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The opinion expressed in these pages last week that the free coinage legislation "is probably dead beyond resurrection," has been confirmed by the defeat of the Stewart bill in the House. We shall hear no more of it in this session, and before the next commences we trust our Western silver miners will see the fact that nothing else that could possibly happen would so injure and depress the value of silver as the adoption of free coinage here without the co-operation of other nations.

The Palmarejo Mining Company, Limited, may be cited as an example of how not to work a mine. The company owns mining property in Western Chihuahua and was launched on the London market in 1886 by promoters who had made an unfavorable record in the Eberhardt mines of Nevada. These promoters received £200,000 cash and £100,000 of fully paid stock, of which the owner is said to have received less than \$500,000. The mines were not new; they had been examined many times by American engineers, who had refused their purchase for less than \$300,000. However, the English company was persuaded by the glowing report of its experts, not only to buy the mine, but to subscribe a working capital of £100,000. It was determined to build a mill, but when the ground was examined it was found that it would have to be located some 30 miles from the mine, where water could be obtained. This was apparently unexpected, and as the ore would not bear transportation expenses if carried on mules, the building of a railway was suggested and £150,000 was subscribed to the Mexican Mineral Railway, the Palmarejo Company guaranteeing the new company 7 per cent. interest on its bonds and an 8 per cent. stock dividend. The railway was commenced, as was a water ditch, and the construction of the mill was resumed. Soon the latter was stopped for lack of funds and the company had to issue debentures amounting ultimately to £150,000 before it could be completed. These were subscribed to by the stockholders, who were receiving favorable reports of developments in the mine. Finally the auspicious day came last April, when the railroad was completed, the mill built and the ditch ready for the water, when unfortunately for the patient English stockholders who had subscribed £600,000 in anticipation of success, there was enough water to run five stamps only, and of course, as funds are exhausted, there are further calls for money. The railroad itself was a complete failure, a fact that caused no surprise to any one who had seen it, for its grades were so heavy that it required two locomotives to haul one car of ore.

During this time the company had no less than three general managers and scores of subordinates. The promoters claimed an average value of \$30 per ton for the ore, which is just about double the estimates of many responsible experts. The prospects of the mine ever paying its debts, or the stockholders ever getting anything are extremely remote. If English investors in general would profit by this expensive lesson, it might be some satisfaction to those who had lost their money to feel that it was a philanthropical investment for the good of their fellow countrymen. Unfortunately, however, the crop of fools is perennial, and the supply is never exhausted. Or, to put it less brutally, the English investors in mines display an amount of blind unquestioning faith which if better directed would surely secure the canonization of a large proportion of Carlyle's "forty millions."

THE MEXICAN TAX ON LEAD BULLION—OUR OPPORTUNITY.

The Mexican Government propose placing a tax of 1/2 per cent. *ad valorem* on the lead bullion produced by the various smelting works in the Republic which has heretofore been free. It seems as if such action would be a great mistake on the part of our sister republic after inviting and stimulating the removal of smelting plants from this country, and the construction of others by the absence of taxation. It would injure what is becoming one of Mexico's most important industries, not so much through the weight of this tax, but through the fear of capitalists that at any time the tax might be arbitrarily increased.

On the other hand, if our government should repeal the stupid and injurious tariff on lead ores and admit them free, this Mexican tax would aid us in undoing the mischief we have done to our smelting and mining industry, and possibly might bring back some of the smelting business to this country that we drove away. It is now well established that the increase in the smelting charges on dry ores, that is on the greater part of the ores produced in this country, has averaged about \$2 a ton. This is the price our silver ore miners are paying for the foolish exclusion of Mexican lead ores at the dictation of a few owners of lead mines in Colorado.

Smelting and refining works are now to be established in British Columbia, because our market is closed to their ores. The net result of that brilliant piece of statesmanship, which the Western papers so fervently advocated and so unanimously abused the ENGINEERING AND MINING JOURNAL for opposing, has thus been the building up of rival metallurgical industries in Mexico and Canada and the imposition of an increased smelting charge or tax on all our dry ore miners of \$2 a ton, without any compensating advantage in any direction. It is true the Western miners and newspapers have generally, though tardily come to a knowledge of these

facts. They should now with one voice call for the abolition of the tariff on foreign ores, and undo as far as possible the injury they did to their constituencies.

THE FACTOR OF LOCAL CONDITIONS IN MINING OPERATIONS.

Many experts base their estimate of cost from the results of well known mines, operating under advantageous conditions. Local conditions, however, vary so greatly that such estimates may omit or greatly undervalue elements of cost dependent on local conditions for their value.

To instance a few cases: In Zacatecas, Mexico, it was proved after exhaustive experiments that to the depth of 150 meters it was far cheaper to use a *Malacate* or Mexican horse whim than a steam hoist, either for hoisting ore or bailing water. The prices of corn and coal were the controlling factors in this decision. Again, in the same locality it is far cheaper to work by the old Patio process than by pan amalgamation, for not only does the former process give a higher extraction but the costs are lower and the bullion finer, and the latter is no unimportant matter in existing Mexican metallurgy, and again, even after the establishment of central reduction works in Mexico, it is cheaper to work ores of less than 40 oz., by the Patio process per ton than to ship them.

This is a special case in Mexico, but there are others in this country which are harder to explain. At the mines of the De Lamar Mining Company, Limited, in Idaho, the cost of reduction by the free milling pan amalgamation process has been \$7.60 a ton in a 30-stamp mill, whereas on the Comstock with a more rebellious ore, the cost has averaged during some years less than \$4.00, and this is true in other localities, such as the mines of Butte, Mont., where the Alice Mining Company in 1891 milled by dry crushing and chloridizing roasting 39,000 tons at a cost of \$5.94 a ton, and where the Blue Bird's average cost was about \$7.00 a ton, opposed to a cost of \$8.93 a ton at the Ontario mill of the Ontario Mining Company, of Park City, Utah, where labor was the same and supplies much cheaper. The mills were of the same type and of the same age. It is difficult to explain this difference in cost. Much beyond the reach of any set formula as in the latter case, nearly all the factors would be less and the result lower, entirely in discordance with actual results.

When the field is gone over from South America to British Columbia, and from China to the Transvaal, it will be found that costs differ, unaccountably, that calculations made from a foreign standpoint are deceptive and that a thorough acquaintance with the locality itself is necessary for the engineer to predict either cost or profit with any certainty.

THE TYRANNY OF SOME LABOR UNIONS.

The success of the striking millmen at Homestead, Pa., who undertook to control absolutely the works of the Carnegie Company and opposed, forcibly, the entrance of watchmen sent by the company to guard them, found a prompt echo in the mountains of Idaho, where the striking miners' union men attacked and murdered a number of non-union workmen, blew up with dynamite the concentrating mill that was being run by non-union workmen, and threatened to drive every non-union workman from the entire Cœur d'Alene district.

The State troops in Pennsylvania were promptly called out in such force that the Amalgamated Association strikers found it prudent to offer no resistance, and the works are now again in possession of their owners, and no doubt will soon be in operation by non-union workmen.

In Idaho the national troops had to be sent to quell the riot, and, under their protection, the mines and mills will soon be at work with non-union men.

The labor unions that attempt to prevent men who do not belong to them from earning their living, and that act as tyrants, with power of life or death over those who do not agree with their decrees, are the worst enemies of the workmen, and are out of place in a free country. They had better emigrate in a body to some country where they can force everyone into their union, decree ten dollars a day of five hours as the minimum wages, and enforce it—until they starve. They will, of course, have no hated employers of labor there, and no industries.

In this country every man has an "inalienable right to life, liberty, and the pursuit of happiness," and any body of men seeking to take away these rights is as much a tyrant, and a traitor to free institutions, as would be a dictator who should seek to establish slavery both of whites and blacks in this country. Such attempts at tyranny by labor unions invariably destroy the union and leave the workmen worse off than they were before.

Labor unions are desirable for the protection of the weak, and when conducted with moderation and wisdom can, and often do, secure a recognition of their rights. Witness the association of locomotive engineers, which has secured many important advantages for its members, and is held in respect by employers. The ENGINEERING AND MINING JOURNAL favors such unions; but, in the interests of the workmen, it utterly condemns such exhibitions of tyranny and brutal instincts as have recently been shown in Idaho and in Pennsylvania.

SHALL THERE BE A ROAD EXHIBIT AT CHICAGO?

Mr. ALBERT A. POPE, of Boston, has issued a vigorous circular on the above subject, entitled "An Open Letter to the People of the United States," and concluding with an appeal to the press of the country for such an agitation as will arouse public attention to the importance of good roads. I have no doubt that the ENGINEERING AND MINING JOURNAL will gladly lend its columns to the profoundly important cause of good roads; and whether agitation at this late day be likely or unlikely to effect the immediate end desired by Mr. POPE, it is timely now, and will be timely always, until the needed reform shall have been secured.

Mr. POPE first declares that the Columbian Exposition will offer an unequalled opportunity to teach our people the great need, and the best means, for the construction and maintenance of good wagon roads. He then shows that the present classification of exhibits does not permit the grouping together at any one place of illustrations of the methods, machinery, tools and accessories of road making; that fences, "road construction," plows, rollers, stump extractors, traction engines, apparatus for road making and excavating, samples of wood for paving, timber prepared to resist decay, etc., are scattered in various classes over the thirteen acres covered by the Agricultural Building and its annex; that asphaltic compounds, natural and artificial stones and cements, rock breakers, sieves, sizing appliances, etc., must be sought here and there in the 56-acre building of Mines and Mining; that street rollers, sweepers and sprinklers are in the Machinery Building (15.8 acres); that systems of drainage, wheelbarrows, carts and sprinkling-carts are in the Transportation Building (14.4 acres, including the annex); and, finally, that the 30.5 acres comprised in the vast building devoted to Manufactures and Liberal Arts are to contain somewhere the exhibits of conduits of water and sewerage, drains and sewers, construction and maintenance of roads, streets and pavements, bridges and working plans for paving and draining. "In other words," says Mr. POPE (referring to a person "interested in the subject and endeavoring to learn what he can as to the best methods and machinery to be used in the building of a highway"), "he finds that he must visit five enormous buildings, having with their annexes an aggregate area of 79.3 acres." Before offering any comments upon the situation thus described, I will complete the summary of the contents of this "Open Letter."

