labor has been advanced 25 cents per ton at some mills.

Skelp Iron.—Another advance has been made. Grooved skelp is quoted at 1 90, but sheared is selling better, and prices have run up as high as 2 15, though some business has been done for less.

Wrought Iron Pipe.—Discounts are not questioned; business is booming in. Inquiries have just been received to-day on business for October delivery. The general reply from mill authorities is that there is as much business offering and to offer as they will be able to get rid of this year.

Nails.—The nailmakers think it is about time for them to share in the general improvement. Each one blames his neighbor for not showing a proper trade spirit to bring about an advance. The consumption, of course, continues on a large scale, for there is no diminution in building operations. Car lots have sold this week at \$1.90 and, we have been quietly informed, as low as \$1.80; store lots, \$2.

Sheet Iron.—The sheet mills are simply oversold

and no comments can add anything to the situation. It is learned that there are a few buyers who would like to come in and place large orders against the probability of a further advance, but the mill people are not soliciting remote business.

Plate and Tank Iron.—There is a considerable diversity in quotations; some mills are turning out orders at prices that look as though an advance had never been heard of, but there are special reasons for these exceptions. Old time customers with a large amount of business have managed to escape the slight advances which newer and irregular buyers have found it necessary to pay. Still it is correct to say that there has been a general advance; buyers have paid this week 2-20 for ordinary plate and tank; shell is still 2-40@2-50; flange 3-25, and fire box 3-75@4c. There is a good deal of new business going out for ship plate, much of which finds its way to Western mills.

Structural Iron.—The bridge builders who order in a large way have been able to buy thus far at reasonable prices, yet quotations are given by manufacturers at 2-15@2-20 for bridge plate, without shading. Orders for angles were placed this week at 2-10; tees are 2-60@2-70; beams and channels, 2-80.

Steel Rails.—Very little actual new business has been reported; quotations, \$28. It is intimated this week that some large orders will soon be placed; but at present writing there are no facts deserving of special mention.

Old Rails.—Seaboard lots have been offered all week without finding takers; the holders are on the warpath, and refuse to talk compromise; buyers expect to capture them at quotations as much as a dollar under their war prices; but no business has been done this week below \$24.50 delivered, and this is regarded as an exceptionally low price.

Scrap Iron.—The mill owners have been following the scrap dealers very closely, and the result now is that there is scarcely any scrap in our Philadelphia yards that is wanted. Car lots would bring \$21.50, and choice, \$22; cargo lots are \$21. Old car wheels, \$17.

Pittsburg, Aug. 22.

[From our Special Correspondent.]

Raw Iron.—Last week we reported an active and firm market, with prices on the up grade, and most of the traveling performed by buyers; since then there has been no abatement in the demand. The sales reported last week were the largest that ever were made since Pittsburg became a city; the reason they are not so large in this issue may be accounted for, first, many of the furnaces have disposed of all they were desirous of parting with at present; second, the price of coke is still an unsettled problem. Of course, those furnaces which have contracts for dollar coke are satisfied with the situation; at the same time, there are a large number of furnaces which are not so well situated, and will have to pay the market rates, whatever that may be.

The iron market must necessarily be unsettled until something is definitely known, whether coke will be \$1.25 or \$1.50 per ton. The entire outlook is becoming more and more favorable to the selling interest, and, although the output is enormous, it looks as though prices were bound for a higher level. It is certainly astonishing how persistently the English iron market is advancing week by week. Reports are the same, "firm and steadily advancing," yet production there is the heaviest on record. Comparing prices in Great Britain with prices current a year ago, we find Middlesboro pig 30 per cent., Bessemer, 25 per cent.; Scotch, 20 per cent. and ordinary bar iron 40 per cent. higher than they were at that time. From this it can be readily conceived we have nothing to fear from the other side. The argument that prices cannot advance materially, because of our immense capacity for production, does not therefore have much force.

The following sales make very interesting reading:

Sales.

| Coke and Coke Smelted Lake Ore. | |
|---|---------------|
| 5,000 Tons Bessemer, September and October. | \$ 7.75 cash. |
| 2,000 Tons Gray Forge. | 15.00 cash. |
| 2,000 Tons Gray Forge. | 15.00 cash. |
| 2,000 Tons Gray Forge. | 15.00 cash. |
| 1,500 Tons Bessemer at furnace. | 16.40 cash. |
| 1,500 Tons Gray Forge, September and October. | 15.25 cash. |
| 1,000 Tons Gray Forge. | 15.15 cash. |
| 1,000 Tons Gray Forge at furnace. | 14.15 cash. |
| 1,000 Tons Gray Forge. | 15.00 cash. |
| 1,300 Tons Mottled. | 14.00 cash. |
| 750 Tons Gray Forge. | 15.15 cash. |
| 500 Tons Gray Forge. | 15.15 cash. |
| 500 Tons Gray Forge. | 15.00 cash. |
| 500 Tons Gray Forge, all Ore. | 16.50 cash. |
| 500 Tons Gray Forge. | 16.25 4 M. |
| 500 Tons Gray Forge, all Ore at furnace. | 14.75 cash. |
| 300 Tons No. 1 Foundry. | 17.25 4 M. |
| 300 Tons No. 2 Foundry. | 16.25 cash. |
| Coke, Native Ore. | |
| 600 Tons Cold Sheet, Gray Forge. | 14.50 cash. |
| 300 Tons Cold Sheet, Gray Forge. | 14.15 cash. |
| 100 Tons White Iron. | 14.00 cash. |
| 100 Tons Gray Forge, all ore. | 16.00 cash. |
| 100 Tons No. 1 Foundry. | 16.75 cash. |
| 50 Tons No. 2 Foundry. | 15.50 cash. |
| Charcoal. | |
| 550 Tons Cold Blast. | 27.00 cash. |
| 150 Tons Cold Blast. | 27.00 cash. |
| 100 Tons Cold Blast. | 27.75 cash. |
| Muck Bar. | |
| 3,000 Tons Neutral, September and October. | 28.25 cash. |
| 2,000 Tons Neutral, August and September. | 28.00 cash. |
| 750 Tons Neutral, September and October. | 28.25 cash. |
| 1,300 Tons Neutral. | 28.00 cash. |
| Steel Wire Rods. | |
| 670 Tons American Fives. | 42.00 cash. |
| 500 Tons American Fives. | 41.85 cash. |
| 500 Tons American Fives. | 43.00 cash. |

| Ferro-Manganese. | |
|---------------------------------------|---------------|
| 200 Tons, 80 per cent. | 62.50 cash. |
| 300 Tons, 80 per cent. | 63.00 cash. |
| Bloom Ends. | |
| 700 Tons Bloom Ends. | 19.00 cash. |
| 500 Tons Bloom Ends. | 19.50 cash. |
| 350 Tons Special. | 20.60 cash. |
| Steel Slabs and Billets. | |
| 1,500 Nail Slabs. | 28.00 cash. |
| 1,000 Tons Billets. | 29.25 cash. |
| 750 Tons Slabs and Billets. | 29.10 cash. |
| 500 Tons Billets. | 29.00 cash. |
| Skelp Iron. | |
| 1,500 Tons Special bar, per 100 lbs. | 2.20 4 mo. |
| 750 Tons Special bar, per 100 lbs. | 2.10 4 mo. |
| 600 Tons Wide Grooved, per 100 lbs. | 1.90 4 mo. |
| 500 Tons Narrow Grooved, per 100 lbs. | 1.80 4 mo. |
| Old Iron Rails. | |
| 4,000 Tons American Ts. | 24.75 cash. |
| 1,000 Tons American Ts. | 24.85 cash. |
| Prices. | |
| Coke or Bituminous Pig— | |
| Foundry No. 1. | \$16.50@17.00 |
| Foundry No. 2. | 16.00@16.25 |
| Gray F. No. 3. | 15.25@15.50 |
| " No. 4. | 14.50@14.75 |
| White. | 14.00 |
| Mottled. | 14.00 |
| Silvery. | 13.50 |
| Bessemer. | 17.50@17.75 |
| Low Phos. | 21.50@22.00 |
| Charcoal Pig— | |
| Foundry No. 1. | 23.50@24.50 |
| Foundry No. 2. | 22.00@22.25 |
| Cold-Blast. | 25.00@28.00 |
| Warm-Blast. | 24.00@25.00 |
| 10 + 12% Speigel. | 30.00@29.00 |
| 20% Speigel. | 36.00 |
| Muck-Bar. | 28.00@28.50 |
| Steel Blooms. | 28.00@28.50 |
| Steel Slabs. | 28.00@29.50 |
| Steel Crp Ends. | 18.50@19.00 |
| Steel Bl. Ends. | 19.00@19.50 |
| Ferro-Man., 80%. | 62.00@63.00 |
| Steel Billets. | 28.50@29.00 |
| Old Iron Rails. | 24.75@25.00 |
| Old Steel Rails. | 18.00@19.00 |
| No. 1 W. Scrap. | 19.00@20.00 |
| No. 2 W. Scrap. | 17.50@18.00 |
| Steel Rails. | 28.50@29.00 |
| " light sec. | 29.00@32.00 |
| Bar Iron, nom. | 1.70@ 1.80 |
| Iron Nails. | 1.90 |
| Steel Nails. | 1.90 |
| Wire Nails. | 2.15@ 2.20 |