In February, 1892, Mr. POPE wrote to Director General DAVIS, urging, in view of the importance of a comprehensive exhibit of improved roads and road-making machinery, that portions of roads adjacent to the Exposition should be constructed on different approved European and American systems; that cross-sections of these roads should be exhibited, together with all materials, machinery and appliances (including stone-crushers, rollers, sweepers, sprinklers, etc.); that this should be done in a separate building, devoted to Road Construction and Maintenance as a distinct department; and that an association should be formed to defray the expense and secure the success, of such an exhibit. Finally, Mr. POPE offered to contribute \$1,000 to such an object.

His communication having been referred to Dr. S. H. PEABODY, chief of the Department of Liberal Arts, was answered March 11, substantially as follows:

After forcibly expressing his own sense of the importance of the subject, Dr. PEABODY points out that road construction appears twice in the adopted classification of the Exposition: once in "Liberal Arts," as a group under "Civil Engineering;" and again in "Agriculture," as a group under "Farms and Farm Buildings." He thinks the latter would be the appropriate place for an exhibit having for its main purpose the enlightenment of the farmers especially, but offers to find room in the Liberal Arts, if desired, for a limited display, comprising statistical charts, diagrams and photographs of good and bad roads, and of machinery, sections showing different constructions, and printed matter for distribution. The establishment of a separate new Department of Road Construction with a house, grounds and a collection of machinery, is pronounced to be impracticable.

Notwithstanding this partly discouraging, though not unsympathetic, reply, Mr. POPE concludes his "Open Letter" with the assertion that there is still, before the opening of the Exposition, May 1, 1893, ample time to erect a suitable building and carry out his comprehensive plan; declares that every State ought to contribute cross-sections of roads, and that examples of country road bridges should also be shown; appeals to the press to agitate the subject; and predicts that, when its importance is once realized, "it will become one of the leading issues of the time, far transcending in practical importance the tariff, silver coinage, or Republican or Democratic rule."

If by this peroration Mr. POPE means that the construction of wagon roads throughout the country ought to be, and will be, considered a legitimate function of the Federal Government, I cannot agree with him. Nor do I see how the subject can become an issue in politics, as the tariff and the silver coinage are. Beyond question, bad roads occasion to the people of this country an annual and irreparable loss in unnecessary labor, time and repairs, and in the consequent reduction of profits upon

products sold and enhancement of cost of articles purchased, far exceeding the injury inflicted by any financial system, even as estimated by its opponents. For as everybody, both in and out of Wall Street, agrees, the primary factors of prosperity are production and transportation. Nobody dreams that floods, droughts, grasshoppers and other causes of deficient harvests, will fail to produce corresponding business depression, or can be counteracted by legislation. But bad roads are, in their effect, like bad crops. Whether a man spends so many days of fruitless labor upon a field which yields him nothing, or whether he lets that field lie idle, and spends the same number of days in the extra time required for hauling slowly and in small loads, over rocks and through mud, the product of another field, is all the same in the end. But this does not make it the duty of the Federal Government to mend his roads for him. The States, counties and towns are the proper agencies for the needed reform, and they must be stimulated and supported by a more enlightened public sentiment than now exists in the rural districts. For arousing such a sentiment, Mr. POPE is quite correct in his belief that the Chicago Exposition will offer an excellent opportunity. It is not pleasant to discourage him in any part of so laudable a purpose. Nevertheless, even the sincere wish to assist him dictates the frank advice that he should abandon his larger scheme, and devote his energy to the modest but practicable plan suggested by Dr. PEABODY. If Mr. POPE had visited Chicago and had gained a clear conception of the magnitude and complexity of the vast system approaching completion there, he would realize that it is now too late to propose new departments and buildings, or to change the classification already determined.

Moreover, while the separate exhibit which he conceives would undoubtedly be, as an addition to those already provided, interesting and instructive, I do not think it would be desirable as a substitute for them. In other words, while a person "interested in the subject," as Mr. POPE says, would be glad to find in one place everything connected with it, a collected exhibit of that sort would fail to impress persons not interested in the subject, for one simple reason, if for no other: namely, such persons would not go to see it. At all events, the number of unlearned visitors who would deliberately visit a building devoted to road-construction would be but an infinitesimal fraction of the millions who would pass, in one of the larger buildings, an exhibit which might arrest their attention. Especially for the vitally important end of instructing farmers and villagers, a limited and incidental exhibit is even more likely to be effective. This is notoriously the class which now needs to be aroused to the value, and convinced of the economy, of good roads. And one of the cardinal difficulties in the case is the general impression among such people that good roads must necessarily be very costly and elaborate, and that they constitute, therefore, a luxury which only dense or wealthy populations can afford. Take, for instance, a shrewd farmer, quite willing to drive over a smooth highway, but not satisfied that he can afford, for the sake of such a convenience, to pay in money a heavy road-tax, instead of "working out" a light one; and suppose him to be introduced into a comprehensive exhibition, such as Mr. POPE proposes. I repeat, that I wish the plan were practicable, for it would be worth its cost, if only as a formal recognition of the fundamental importance of this subject. But as a means of impressing favorably our supposed farmer, I must doubt its efficacy. The great assemblage of artificial stones and concretes; the steam machinery; the conduits and sewers; the various pavements—in short, all the paraphernalia of street engineering, entirely inapplicable to country roads, would rather hinder than help his appreciation of whatever there might be in the same collection, calculated to recommend to him reforms practically within his reach. A few simple sections and graphic illustrations, together with printed documents which he could carry away and study, and which would show him what can be done with profit by him and his neighbors, would influence him more than such a display.

After all, for the purpose of impressing upon the ignorant public the importance of good roads, the exhibition of the methods, machinery and details of construction is not the great need. Such an exhibit addresses itself chiefly to engineers. It is only up to a certain point that we want to teach farmers how to make their own roads. That degree of education it is indeed highly important to give them; but it does not require familiarity with more elaborate and costly operations. When that point has been reached, the desirable thing is not that the farmer shall be a road engineer, but that he shall be wise enough to know the advantage of having permanent highways constructed by experts and paid for out of the treasury to which he contributes his share in taxes. It is really political, rather than engineering education, that he needs. We hear a good deal, especially from organizations claiming to represent the farmers, of the desirability of government control of railways. Upon the inquiry, what sort of management would probably result, some light may be gained from the picture presented by our country roads, which are everywhere in charge of officials elected by the people, directly responsible to their constituents and peculiarly obedient to public sentiment. The spectacle is not encouraging to the advocates of further experiments in state socialism. Until the people of this country, through their local

governments, can produce wagon-roads over which it is possible to drive more than an average six miles per hour, and to haul freight at better rates than 20 cents and upward per ton-mile, one would rather not trust them to administer, through more distant agencies, the far more difficult operations of continental transportation.

To return, in conclusion, to Mr. POPE's letter, his feeling is patriotic; his views are sound; his object is profoundly important; I hope he will succeed in accomplishing much, and I think he will be more likely to do so if he does not attempt too much.

R. W. R.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

A New Wyoming Clay.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I send you a sample of clay which can be loaded in car-lots at \$5 per ton. An analysis gave: SiO_2 , 59.78%, Al_2O_3 , 15.10%, FeO , 2.40%, CaO , 0.73%, MgO , 4.14%, and water 16.26%. Later analysis showed 16% to 23% of Al_2O_3 . I want to know its name, if it has any, and for what it can be used. A number of cars have been ordered for New York, Chicago, San Francisco, Philadelphia and other points, but we can get no information as to its value or use. Correspondence with users of clay, accompanied by samples, have elicited no information other than that it is of no use in their business. It was at one time mined and sold as mineral soap. Could it be used in adulterating soap? It dissolves readily in water. Other subscribers as well as myself are interested and we desire your opinion.

LARAMIE CITY, Wyo., July 3, 1892.

W. H. ROOT.

[This clay differs from any other that we are acquainted with. Dana describes a clay called Mont Morillonite which softens in water, and has a composition analogous to that of the Wyoming sample, but we do not believe them to be identical. The sample sent us is distinguished by forming a jelly with water, which would indicate the presence of gelatinous silica and alkaline silicates. It might be used for making scouring soap, and it ought to be of value for glazing in the manufacture of pottery. Correspondence is invited from those interested.—Ed. E. & M. J.]

An Alkali Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I notice in a recent issue of the *Zeitschrift für angewandte Chemie* a patent for manufacturing alkali, which commends itself by its simplicity and evident cheapness. "The chloride is melted in an apparatus constructed on the principle of a converter and treated with hydrogen gas. Sodium oxide is obtained in accordance with the formula $2 \text{NaCl} + 2\text{H} + \text{Co} = \text{Na}_2\text{O} + \text{C} + 2\text{HCl}$."

"From the residue of Na_2O and C, metallic sodium can be obtained by continued heating.

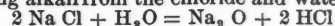
"By oxidation of the carbon, anhydrous soda can be obtained or by dissolving in water and evaporating, caustic alkali is left."

It is an English patent, No. 4,661. Can you give me any information concerning it?

L. J.

NEW YORK, July 13, 1892.

[As a mere matter of equation, the manufacture of alkali from common salt by passing hydrogen gas and carbon monoxide through the fused mass is a pretty one, but we do not believe it any more feasible than that of making alkali from the chloride and water vapor, thus:



Many of these things can be performed in the laboratory but commercially they don't pay.—Ed. E. & M. J.]

Plain vs. Corrugated Belts.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the article on "Plain and Corrugated Belts" for vanners in ENGINEERING AND MINING JOURNAL for July 2d, the abstractor does not give sufficient data to admit forming an opinion as to the value of Mr. Pfordte's tests. If he ran the pulp from five stamps on to one plain belt vanner and compared the results with a like test upon one corrugated belt, he overloaded the former, giving it double the amount of work ordinarily expected of it. In practice one corrugated belt or two plain belts are expected to handle the pulp from five stamps; and although the single corrugated belt will not give as good results either in cleanness of concentrates or low value of tailings, it is quite commonly put into small mills where the cost of plant must be kept at the lowest possible figure.

The writer is familiar with the results of a long series of tests of these two belts, made at the Treadwell mill, Alaska, where throughout one-half the mill the pulp from five stamps was divided and run over two plain belt Frues, while in the other half the same amount of pulp was run over one corrugated Frue belt. These tests were extended over more than a year's time, and were made with extreme care and on such a large scale that no errors of sampling could interfere; and the results were so conclusive that the company finally put in 24 new machines, and fitted with plain belts both these and the 24 formerly supplied with corrugated belts, giving them 96 vanners for the whole 240 stamps.

The ore treated at this mine contained approximately 90% quartz, 7% lime and 3% of pyrites of iron; and assayed from \$3.00 to \$6.00 in gold.

From the corrugated Frue belts were obtained concentrates of 80 to 85% pyrites and 15 to 20% gangue.

From the plain belts were obtained concentrates of 90% or over of pyrites and 10% or less of gangue. The total gold contents of the concentrates from the half the mill fitted with corrugated belts averaged 3 to 6% less than the output of the plain belts, being about one-third the total output of the mine. The tailings from the corrugated belts invariably ran from 20 to 50% higher than those from the plain belts,

One point very much in favor of the plain belts where clean concentrates are desired is, that the concentrates at the upper end of the plain belts can at all times be examined closely, and the machine kept in careful adjustment; while the degree of clearness of the concentrates in the corrugations cannot be easily determined until they are shoveled from the box to the car.

GRANITE, Mont., July 8, 1892.

Mining in the Republic of Colombia.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Hydraulic mining is in a bad way in the Department of Tolima. The following is a list of the principal companies which have operated here:

American companies: The Colon Gold Company, amount of capital unknown; Las Casas Gold Company, of capital unknown—say for both, \$1,000,000; Talento, \$1,000,000. English companies: Colombian Hydraulic (third company which has worked the mine), \$375,000; Orita, \$150,000; Gravel Gold, \$500,000; Tetuan, \$1,000,000; Colon, \$1,000,000; Tesoro, \$1,000,000; Lona, \$1,500,000; Saldaña mines, \$150,000. Total, \$7,675,000.

Of this large amount of nominal capital only about \$250,000 has been spent in original purchase, and about \$600,000 in ditches and equipment, the remainder being "water." The total product of these two mines up to date is approximately \$800,000, of which Colombian Hydraulic is responsible for some \$600,000. With the exception of this latter, and possibly Orita, there is not the shadow of a chance for any of them, under the most favorable circumstances, paying an appreciable dividend on the absurd amounts of their capitals. The properties for the most part are fairly good ones, and if worked on legitimate lines, by men who have knowledge and experience of hydraulic mining, they would do credit to the country. As it is they have no chance. Most of the managers have served their apprenticeship to those who have learned all they know on the subject in this country. There is not at present one experienced Californian miner here, and add to this the fact of the enforcement of the law with regard to the pollution of rivers, which has had the effect of shutting down some of the mines, it will be gathered that, as above stated, hydraulic mining is in a bad way here.

Interested parties are hoping that the movement in the States with the view to a resumption of hydraulic mining in California will have the effect of inducing Colombia to alter this (to miners) obnoxious law, but as a matter of fact there is nothing analogous in the conditions. In California mining first occupied the field, and should have, within reason, rights of priority. Here the priority of the respective industries is reversed. Moreover, the laws with regard to the pollution of rivers was in force before the mines now shut down—Colon and Tetuan—commenced operations, and the promoters and managers, if they were not aware of the fact, ought to have been. After all, there is nothing unfair about this law. It simply provides for compensation to the land owners. A few thousand dollars would put the above quoted mines into operation, and this would be a far more advisable course than that adopted under the cry of blackmail, etc., especially if the properties are one tithe as rich as the promoters represented them to be.

The only two mines of the above list that have done anything are Colombian Hydraulic and Orita. The former has seen its best days, and the latter has not paid running cost for some time.

There is nothing doing at Talento. The property is apparently abandoned, though reputed to be a good one.

No work has been done at Bocaneme and El Cristo for some time. These stocks, it will be remembered, were floated some time ago in New York with a great flourish of trumpets, by Asbury Harpending. The mines are undoubtedly first rate, and the suspension of work is a mystery. In my next I propose giving a description of these properties.

A little gold quartz mining is being done in the Orgarus and Ibagué districts, but with indifferent results.

The Tolima Company's mines at Frias are doing splendidly. Mr. John C. Randolph, E. M., of 35 Broadway, who acted as Government Mines Commissioner here in 1887, speaking of this mine in his report stated: "This is the most important mine not only in Tolima, but perhaps in the Republic." Recent developments have borne out Mr. Randolph's opinion. At the North Tolima Company's Calamonte Mine some good mineral also is being extracted. From these two mines the manager estimates that about one million ounces of fine silver will be produced during the current year, the cost of extraction being about 25 cents per ounce. Exchange on New York, 100% premium.

HONDA, June 2, 1892.

COLOMBIA.

Spartanburg, S. C., Gold Fields.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Mining operations in the Spartanburg gold fields are now attracting a local interest, both the business talent and conservative men being interested in the new developments. A brief description of the locality, its placer mineral deposits and prospects will prove of interest.

In the early part of February last I was engaged in professional work for the Wolfe & Tyger Mining Company, and embraced the opportunity to examine and compare the geological features of the placer deposits of this place with those previously observed in this section.

The Wolfe Creek and Tyger River Gold fields, the present center of attraction, are situated 18 miles northwest of Spartanburg, S. C., and comprise several thousand acres of land, on which auriferous gravel deposits have been found, and in some instances extensively worked, according to the crude and desultory methods obtaining thirty or more years ago. Such work paid handsomely, however, as \$1 per day per slave was considered low. In addition to the placer deposits, a number of gold-bearing veins have been discovered carrying high-grade ores—from \$30 to \$300 per ton, no selected samples—but so far development on such veins is insufficient to determine their true character. That rich discoveries will be made in the future seems probable.

The district known as the "gold bearing belt" is situated about eight miles southwest of the foot hills of Hog Back Mountain, a spur of the Blue Ridge. The topography is pleasing, slopes gentle, the hills well rounded and rising about 150 ft. above the river. The altitude above sea level of the country is from 1,300 to 1,400 ft. The geological age of the

country rock is plutonic. The underlying country rock of the "gold belt" proper is soft granite, yielding readily to the pick. Within this area is included the gold bearing placer and system of veins—dip 75 degrees northwest from a horizontal and strike N. 30 E.

The auriferous gravel and clay beds are parallel strata of gravel and clay. The gravel contained in the beds, or strata, is for the most part pure silica; never containing gold, pyrites or other minerals; sometimes colored with iron oxides, but evidently after deposition, as the coloring matter only penetrates the fractures in the structure. Individual pieces are rough, angular sharp edges, white, opaque, of a granular structure and friable, being easily reduced with a few blows of a hammer to a coarse sand. The gold associated with the gravel in the beds, and evidently deposited at the same moment of time, is coarse, free and very pure. An auriferous gravel deposit is also found in the southeast side of the veins.

There are no evidences that these gravel beds were influenced to any appreciable extent by the agency of water, either in their deposition or subsequently, except as the bed of a superimposed stratum of clay, and where such deposits occupy the beds of streams. The origin of both, as at present observed, was coeval, and while the deposition of any single stratum of gravel was momentary, that of the clay occupied a much greater division of time.

The auriferous beds vary in thickness from a few inches to 2 ft. or more; in some restricted areas 5 ft. has been observed.

The clay and surface soil overlying vary from a few inches to several feet in thickness. The average is scarcely more than 2 ft. At the bases of the hillsides, and in ravines it is seldom more than 5 ft., rarely 10 ft. The alluvial deposits in the valleys will average about 5 ft. The surface soil and alluvia carry gold in paying quantities (in mining parlance this is defined as a "shadow," or a single particle to each shovelful or about 5 lbs. of earth, a color is several particles) which gold differs in character from that found in the gravel beds in that it is finer and evidently liberated by the decomposition of vein stuff.

From observations by the writer these auriferous beds will yield from 10c. to 50c. per sq. ft. of surface, or an average of 3 cu. ft.—about 270 lbs. of material, including the gravel. There are several strata of gravel alternating with clay at the same place.

The Wolfe & Tyger Mining Company have recently completed a ditch on Wolfe Creek four miles long, with a reservoir, and have in operation one two-inch "Giant" under 40 ft. head, and contemplate putting on several more shortly. No general "clean up" has, as yet, been made, but the Giant is said to be making about \$15 per day, at a cost of \$3.25.

Work is at present confined to the Wolfe Creek placer, but the Tyger River deposits are said to be the richest. Looking to the development of this territory in the near future, the above-named company have completed a survey of the Beaver Dam Canal, 10 1/2 miles long. This canal, with its feeders, practically controls the supply of available water, covers about 2,000 acres of placer territory, and will afford 500 miners' inches of water—about 8,400,000 gallons per day of 24 hours. GEORGE E. LADSHAW. SPARTANBURG, S. C., June, 1892.

THE MINES AND MILLS IN PRIBRAM, IN BOHEMIA.—VI.

Written for the Engineering and Mining Journal by John W. Meier.

(Concluded from page 28.)