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, August 23

Heavy Chemicals.—No definite intelligence concerning the meeting of the English alkali makers has been received as yet, and it is still a matter of doubt as to whether anything has been effected. The foreign market, however, according to the latest cables, is higher, and this, together with the fact that the legitimate demand for consumption here has very materially increased, has contributed to give a much better tone to the market, and the feeling is apparently more sanguine than it has been for some months past.

There is some apprehension of a strike among the glass workers, which may deter the glass manufacturers from purchasing their supplies of carbonated soda ash as early as usual; but there is, nevertheless, a good demand, which absorbs about all that is offered. For 48 per cent. ash quotations range from \$1.20@ \$1.25 per 100 lbs. in a large way.

Caustic soda ash, 48 per cent., is also meeting with a ready sale. Transactions are reported at about \$1.20, which is a fair average quotation for round lots.

Caustic soda.—The price of this article was advanced in Liverpool fully 5s. per ton last Friday, just after our last report, and prices here during the present week have been correspondingly higher. For all the higher tests, \$2.25@2.30 is now quoted, but it is believed that sales have been made as low as \$2.20.

Bleaching powder as yet has not shared in the general improvement, and quotations remain at about \$1.70@1.75. The weakness has been due in a measure to heavy offerings on the spot, which sellers hope to be able to soon dispose of, and then it is trusted that an improvement in price will occur.

Acids.—The managers of the acid combination must be credited not only with some originality but with a keen perception of the weaknesses of human nature. At each of the semi-monthly meetings of the "combine" in the rooms of a well-known down-town club, a bountiful feast is provided, and it is said that when the manufacturers of acid, who for years past have been so bitterly antagonistic to each other, are under proper gastronomic influences, such a delightful feeling of generosity and harmony pervades the assemblage that no dissensions are possible. At Wednesday's meeting the question of prices was not discussed and quotations are therefore unchanged.

The formation of a combination, so far as can be learned, has not lessened the volume of trade. Consumers, so long as they are assured that the makers are presenting a solid front, and that no partiality is shown to any one, are apparently willing to pay schedule figures without objection. There are, of course, some exceptions to this, and a few buyers still do a little "shopping," and endeavor to secure concessions of some sort, all of which, according to manufacturers, is unavailing. Most of the works claim to be busy, and there are certainly no evidences that the recently noted expansion of the demand has been in any way checked. The prospects of the trade have undoubtedly brightened; whether they will continue to do so or not depends to a great extent on the actions of the manufacturers themselves. Prices remain as quoted last week.

Fertilizers.—Trade during the past few days has improved to a noticeable extent. With the fall season so near at hand, this is, of course, to be expected. Dealers are awaiting with considerable interest if not anxiety for some reliable and unbiased information concerning the condition of the crops, particularly in the South. There has been no appreciable change in quotations, which we continue as follows: Azotine, \$2.30; dried blood (city), low grade, \$2.25@2.30 per unit; Western high grade, \$2.35@2.37 per unit for ground material; tankage, high grade, \$24@25 per ton; low grade, \$22@23 per ton, as to quality. Fish scrap, \$23 per ton, f.o.b. factory. Sulphate of ammonia at \$3.05 per cwt. Refuse bone-black, guaranteed 70 per cent phosphate, \$19.50@21 per ton. Dissolved bone-

black is 92 1/2 c. @ \$1 per unit for available phosphoric acid, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, \$20.00 @ \$23.50; ground, \$25.00@26.50.

Charleston rock, undried, \$5.50 per ton; kiln dried, \$6.75 @ \$7 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, \$11, ex-steamer at New York. As will be noticed, prices for kiln-dried rock at the mines are decidedly firmer. This is probably due in a measure to the rumors that have been circulated regarding the reported absorption of all the South Carolina deposits by capitalists who may be able to hold values more firmly at higher figures.

Muriate of Potash.—The supply on the spot is still in excess of current requirements, and trade is rather slow. It is estimated by a generally well-informed dealer that there are from 1,000 to 1,200 tons on the spot held by various parties at the syndicate price of \$1.80 per 100 pounds.

Double manure salt, basis 48 per cent., is held at \$1.20 per 100 pounds on the spot, and \$1.15 for futures, for which a liberal inquiry is reported. High grade manure salt, basis 90 per cent. potash, is quoted on the spot at \$2.32 1/2 per 100 pounds. The syndicate price for futures is \$2.50.

Kamit.—In this market the inquiry continues light, and the week closes with no noteworthy features to record. Quotations continue at the official figures, \$10 per ton actual weight, and \$9.75 foreign invoice weight.

Miscellaneous.—Nitrate of soda continues in light demand at \$1.85. F. B. Nichols reports as follows on the 15th inst.: "The deliveries clearly indicate an increase of consumption. The arrivals are mostly shipped afloat, and a steady decrease of stock in store is a fact. Beside our exhibit there are about 3,000 bags now going out, which will appear in our next. The market has had a painful illness, but is convalescing and steadily growing stronger. The arrivals include the 'Stormy Petrel,' overlooked in our last. Valparaiso continues firm, but freights to the States have given way, and several charters were made at \$2.80@ \$2.85. The visible supply includes October and November shipment, but not the two leaking vessels in Valparaiso. For late shipment business was done in Europe in the fortnight at 9s., the parity of \$1.90, and it is not altogether unlikely that some of the vessels chartered for this side may be diverted. Shipments from the coast to all ports, August 1st, 432,000 tons, against 291,000 tons last year." Mr. Nichols' statistics show that the visible supply is 340,758 bags, against 297,833 bags at this date in 1888, and 257,300 bags in 1887. Arrivals during the fortnight aggregated 25,397 bags, and deliveries 45,721 bags, an encouraging comparison. The supply in New York, in store or afloat, has decreased from 84,682 bags on August 1st to 64,358 bags on the 15th inst. There are about 8,000 bags in Philadelphia and Baltimore.

NOTES OF THE WEEK.

The Boston Fertilizer Failures.—Judge Barrett, in the Supreme Court on Tuesday, ordered the publication of a summons in a suit brought by the National City Bank against Glidden & Curtis, of Boston, and the Pacific Guano Company. The bank officers say that drafts amounting to \$15,450 were issued by the Pacific Guano Company on Glidden & Co., and that the money due cannot be collected.

Phosphates.—It is reported from Alabama that the phosphates recently discovered on the line of the Central Railroad, near Meridian, Ala., have been tried on crops in that State with marked success.

A Soapstone Failure.—The Union Stone Company, No. 38 Hawley street, Boston, has made an assignment for the benefit of its creditors to Charles H. Tyler, expert accountant, of No. 113 Devonshire street. Mr. Tyler says he sees no reason why the company cannot pay dollar for dollar. Certain parties have been putting money into the company, but they declined to do so further, and the assignment was thus forced. The liabilities, exclusive of the \$100,000 capital stock, are about \$37,000; nominal assets, \$103,000. John M. Little is president of the company, which manufactures artificial soapstone, employing thirty hands, at its works in Everett.

Sulphur in Sicily.—The British Consul at Palermo states that the exports of sulphur from that port increased somewhat last year; but the chief export is from Catania, Girgenti and Licata. Mr. Vice-Consul Franck, of Catania, who has paid special attention to the sulphur trade, notes in his report that this line of business has never reached such a point of depression and of dullness as at the present moment. The returns of the other Vice-Consuls of Girgenti and Licata all denote a stagnant condition of the trade, notwithstanding that there has been a rise in price. The bad condition of trade is partly attributable to the great deficiency of capital in Sicily, both in working the mines and in regulating the sulphur market, which is entirely at the option of the very few speculators who can dispose of means, and impose their terms on the producers who are hard pressed for money.

English Chemicals.—The following from a London contemporary on the state of the chemical market at Newcastle is by no means encouraging. Under date of August 7th, three weeks ago, it says: "The stocks of bleaching powder have increased by 520 tons since last month, and the value of this product, in consequence of what is considered to have been an unsatisfactory termination of the Association meeting at Liverpool on the 27th ult., has fallen something like 10s. per ton. Some of the makers are much in want of orders. Caustic soda is in small demand, and the manufacturers of this article are only partially employed. Crystals of soda are scarce, and the supply is hardly equal to the demand. Ash meets with no inquiry. Refined alkali is quiet, and only first-class

brands are wanted. The Newcastle Chemical Works Company are making progress with their sulphur recovery plant, which is being erected on land adjacent to their chemical works, Gateshead."