The Linkenbach table, rotary table and hand buddle, are compared in a paper of later date [Oesterr. Ztschr., October 6th, 1888]. Mr. von Reytt publishes a table of comparative tests between these three; tests were made with the very finest slimes, for which work the tables are well suited. With the hand buddle a test was first made as to relative value of a cement coat or one of the plain wood. A buddle prepared with the former, with pitch of 40° 55' saved 23 2/3% of the silver, and showed a profit of 7.25 florins in washing 4,000 kilos, while a plain wooden one, with pitch 5° 15' saved 36 1/2%, and the profits were 12.76 florins. The wooden one was therefore used in the subsequent tests.

The Linkenbach and rotary (in the cement coating) had diameter and pitch as given heretofore. Feeders were used which thoroughly disintegrated and mixed the slime with water, and with the rotary a small Spitzkasten was used to thin the pulp and give a regular feed. In the

TABLE OF TESTS (LINKENBACH AND ROTARY TABLES AND HAND BUDDLE).

	Wet slimes, kilos.	Dry weight, kilos.	Assays in per cent.			Total content, kilos.		Losses %	Profits of treatment, florins.	No. hours run.	Wet slimes, per hour, kilos.
			Ag.	Pb.	Zn.	Ag.	Pb.				
Slimes worked.....	30,700	23,430	6.1	2.0	5.4	1,9329	469				
(1) Rotary table, enriched slimes.....		4,390	13.6	3.0	10.0	1,6196	103			152	19.7
Rotary table, these reworked on buddle.....		141	50.9	23.5	11.2	0.1942	26.96	194.5	13.37		
(2) Linkenbach table, concentrates.....		1,893	21.8	5.5	10.5	1,4197	104			122 1/2	24.6
Linkenbach table, these reworked on buddle.....		633	59.9	17.0	13.3	0.6983	86.85	8.59	14.43	65 1/2	41.2
(3) Hand buddle, concentrates.....		900	8.7	18.1	11.0	0.9882	131				
Hand buddle, taken from launders.....										331	8.3
Hand buddle, liquid concentrates.....		340	30.5	14.0	10.5	0.2415	32				
Hand buddle, concentrates from catch pits.....		57	16.8	7.5	6.6	0.0145	2				
		1,297				1,2442	168	74.8	64.2	55.75	
(4) Linkenbach, headings from catch pit.....		739	34.3	12.8	12.3	0.8720	95				51 1/2
Linkenbach, middlings reworked on buddle.....		260	33.4	13.9	13.2	0.2990	36				
		999				1,1710	131	76.3	72.1	49.52	

first test with the Linkenbach (test No. 2 in subjoined table) it was run solely to enrich the slimes sufficiently that they might be successfully treated on the buddle, but the percentage of zinc was increased by reworking of middlings on the Linkenbach. In the second test (see No. 4 below) with the same table an effort was made to obtain clean headings, and the middlings (rich in blende) were reworked on the buddle.

The profits having been determined by calculating the yield in metals at the tariff rates of the smelter, and deducting the expenses make the best comparison as to the merits of the different tables under existing conditions, in Pribram. The hand buddle therefore stands first on the list, and in test 4 the Linkenbach comes next. A partial concentration on the conical tables, without attempting to make a product high in lead for fear of a greater loss of silver, followed by a second treatment on the hand buddle, appears to be the proper treatment for fine slimes. Hand labor which would elsewhere appear a retrogression in the art of concentration is at Pribram the correct thing. This opinion is justified by experience. The great losses in slime concentration, being from 75% to 96% of the silver, bring forcibly to mind again the fact that there is a large field for inventors to devise better machinery for it. It is one of the great problems of the mining industry. In addition to tables given, it would be interesting to see a record of tests of Frue vanners, Triumph vanners, and other American machines on similar slimes, provided profits be also shown.

In these experiments, as well as in the ordinary routine of work on slimes and sands at Pribram, the following precautions are especially to be recommended:

Great care exercised in sizing these intermediate products, thorough mixing of them to uniform consistency, automatic feeding by slime feeders and control of water supply for the sprinklers.

The different concentrators in the year 1887 delivered to the smelting works 88,247.66 quintals (1 quintal = 220.46 lbs. avd.) dry weight of concentrates, which contained 22,734.93 kilos Ag. and 84,964.6 quintals of lead.

Smelting.—At a distance of about one mile to the north of Birkenberg are the large smelting works, in which all the ores from the mines and concentrates are smelted, as well as considerable amounts purchased from other parties. The work is so similar to that in the United States that only a few general notes need be made, and a few details described

The mattes are calcined in brick kilns with inclined floor (see Fig. 19) which have grates in the front wall at *g*, and the fumes pass through a number of openings *O* into a large brick flue, from which they go to a large brick chimney.

A special building contains two refining furnaces, two liquation furnaces, two remelting pots and three sets of Pattison apparatus. The refining of so impure a bullion and reworking of intermediate products require a large plant and a large force; 455 men and 28 women are employed at the smelter.

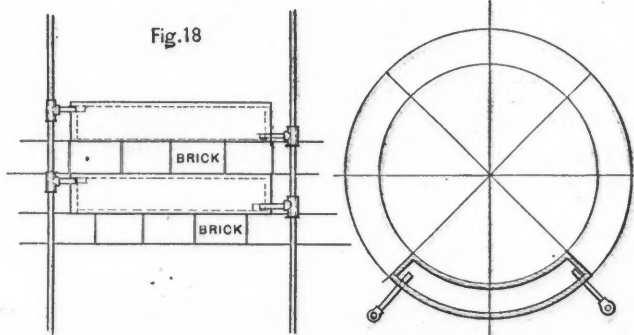
Product for 1888 was 35,072.7 kilos silver, 26,867.5 quintals litharge, 13,447.2 quintals soft lead and 3,211.5 quintals antimonial lead. The product remains about the same year after year.

In the year 1887 the cost of working and reconverting one quintal of ore was 3.41.36 florins, cost of one kilo fine silver was 13.43.83 florins. On amounts of metals contained in the ores there was a loss of 2.003% of the silver and of 16.36% of the lead. Profits of smelting works for same year were 1,053,524 florins. As one kilo = 32.15 oz. troy the cost of producing one oz. fine silver is 17.5% cents, and total product of silver is 1,154,853 oz. troy, or 96,238 oz. per month. This figure will give to Pribram a respectable place among the great silver producers of the world.

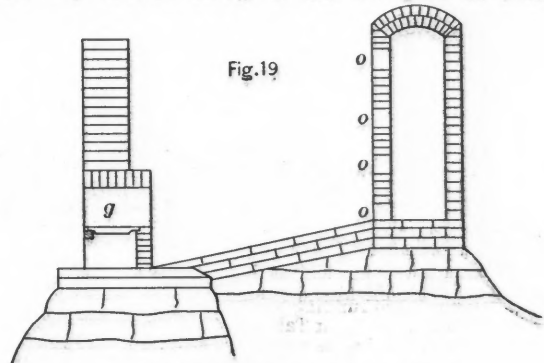
ANNUAL REPORTS.

DALY MINING COMPANY.

The president of this company, Mr. R. C. Chambers, states in his annual report that the 900 ft. level is the best of evidence of the continuity of the vein, and that there has been disclosed the largest and best ore body that has yet been cut in the mine, and that there is no possible doubt of the continuance of dividends. He considers that two years' ore is in sight. During the year a refinery was built at considerable expense. In 1891 2,419 tons more of dry ore than in the previous year were milled, and 28% more of the contents were saved, averaging 3.42 oz. more in silver for each ton, and although in addition nearly 2½ times as much ore, carrying an increased average of 3.24 oz. silver per ton were sold, yet but \$45,000 more were received from the mill product, and the gross proceeds of the ore were only doubled owing to the low price of silver during



SECTION OF SHAFT FURNACE SHOWING WATER COOLING SEGMENTS.



MATTE CALCINING KILNS AT PRIBRAM.

that appeared novel to the writer. Mr. A. Zdrahal published about 1890 a pamphlet, "Die K. K. Silber und Bleihütte zu Pribram," from which much information was obtained. The ores are first crushed, then weighed in lots of 250 kilos each, samples drawn while weighing, moisture determined, and four average samples taken from the dry ore, one being for the smelter, one for the miner, and two are held in reserve. Silver and lead are determined by fire assay, zinc by a volumetric method (a discount being made when the ore carries over 5% of zinc). An analysis of ores, as purchased in 1887, was made by Dr. Dietrich, the chemist, gave the following results: PbS, 45.090; Ag₂S, 0.313; Cu₂S, 0.120; As₂S₃, 0.840; Sb₂S₃, 1.070; SnS, 0.140; FeS₂, 4.650; ZnS, 8.730; FeO, CO₂, 13.770; MnO, CO₂, 1.610; CaO, CO₂, 1.750; MgO, CO₂, 0.570; Al₂O₃, 1.690; SiO₂, 20.050; total, 100.393.

The culled ores direct from the mines are low in SiO₂, contain less than 0.3% Ag and over 50% Pb, the Dürrerz contain over 40% SiO₂, 0.2% Ag and 13% Pb, while the general average of ores used (including concentrates) contain 34.4% Pb and 0.260% Ag.

The calcining is done in 12 long reverberatory furnaces, which have bridges of magnesia bricks, cooled by air, and the fumes pass through the chambers for condensation. In these furnaces ores are roasted and fused afterward, the percentage of S being reduced from 12% to 0.9%. Premiums are paid to workmen for low percentages of S obtained.

There are seven blast furnaces of circular section and one of square section; the hearths of these round furnaces are not covered with the usual water jackets, but with alternate rings of fire brick and water blocks of cast iron. These are hollow and form segments of a circle (see Fig. 18); two steam elevators hoist charges to a floor level with the tops of the furnaces. Of ore, slags and mixed products 1,300 kilos are charges with 150 kilos of coke and four hectolitres of charcoal (one hectolitre = 28.38 bushels). Limestone and puddling cinder are used as fluxes.

In the year 1888 in 1,636½ days smelting, there were charged 44,348.47 quintals ore and flux, the product of which was 42,802.658 kilos of silver and 94,208.45 quintals lead.