Liverpool. Aug. 14. (Special report by Messrs. J. P. Brunner & Co.)

Chemicals.—Although there is not a large business passing in chemicals, stocks are light at the moment, and, with no pressure to sell, prices are steady.

Soda Ash.—There are few orders reported from America, but rather more business doing for other quarters, and in some cases slightly higher prices asked. We quote: Caustic ash, 48 per cent., 1 1/2 d. to 1 1/4 d.; high test, 1 1/2 d. to 1 1/4 d. Carb. ash, 48 per cent., 1 1/2 d. to 1 1/4 d.; high test, 1 1/2 d. to 1 1/4 d.

Soda crystals are held for £2 10s., and most makers are well sold for this month.

Caustic soda shows a further improvement, and there is little offered for prompt and August delivery; in fact, buyers do not find it easy to fill orders for delivery this month. We quote to-day: 60 per cent., £5 17s. 6d. to £6; 70 per cent., £6 15s. to £7; 74 per cent., £7 10s.; 76 per cent., £8 to £8 5s.

Bleaching powder, although still quiet, is in small compass as regards hardwood. Sales have been made for the States to-day at £6 17s. 6d. to £7, and there are few sellers. Owing to the difficulty in getting hardwood shooks, most makers are packing in softwood casks, and this accounts for the firmer feeling for hardwood.

Chlorate of potash has eased off a little, and business is reported at 4 1/2 c., although most sellers still hold for 4 1/2 up to 5 c., according to their position.

Bicarb. soda, in demand, at £4 12s. 6d. to £4 15s. per ton for one cwt. kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia is better, and £12 per ton is now lowest price for good grey, 24 per cent f.o.b. here.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Aug. 23.

Two new structures of importance are now attracting the attention of building material men. One is the great Amusement Amphitheatre to be erected on the site of Madison Square Garden, and the other is the fine new building projected by the Central Railroad of New Jersey on the corner of West and Liberty streets. Later on Andrew Carnegie's proposed build-

ing on Fifty-ninth street will require a large amount of material.

Bricks.—There has been less brick here this week than last. The storms of a few weeks ago, which either stopped production or "washed" the brick, are now beginning to have some effect on the market. Not much washed brick has been received as yet, but the decrease in the accumulation of good and medium qualities has been felt, and during the week the demand has also been of larger proportions. The tone of the market has, therefore, been somewhat improved. Prices, however, are unchanged. Exceptionally fine qualities of Haverstraw brick are held at \$6.25 per M., but the current inquiry has been principally for medium grades of either the Haverstraw or Upriver products, at prices ranging from \$5.25 to \$6. Jerseys are held at \$4.50 to \$5.25, and Pale at \$3.25 to \$3.75 per M.

Cement.—Trade is still rather quiet. Foreign Portland is in light demand at \$2.25 to \$2.40, with \$2.45 to \$2.75 asked for special brands. Saylor's American Portland is moving a little more freely at \$2.15 to \$2.40, according to quantity. Rosendale is meeting with a seasonable demand at 90c. to \$1.10, according to brand. There are those who believe the day is not far distant when a combination of the cement makers of the Rosendale field will be effected.

Slate.—The most noteworthy change in this market since our last report has been a falling off in the demand for sea-green slate and the Vermont Slate Trust, finding that over-production is threatened, have decided that the output of thirty of the quarries included in the trust will be reduced to two-thirds after September 1st. Black slate is still in good demand, however, and in this line at present over-production is not even remotely feared. Pennsylvania black is quoted at quarries at \$4.00 to \$4.75 per square, according to size; Vermont sea green, \$2.25 to \$2.90 at quarries; unfading green, \$3.00 to \$3.65 at quarries, and red, \$5 to \$10 per square.

CONTENTS.

Table listing various articles and their page numbers, including 'The Dry Ore Mines are Paying the Piper', 'Major Powell on Storage Reservoirs', 'The Copper Combination', etc.

Table listing 'Vacation Notes from Northern New York' and 'Is a Faulted Fissure Always the Oldest?—A Study of Faults', with page numbers.

Table listing 'MINING NEWS' and 'FOREIGN MINING NEWS' for various states and countries, including Alabama, Arizona, California, Colorado, etc.

IMPORTS AND EXPORTS OF METALS AT NEW YORK AUGUST 10, TO AUGUST 17 1889, AND FROM JANUARY 1.