The base bullion from first smelting carries 0.468% Ag; is otherwise very impure, containing bismuth, As, Sb, Fe, Ni, Zn, S, and 0.1% Cu. Most of it must be refined, but little going to the Pattison furnaces direct.

Slags are tapped directly into conical pots, and lower part of the resulting blocks of slag is charged again into the furnaces, and occasionally even the upper part of them if they contain over 0.0025% Ag. The poor slags are used in the manufacture of slag bricks. Refining of base bullion is done in liquation furnaces, and the residuum, which is rich in copper, is remelted with slags, more base bullion being extracted from it, which, on liquation, leaves a residuum with 13% copper.

the year; \$723,370.11 was realized from the sale of sulphides and \$332,863.09 was received from the sale of 5,734 tons of ore; 29,690 tons of ore were mined at an average cost of \$6.52 per ton. Hauling to the mill of 23,994 tons cost 83c. per ton. The reduction of 24,214 tons cost \$6.27 a ton. Prospecting averaged \$1.65 a ton on 29,690 tons. Sundry expenses amounted to 96c. on the same quantity, a total expense of \$16.23 a ton. During the year the company purchased 5,945 shares of the Home Coal Company's stock, for which \$40,901.60 was paid. In addition \$36,000 was advanced to that company. On account of the construction of the Ontario drain tunnel \$102,135 was paid. Dividends amounting to \$450,000 were declared, making a total to January 1st, 1892, of \$2,212,500. The Comstock No. 2 Domingo and several other claims were purchased at a cost of \$10,000.

ONTARIO SILVER MINING COMPANY.

The report of this company for the year ending January 1st, 1892, has been issued. Mr. R. C. Chambers, the superintendent, reports recent discoveries in the mine, particularly on the 100 ft. level on the spur vein west of No. 1 shaft, and states that stoping ground, some 700 ft. long, has been opened up. At No. 2 shaft on the 1,500 ft. level a cross-cut has been driven north a total distance of 831 ft. The foot-wall has reached 705 ft. and the hanging wall 735 ft.; both walls are limestone. One stope has been carried west 100 ft., yielding a considerable amount of high-grade ore. On the hanging wall drifting is run west 120 ft., with a small seam of ore near the cross-cut and some scattering bunches. The outlook on this level, particularly on the hanging wall side, is considered good. This is the deepest working in the mine. At No. 3 shaft the usual results have been obtained. The Ontario tunnel is now in 8,955 ft. During the year, while 107 days' time was lost, owing to the cutting of two large bodies of water, the tunnel has advanced 3,200 ft., an average of 12 ft. per day. The disbursements on the tunnel account amounted to \$93,345.68. The product for the year amounted to 903,824.85 fine oz. silver in bullion, which was sold for \$881,229.42. In slags, 3,331 oz. brought \$2,774.50; 12,168 tons of ore were sold, containing 966,453.61 oz. silver, bringing \$777,931.80. In addition, \$869.17 was derived from the sale of sulphides, containing 894.80 oz., making a total product of \$1,662,804.89, less freight on bullion and smelting expenses, amounting to \$74,806.38; leaving a gross product of \$1,587,998.51. During the year 25,650 tons were reduced at the mill of an average value of 38.9 oz. silver per ton. Ninety-one per cent. of the silver was saved, the tailings running 3½ oz. An average of 75 tons per day were crushed. During the year 23 days and 5½ hours time was lost. The cost of reduction was \$3.93 per ton; hauling ore, 56 cents; mining, \$7.53; sundries, including mine construction, \$1.76; bullion expense, \$1.23, and prospecting, \$4.01; making a total cost of \$24.02 per ton of ore. Dividends amounting to \$900,000 were paid, as customary, making a total up to January 1st of \$12,425,000.

STATISTICS OF SOUTHERN INDUSTRIAL PROGRESS.—II.

Written for the Engineering and Mining Journal by Prof. Wm. B. Phillips.

(Concluded from page 30.)

It is in the production of coal and pig iron, two of the most important factors of industrial progress, that the Southern States have shown the most wonderful growth. Tables VI., VII. and VIII. exhibit the production of iron ore, coal and pig iron in these States from 1850 to 1890, the last table showing also the production of pig iron for 1891. It is a remarkable fact that the percentage of iron ore production in 1850 approximates very closely to that of 1890. In the former year it was 21.28 and in the latter 20.20, having fallen, however, in 1850 to 8.40, in 1870 to 10.00, and in 1880 to 10.56%. The capital invested in the iron ore business in 1880 was 7.20%, and in 1890 12.30% of the total for the United States. It is instructive also to observe that in 1890 they raised 20.20% of the total amount with 7.20% of the money invested. This goes far toward explaining why it is that cheap pig iron is produced in the South; the money invested in the raising of the ore is three times as productive as for the country at large.

In pig iron the Southern States have shown during the last thirty years such a growth as could not have been conceived of from the standpoint of 1860 or 1870, or even 1880. Starting with a production of 100,761 tons in 1860, or 10.20 per cent. of the total, they fell to 9.01 per cent. in 1870, rose (slightly) to 9.26 per cent. in 1880, to 18.76 per cent. in 1890, and to 23.15 per cent. in 1891. In ten years these States have more than doubled their production of pig iron. When we consider that only twelve years ago the total production of pig iron in the Southern States was 350,436 tons, and that in 1891 the output had risen to 1,914,042 tons, we are simply amazed at the rapidity with which the change has been brought about; a change, too, which has been wrought in the face of ridicule and opposition, for it was only a few years since it was proposed by some wit to keep Southern iron under a glass case, as being too brittle to handle. Let him look to it that his own furnace is not put under a glass case as a memento of departed greatness, for the ridiculous Southern iron has pushed

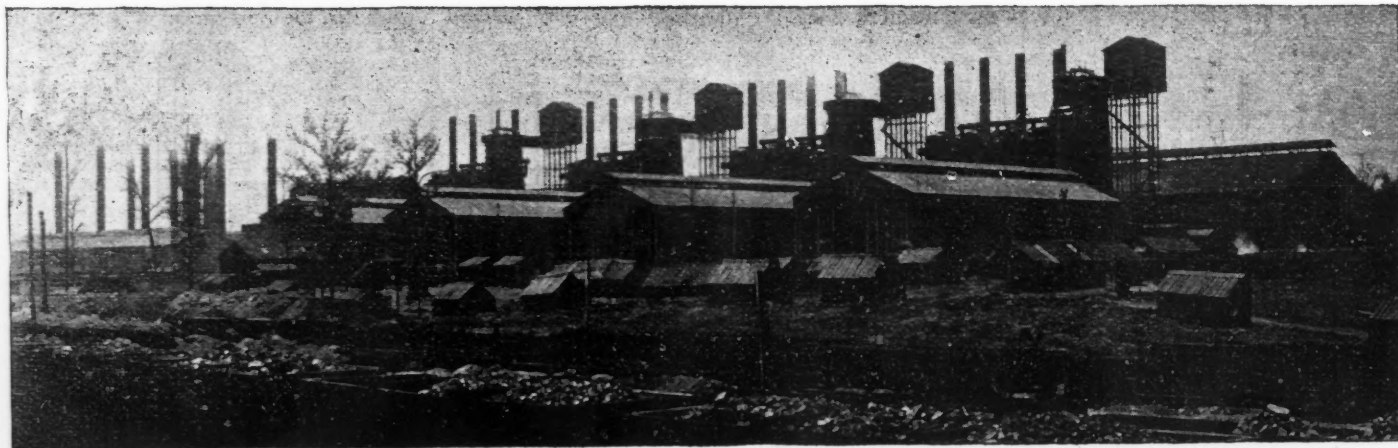
TABLE VII.
SHOWING THE NUMBER OF SHORT TONS OF COAL MINED IN THE SOUTHERN STATES FROM 1860 TO 1890, INCLUSIVE, OMITTING FLORIDA, MISSISSIPPI, LOUISIANA, AND SOUTH CAROLINA, WHICH YIELD NO COAL. ALL BITUMINOUS.

	1860	1870	1880	1890	Value at mines, 1860.	Value at mines, 1890.
Alabama.....	10,200	11,000	340,000	4,090,409	\$12,550	\$4,202,469
Arkansas.....	200	Not given.	14,778	399,888	600	511,595
Georgia.....	1,900	Not given.	and North Carolina.	and N. Carolina.	4,800	339,382
Kentucky.....	285,760	150,582	154,994	226,156		
Maryland.....	438,000	1,819,824	916,288	2,339,755	493,150	2,374,339
North Carolina.....	Not given.	Not given.	2,228,917	2,939,715	464,338	2,517,474
Tennessee.....	165,300	133,418	495,131	1,925,689	423,662	See Georgia
Texas.....	473,360	Not given.	Not given.	184,140		2,338,309
Virginia.....	608,878	61,803	43,079	865,786	798,128	465,900
West Virginia.....		608,878	1,820,844	6,231,880		804,475
Aggregate.....	1,374,720	2,385,505	6,043,034	19,263,718	2,227,528	18,613,527
The United States	6,218,080	17,199,415	42,723,329	111,320,038	8,369,063	110,420,801
Percentage in Southern States	22.12	13.72	13.00	17.33	26.60	16.60

The North Carolina product in 1880 was 350 tons, and not much more in 1890. In 1880 Virginia produced also 2,817 tons of anthracite coal, valued at \$8,290. In the United States, 1890, there were produced 8,115,812 tons of anthracite coal, making a total of 11,331,922 tons. If the amount of coal raised in the Southern States in 1860 be reckoned as percentage of the total United States production it will be 9.61%.

Southern States raised 22.12% of the whole, and in the latter 17.33% of the total production.

It is interesting also to observe how the extension of railway facilities has kept pace with and even exceeded the rate of increase in the production of coal, pig iron and iron ore. Table IX. sets forth the mileage in the Southern States from 1860 to and including 1890. In 1860 they had 32.46%



THE ENSLEY FURNACES, ENSLEY, ALA.

its way into the long cherished markets of his own State, and be it brittle or be it tough it confronts him on every side.

The growth of the pig iron industry in the South is most forcibly put when it can be said that the State of Alabama alone produced in 1890 nearly as much pig iron as the whole United States in 1860, and that the Southern States produced in 1891 very nearly as much as was produced in the United States in 1870. Alabama produced in 1890 very nearly three times as much pig iron as was produced in the entire South in 1880, as will appear from Table VIII.

As regards coal the Southern States have recorded a wonderful change, Table VII. shows the amount of coal mined in each Southern State year by year (the census year) from 1860 to 1890.

In 1860 the mining of bituminous coal in the United States may be said to have been in its infancy, for the total production was only 6,218,080 tons, while in 1890 it was 111,320,038 tons. In the former year the

TABLE VI.
SHOWING THE AMOUNT OF IRON ORE IN TONS RAISED IN THE SOUTHERN STATES FROM 1850 TO 1890, INCLUSIVE, WITH THE CAPITAL INVESTED IN 1880 AND 1890.

	1850.	1860.	1870.	1880.	1890.	Capital invested, 1880.	Capital invested, 1890.
Alabama.....	1,838	3,720	11,350	191,676	1,570,319	\$536,442	\$5,214,906
Georgia.....	5,189	2,700	2,362	91,416	and North Carolina.	and North Carolina.	and North Carolina.
Kentucky....	72,010	98,750	126,562	64,809	258,145	184,225	1,634,434
Maryland....	99,865	79,290	133,067	139,628	77,487	779,829	405,686
N. Carolina...	930	.....	3,174	3,318	and Delaware.	and Delaware.	and Delaware.
S. Carolina...	.....	.....	609	.....	29,359	538,514	355,074
Tennessee....	83,810	56,959	64,988	104,465	See Ga.	See Ga.	See Ga.
Texas.....	.....	.....	.....	3,600	473,294	473,920	1,897,895
Virginia.....	67,319	28,139	47,168	182,326	13,000	.....	51,678
W. Virginia..	.....	.....	36,940	61,216	and West Virginia.	and West Virginia.	and West Virginia.
Aggregate....	335,932	279,448	431,211	842,454	\$2,932,830	\$1,437,855	\$13,495,104
The U. States	1,579,318	3,218,275	4,303,847	7,974,806	14,518,041	61,782,287	109,766,199
Percentage in So. States..	21.28	8.40	10.00	10.56	20.20	7.20	12.30

of the mileage, produced 22.12% of the bituminous coal, 8.40% of the iron ore, and 10.20% of the pig iron. In 1890 they had 25.85% of the mileage, produced 17.33% of the soft coal, and 20.20% of the iron ore and 18.76% of the pig iron.

The growth of the railway system has rendered possible the opening of mines and the erection of furnaces just as the establishment of these industries has given the railroads their *raison d'être*. The liberal policy pursued by many, yes, even by most, of the Southern railroads has unquestionably resulted in the successful conduct of enterprises which otherwise must have remained on paper. General E. P. Alexander, in the *March Forum*, has presented this view of the matter very clearly, and he speaks with the authority of one who has been most intimately connected with some of the most important railroad movements in the South. When one examines the network of railroads in the great manufacturing States of the country, he realizes at once how vital a part rapid and cheap transportation plays in the prosperity of the nation. It is beyond all others the great factor in the creation and distribution of wealth, and has made the United States what they are to-day, the richest and most prosperous country on the globe.

But the Southern States, with all their natural advantages of soil,

TABLE VIII.
SHOWING THE PRODUCTION OF PIG IRON, IN TONS, IN THE SOUTHERN STATES FROM 1850 TO 1891, INCLUSIVE.
Blooms are excluded. Census year.

	1850.	1860.	1870.	1880.	1890.	1891.
Alabama.....	1,742	6,200	62,336	914,940	891,154
Georgia.....	31,105	1,220	23,099	32,687	55,841
Kentucky.....	33,471	57,943	58,108	53,604	50,225
Maryland.....	30,500	54,204	59,664	165,559	138,206
North Carolina..	3,181	3,903
Tennessee.....	22,302	28,688	47,873	299,741	326,747
Texas.....	1,400	10,885	20,902	20,902
Virginia.....	11,646	17,233	17,906	327,912	330,727
West Virginia..	16,950	80,050	144,970	96,637
The returns for 1890 and 1891 are to the 31st December of each year.						
Aggregate.....	100,761	183,910	350,436	1,953,459	1,914,042
The United States	564,755	987,559	2,052,821	3,781,021	10,307,028	9,273,455
Percentage in Southern States.	10.20	9.01	9.26	18.76	23.15

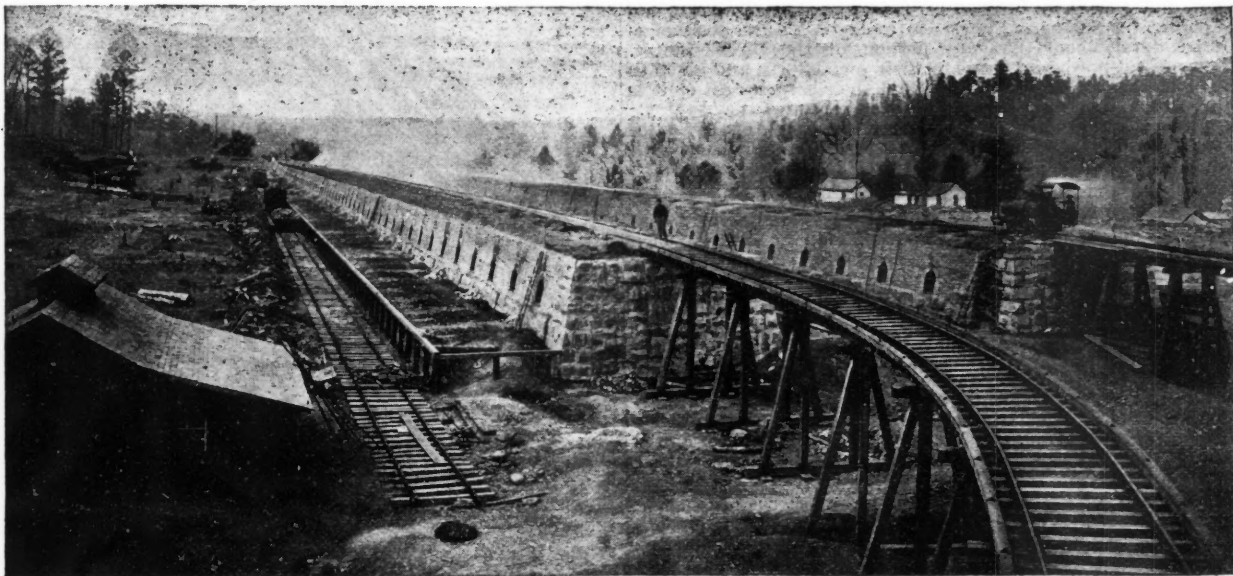
TABLE IX.
SHOWING THE NUMBER OF MILES OF RAILWAYS IN OPERATION IN THE SOUTHERN STATES, 1860 TO 1890 INCLUSIVE.

	1860.	1870.	1880.	1890.	Miles of railway to each 100 sq. ms. of area. 1860.	Miles of railway to each 100 sq. ms. of area. 1890.
Alabama.....	743	1,157	1,843	3,422.20	1.42	6.55
Arkansas.....	38	256	859	2,313.44	0.074	4.29
Florida.....	402	446	518	2,489.52	0.68	4.27
Georgia.....	1,402	1,875	2,459	4,592.83	2.36	7.72
Kentucky.....	534	1,017	1,530	2,946.38	1.32	7.29
Louisiana.....	335	450	652	1,749.94	0.68	3.59
Maryland.....	and District of Columbia	and District of Columbia	and District of Columbia			
Mississippi.....	386	671	1,040	1,270.04	3.14	10.40
North Carolina.....	862	930	1,127	2,470.85	1.84	5.28
South Carolina.....	737	1,178	1,486	3,128.17	1.41	5.99
Tennessee.....	973	1,139	1,427	2,296.65	3.18	7.51
Texas.....	1,253	1,492	1,843	2,793.98	2.98	6.65
Virginia.....	307	711	3,244	8,709.85	0.11	3.28
West Virginia.....	1,379	1,486	1,893	3,367.65	3.25	7.93
West Virginia.....	352	3.7	691	1,433.30	1.42	5.78
Aggregate.....	9,921	13,265	20,612	42,939.61	1.19	5.18
The United States	30,626	52,922	98,296	166,817.41	1.01	5.51
Percentage in Southern States	32.46	25.07	20.97	25.85		

climate, and minerals, have not yet turned their earnest efforts toward manufacturing from the raw materials those finished products which characterize their Northern neighbors. In cotton goods, agricultural implements, machinery, etc., they show a commendable progress, but one in nowise commensurate with their duty. With the exception of

that the consumption of the slag from the Thomas process across the water amounts to over 600,000 tons per annum we are not prepared to believe that in this country there is but one establishment offering phosphate slag on a considerable scale, the Pottstown Iron Company, Pottstown, Penn. The existence of enormous beds of natural phosphates in South Carolina and Florida, and to a much less extent in North Carolina also, has perhaps operated to deter capital from seeking investment in the Thomas process, but the time is coming and may not be far off when the high phosphorus ores will be sought for as eagerly as the low phosphorus ores. The Southern States are particularly rich in ores carrying from 0.20 to 2.00% of phosphorus, and when these shall have been used in the manufacture of steel it is likely that the same economy now shown in the production of pig iron will be seen also in the manufacture of the more valuable metal.