Large table with multiple columns detailing imports and exports of metals (Iron, Steel, Copper, Lead, Zinc, Tin, etc.) for various companies and time periods. Includes sub-sections for 'SHEET IRON', 'STEEL SHEETS, BILLETS, FORGING, ETC.', 'COPPER', 'LEAD', 'ZINC', 'TIN', 'IRON ORE', 'SCRAP IRON', 'CHARCOAL IRON', 'SHEET ZINC', 'SPEIGELZEISEN', 'IRON ORE', 'DE FLORES', 'EARNSHAW', 'LAWRENCE, JOHNSON & CO.', 'COPPER MATTE', 'COPPER ORE', 'BURGASS & CO.', 'WILMS, TERHUNE'.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS, DIVIDENDS, and NON-DIVIDEND-PAYING MINES. Includes entries for Adams, Alice, Almas, etc.

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$875,000 in eleven dividends, and the Terra \$75,000. ¶ Previous to the consolidation in Aug. 1884, the California had paid \$31,390,000 in dividends, and the Con. Virginia, \$240,000. ** Proceeds to the consolidation of the Copper Queen with the Atlanta, Aug. 1885, the Copper Queen had paid \$1,350,000 in dividends. †† 1,500,000.

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

Main table of New York Mining Stocks Quotations, listing various mining companies and their stock prices across multiple dates from August 17 to August 23, 1889.

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities. ‡Assessment unpaid. Dividend shares sold, 21,646. Non dividend shares sold, 37,891. Total New York, 59,537.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing various mining companies and their stock prices across multiple dates from August 16 to August 22, 1889.

Boston: Dividend shares sold, 5,744. Non-dividend shares sold, 2,743. Total Boston, 8,487.

COAL STOCKS.

Table of Coal Stocks, listing various coal companies and their stock prices across multiple dates from August 17 to August 23, 1889.

*Of the sales of this stock, 14,781 were in Philadelphia, and 69,630 in New York. Total sales, 141,849.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing various mining companies and their closing stock prices from August 16 to August 22, 1889.

STOCK MARKET QUOTATIONS.

Table with columns: COMPANY, Bid, Asked. Includes Baltimore, Md. and Birmingham, Ala. sections.

Birmingham, Ala.

Table with columns: COMPANY, Bid, Asked. Lists various Birmingham companies and their stock prices.

Prices bid and asked during the week ending Aug. 22d, 1889.

* Bonds. † First mortgage. ‡ Second mortgage.

Kansas City, Aug. 13.

Table with columns: Company, Par value, Bid, Asked. Lists Kansas City companies and their stock prices.

Pittsburg, Pa.

Table with columns: COMPANY, H, L, Closing. Lists Pittsburg companies and their stock prices.

Sales during the week ending Aug. 22.

West. Electric. 55 shs. \$52 1/2 @ \$52 3/4

* Actual selling price. † Ex-dividend.

St. Louis, Aug. 14.

Table with columns: Adams, American & Nettie, Anderson, etc. Lists St. Louis companies and their stock prices.

Table with columns: Pine Grove, Idaho, Queen of the West, etc. Lists Idaho and Arizona companies and their stock prices.

Auction Sales of Stocks.

The following securities were sold at public auction in New York this week:

3,220 shares New York Mexican Mining Co. \$5

500 shares Gilpin Consolidated Mining Co. \$2

Electric Stocks. Aug. 23.

Table with columns: Brush, Daft, Consolidated, etc. Lists electric stocks and their market prices.

Trust Stocks. Aug. 23.

Table with columns: American Cattle Feeders, American Cotton Oil, etc. Lists trust stocks and their market prices.

During the week ending Aug. 23d the following sales were made at the New York Stock Exchange:

Table with columns: American Cattle Feeders, American Cotton Oil, etc. Lists sales from the New York Stock Exchange.

Foreign Quotations.

Table with columns: London, Paris, etc. Lists foreign quotations for various commodities and stocks.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Table with columns: Acid-Acetic, Muriatic, Nitric, etc. Lists chemical and mineral prices.

THE RARER METALS.

Table with columns: Aluminum, Arsenic, Bismuth, etc. Lists prices for rarer metals.

Soda Ash-Carb.

Table with columns: Soda Ash-Carb., Soda Caustic, etc. Lists prices for soda ash and caustic.

BUILDING MATERIAL.

Table with columns: Bricks-Pale, Jerseys, etc. Lists prices for building materials.

THE ENGINEERING AND MINING JOURNAL will thank

any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.