Southern furnaces for the last two years have shown a disposition to hold their iron somewhat in excess of the furnaces in other parts of the country. In 1890 they made 18.76% of the iron and held on the 31st of December of that year 21.88% of the stocks on hand. In 1891 they made 23.15% of the iron, and held on the 31st of December of that year 25.19% of the stocks on hand. So also at the close of 1890 they were holding 7.64% of their output, while the rest of the country were holding 6.38% of its output, and at the close of 1891 they were holding 8.80% of their output, while the rest of the country was holding 6.80% of its output. We are here met by the curious circumstance that although the production of pig iron in the Southern States is attended with less cost, yet the percentage of stocks held is higher than elsewhere in the United States taken as a whole. That is to say, the Southern furnaces for the last two years have held more of their output than the furnaces in other States. This seems to be the case if one looks at the matter hastily, and a closer examination leads to a similar conclusion. We must take into consideration the production of Bessemer pig iron, for with this Southern iron comes but little into competition, the entire output of the Southern States in 1890 being 284,950 out of a total of 4,583,424 tons, or 6.20%, and in 1891, 226,657 tons out of 3,888,853 tons, or 5.83%. In 1890 they made 1,668,509 tons of non-Bessemer



THE CAHABA COKE OVENS, ALABAMA.

the Bessemer Steel Works, at Ashland, Ky., the works of the Maryland Steel Company, at Sparrow's Point, and the basic steel plant at Chattanooga, no steel is now made in these States. So far therefore as concerns the transformation of the 1,914,042 tons of pig iron made in 1891 into more valuable products, the South is to-day far behind her natural position. I use the term "natural position," for there seems to be no sufficient reason for the continuous shipment of the crudest of all crude products to some other place for conversion into more finished and hence more valuable material.

The assertions of 15 years ago as to the comparative worthlessness of Southern pig iron is now reappearing under another form, and are applied to the supposed worthlessness of this same iron for steel making. We are told with the same gravity as before that the pig will do well enough for foundry and mill purposes but not for conversion into steel, and, too, in spite of the fact that excellent steel has been made by the basic open hearth process at Birmingham from Alabama pig, and at a cost that approximated \$22 per ton. I employ the term "steel" in its common acceptation, and it includes what should perhaps be termed "ingot iron," an expression which, unfortunately, has not yet worked its way into the English language. The manufacture of basic open hearth steel from Southern iron is now beyond question; in the light of foreign experience it is strange that it should ever have been questioned, for such metal has been made on a large scale for several years of material in no wise better than ours. It was, however, demanded that actual experience should demonstrate its suitability for this purpose, and this has been done.

The vast majority of the Southern ores, as indeed the great majority of iron ores the world over, are not suited for the manufacture of Bessemer steel rails and other work requiring a regular and large output of low phosphorus metal, but they are adapted for the basic open hearth and the duplex process. There exist in some parts of the South, as for instance in Jefferson County, Alabama, extensive deposits of ore well adapted also for the basic Bessemer or Thomas process, which, with its accompanying phosphate slag, should be one of the main industries carried on here. The Southern States consume by far the greater part of the commercial manures now made in the United States, and when we learn

iron out of a total of 5,723,604 tons, or 29.07%. Of all kinds of iron they held 149,270 tons, or 21.88% of the total stocks.

Assuming that the same relative amount of Bessemer as of non-Bessemer was held, we have for stocks of Bessemer iron in the Southern States at the close of 1890 21,791 tons, which is 7.70% of their own Bessemer iron output, 0.50% of the total Bessemer output and 14.60% of their stocks. On the same principle they held 127,479 tons of non-Bessemer iron, which is 7.70% of their non-Bessemer output, 2.22% of the total non-Bessemer output and 85.40% of their stocks. The rest of the country made during 1890 4,055,095 tons of non-Bessemer iron out of a total of 5,723,604 tons, or 70.93%. Of all kinds of iron it held 532,722 tons out of a total of 681,992 tons, or 78.12%. Proceeding as before we find that at the close of 1890 the rest of the country held as stocks of Bessemer iron 274,600 tons, which is 6.37% of its own Bessemer output, 6.0% of the total Bessemer output and 51.55% of its stocks. It held as stocks of non-Bessemer iron 258,122 tons, which is 6.37% of its own non-Bessemer output, 4.50% of the total non-Bessemer output and 48.45% of its stocks.

In 1891 the Southern States made 1,687,385 tons of non-Bessemer iron out of a total of 5,384,602 tons, or 31.35%. Of all kinds of iron they held 168,390 tons on the 31st of December, out of a total of 667,893 tons, or 25.19%. Proceeding as before we find that they were holding, at this time, of Bessemer iron 19,951 tons, which is 8.77% of their own Bessemer output; 0.51% of the total Bessemer output, and 11.85% of their stocks. Of non-Bessemer iron they were holding 148,439 tons, which is 8.77% of their non-Bessemer output, 2.75% of the total non-Bessemer output, and 88.15% of their stocks.

The rest of the country made during 1891 3,697,217 tons of non-Bessemer iron out of 5,384,602 tons, or 68.65%. Of all kinds of iron it held 499,503 tons, out of 667,893 tons, or 74.81%. Proceeding as before we find that the rest of the country held of Bessemer iron 248,510 tons, which is 6.6% of its own Bessemer output, 6.25% of the total Bessemer output, and 50.00% of its stocks. Of non-Bessemer iron it held at the close of the year 250,993 tons, which is 7% of its non-Bessemer output, 4.65% of the total non-Bessemer, and 50.00% of its stocks.

Taking all these things into consideration it appears that there is not

much difference between the Southern States and the rest of the country as regards the holding of stocks, but what there is in favor of the Southern furnaces. If the holding of their output for better prices is an indication of financial strength (and it would seem to be so), then these furnaces are in a better condition than the others. The holdings of the American Pig Iron Warrant Company for 1890 were 59,289 net tons, and for 1891, 34,608 net tons, apart from the iron held to order of the owners. So that this feature of the matter is not of much consequence, although the greater part of such stocks in 1891 was of Alabama iron.

The closing down of so many of the Northern furnaces during the last two months, while the Southern furnaces continue in operation, is highly significant. Pig iron is still hunting for a good place to stop, the market continues very dull, and where the cost of production is higher there is the first sign of trouble. Consumption is fairly active, but not sufficiently so to overtake the enormous outpourings of pig. Even the Southern furnaces with all their advantages cannot long sustain their present rate of production of crude metal. Supremacy in manufactures is not reached through raw materials alone; they must be transformed into the thousand and one articles of universal utility before the full measure of their value is attained.

The recent consolidation of the two largest and strongest iron and coal companies in the South means that in addition to the cheapening of pig iron and coal the manufacture of steel will be undertaken on a large scale. The condition of Southern manufacturers will then undergo another and still more hopeful change, beneficial alike to them and the country at large.

But the manufacture of steel alone, even should it attain the present proportions of the production of pig iron will not of itself relieve the financial pressure. Speaking from the standpoint of the iron maker it is the enormous overproduction of iron that has made the pressure possible. When to this is added the lowering effect of the largest cotton crop ever raised in the country, approximating 9,000,000 bales, and the disturbing effects of the "free silver craze" one gets his focus adjusted on the causes of the present stringency.

In spite of it all, however, and particularly in spite of the numerous swindles that, under the name of "booms," have been foisted upon a too susceptible public, the Southern States are to-day in a better position as regards future development than any portion of the United States. Much of their present prosperity is due to their own efforts, and much to the assistance that has come in from beyond their borders; all of it is part and parcel of an inheritance shared by every citizen of the country.

Outside of the class of professional politicians, the people of the Southern States are busy in laying deep and strong the foundations of industrial greatness—with what hope of success let the last 20 years answer.

Manufacture of Phosphorus.—Typke has taken out an English patent for the manufacture of phosphorus from phosphoretted hydrogen which is a by-product in the manufacture of many phosphites. The gas is passed through strongly heated retorts filled with pumice stone or other substance of a similar character; dissociation takes place, the phosphorus is condensed and the hydrogen escapes.

The Great Niagara Tunnel.—According to press dispatches this tunnel, which will cost \$5,000,000, and by means of which the power of Niagara will be utilized for manufacturing purposes, will be completed by July 23, by Contractors Rogers & Clement. No wheels will be turned, however, before next spring. The Cataract Construction Company, in New York, projectors of the scheme, will probably develop the power on the Canadian side of the river, where they have obtained exclusive power privileges, with a capital of \$3,000,000.

The Combustion of Nitrogen in Oxygen.—A mysterious phenomenon with electric arcs, which has attracted a good deal of attention lately, has been explained by Professor Crookes. When an electric arc is formed by an alternating current having an electromotive force of 50,000 to 100,000 volts and a high frequency, two flames stream out from the electrodes, burning steadily. They give the idea of combustion, but the electrodes are not consumed. The flame is totally different from the well known electric brush and much more nearly resembles that of a taper. Hitherto no explanation has been given of this phenomenon, but now Professor Crookes has announced that it is an actual combination of the oxygen and nitrogen of the atmosphere, with nitrous and nitric acids as its products. The idea of the atmosphere burning to nitric acid raises uncomfortable visions of what might happen to us if it once got lighted, and Prof. Crookes tells us that the only reason the earth has not long ago been deluged in a sea of nitric acid is that the igniting point of nitrogen is higher than the temperature produced by its combustion, and, therefore, the flame is not hot enough to set fire to the adjoining gas. Were it not for this the first lightning flash would have fired the air, and the development of the world on its present principles would have been impossible.

The Production of Pig Iron in Great Britain in 1891.—The official statistics of the production of pig iron in Great Britain during 1891 exhibits a further decline in the manufactures of the old country. During 1891 there were produced 7,046,074 tons as against 7,904,214 tons in 1889. Of this total, 1,769,492 tons were produced in the Cleveland district; this figure compares unfavorably with 1,961,328 tons produced in 1890. South Staffordshire produced 311,816 tons in 1891, as against 269,648 tons in 1890. The South Wales district produced 760,566 tons in 1891 and 824,633 in 1890. Cumberland produced 724,750 tons in 1891 and 834,614 tons in 1890, and Scotland produced 674,076 tons in 1891 and 737,066 in 1890. Altogether there were produced in 1891 2,992,129 tons of hematite, 4,222,320 tons of ordinary and basic, and 191,615 tons of spiegel, ferromanganese, chrome and silicon iron. There were 37 fewer furnaces in blast in 1891 than in the year previous, but the average production was higher. In England and Wales the production per furnace was 20,356 tons in 1889, 20,565 tons in 1890 and 21,537 tons in 1891; but in Scotland there was a decrease in the production from 11,623 in 1889 to 11,287 in 1890 and 10,615 tons in 1891. In the production of the pig iron in 1891 there was used 18,518,192 tons of ore and cinder; unfortunately the relative amounts of ore and cinder are not given. This consumption gives an average of 2.5 tons of ore and cinder to the ton of pig, as against 2.43 tons in 1890. The total quantity of fuel used was 15,373,711 tons, an average of 2.076 tons of fuel per ton of pig as against 2.045 in 1890.

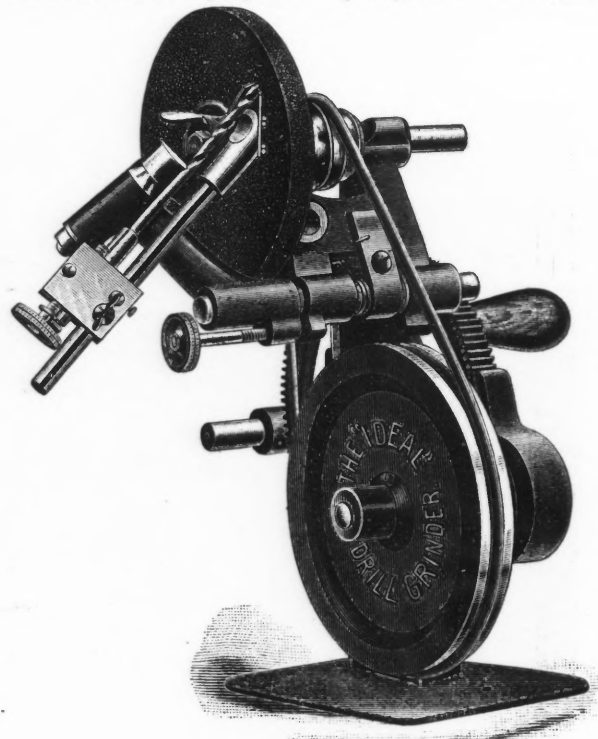
THE IDEAL TWIST DRILL GRINDER.

No factor in general shop practice is of more importance than the drill grinding, especially when applied to small drills, and the machine represented in the accompanying cut is said to be thoroughly successful. The tool stands on a base 4 × 6 in., and is about 12 in. in height. It is provided with an emery wheel 5 in. in diameter. The drill to be ground is held in place by means of a stationary tongue fitting into a groove near the lip of the drill, and is there held in position by an automatic adjusting finger. The feed of the carriage is provided by the hand in the lower end of the slide. The general adjustment is effected by the thumbscrew, which works in slot in arm. Any size drill may be ground up to $\frac{1}{4}$ in. The grinder is arranged for use on any bench or stand. The handle is fixed on the driving gear, which engages with a pinion keyed on the pulley shaft. The pulley is cast solid, and acts as a balance wheel. The diameter of the large gear is in the proportion of four to one to the pinion, and the pulley in the same proportion to the pulley on the emery wheel shaft; thus a high speed is attained by a few turns of the handle. The grinder is sold by Church & Sleigh, of New York.

Effect of Aluminum on the Magnetic Conductivity of Iron.—Tests recently made at Cornell University show that aluminum has no very marked influence upon the magnetic conductivity of cast iron, and but slightly decreases its permeability.

Litharge-Glycerine Cement.—A very durable and hard cement can be prepared, says the *Moniteur Industriel*, by mixing litharge, which has been ground to an impalpable powder and dried, with glycerine in sufficient quantity to make a thick paste.

This cement solidifies rapidly and completely, either in air or immersed



IDEAL TWIST DRILL GRINDER.

in liquid; its volume remains almost constant during solidification, and it resists heat up to 300° without alteration. Finally it adheres most strongly to bodies in contact with it.

Malleable Cast Iron.—The experiments conducted by the Admiralty of Sebastopol, Russia, on the malleable cast iron of the Sestroretzk Iron Works have given very important results. According to the *Revue Universelle des Mines*, the trial bars of Sestroretzk iron which had a cross section of 1.53 to 1.54 in. by 0.3 in. equal to 0.459 to 0.463 sq. in. broke with a tension load of 9.69 to 9.75 tons after an elongation of 0.125 in., which is equivalent to a tensile strength of 21.1 tons per sq. in. cross section. These figures compare well with ordinary Siemens-Martin steel which has a tensile strength of 21.6 to 22.2 tons per sq. in. One of these bars heated to red heat was folded and refolded several times in succession, and at the end but one, scarcely perceptible, crack showed, and it could still be easily folded. A second bar, folded cold under hydraulic pressure after taking a persistent curve finally broke. A third bar heated to cherry red could be forged and lengthened into strips.

Electrolytic Deposition of Chromium.—The following solutions for chromium plating are given by Messrs. Placet and Bonnet in the *Moniteur Industriel*, No. 25:

1. Chrome-alum, 10 to 15 parts; alkaline sulphate, 10 to 15 parts; oxalic acid, 5 parts, and water 100 parts. This solution is heated until it turns violet. Any organic acid may be used.
2. Chromium sulphate, 15 to 20 parts; water, 100 parts. Sulphuric acid to acidulation.
3. Alkaline chromate or bichromate, 10 to 15 parts; chrome-alum, 15 to 20 parts, and water, 100 parts. Many other salts can be used instead of the chrome-alum in the solution. The chromium is deposited at the negative pole. While the deposition takes place at ordinary temperatures, it is more rapid when the solution is warm; it is also assisted by the addition of sugar, alcohol or glycerine.

FLATHEAD COAL BASIN, MONTANA.

Written for the Engineering and Mining Journal by Herbert Wood, M. A.

In recent issues of your valuable journal, I have read with interest Mr. W. H. Weed's sketch of Montana Coal Fields. A late examination of an interesting and comparatively unknown coal basin will at this time be acceptable to your readers. This region may be found on the map of Montana in its northwestern portion immediately south of the 49th parallel and between 114° and 114° 30'. It is the connecting link in the cretaceous system of that great ocean which covered nearly all of Montana, the plains to the east and British Columbia to the Pacific. The basin occupies the valley between the mountain range known as the Rockies proper, which has an elevation from six to eight, even in isolated peaks ten thousand feet above the sea, consisting in ascending order of upper carboniferous shales, dolomitic limestone, Devonian and Sub-carboniferous rocks, dipping northeast. The general trend of this range is north-west. The southern flank of the valley is a spur of the main Cambrian belt, with a trend 10° north of west. It is composed of red and green quartzites and red argillaceous shale, the so-called lower Cambrian quartzitic series. This valley is from 15 to 20 miles in width, and extends southeast for 40 miles without a break, forming a natural trough, in which the upturned beds of the Cretaceous coal bearing series flank the Cambrian range. It is a plateau valley, with heaps of boulders and gravel detritus of glacial origin, sloping to the Flathead River, which winds south southeast through it in a central prairie of a mile or more in width from its source in Southern British Columbia, the fall from the boundary, which is 4,300 ft. above the sea, not being very rapid. That particular horizon of the Cretaceous with which this series is correlative seems to be Dawson's Lower Kootanie Series. It is totally devoid of fossils, save a few carbonized plant forms in the clay shales near the coal seams, and presents the same horizons of shales, clay and fine and coarse grained sandstones, having no volcanic trap or intrusive masses as found in British Columbia, with a probable thickness of 6,000 or 7,000 ft., as measured and paced across the strike at Coal Creek.

The dip gradually lessens from the base of the series abutting the Cambrian from 50° to 8° N. N. E. one mile and a half across the strike, thus exposing the upturned edges of the southern side of a synclinal fold. The more productive portion of the series is the basal thousand feet which has shown, so far as observed, from 15 to 20 seams of coal. Of these at least six or seven are workable seams of coal, the section as displayed in the Emerson Tunnel, 2 miles from Coal Creek and 25 from the international boundary, as follows:

Length of tunnel, 102 ft.; course, 18° E. of North: Coal, 6 in.; clay shale, 16 in.; coal, 33 in.; clay shale, 6 in.; coal, 45½ in.; clay, 8 ft.; coal, 2 in.; clay, 3 in.; coal, 7 in.; clay, 3 in.; coal, 22 in.; clay and fine sand stone, 77 in.; coal, 3 in.; clay and shale, 58 in.; coal, 40 in.; clay, 38 in.; coal, 13½ ft.; clay, 21 in.; coal, 48 in. Dip at end of tunnel, 51° N. N. E. Dip at front of tunnel, 41° N. N. E.

There are here, it will be seen, six workable seams, contributing in all 30 ft. of coal in the tunnel alone, while exposed beyond at the mouth of the tunnel are two more workable seams, 48 in. and 56 in. respectively. I am also informed by the foreman of the mine that in 60 ft. more they will cut a seam of coal of 10 or 12 ft. in thickness.

There is a slight curvature in the rocks, as shown by the following strikes taken at Emerson's tunnel, 12° south of west; Coal Creek, two miles further west, 10° south of west; at Moran's, six miles west, 20° north of west; at Long's, 7½ miles further west, 25° north of west; at Perry's, 12½ miles west, 27° north of west. Other exposures are found along the cut banks of the Flathead, between this last named point and the boundary, a distance of 10 miles.

There is apparently a large local thickening of the coal seams, extending over four or five miles, more particularly in the vicinity of Coal Creek. The northern side of the valley was not examined at all, but credible report gives the coal bearing rocks, exposed midway of the valley at Quartz Creek and southeast a distance of 25 miles on Middle Fork, a tributary of the Flathead—a rough estimate giving 75 or 100 square miles of a coal field. Regarding the character of the coal, it is a fair grade of lignite with no appreciable coke. It contains small nodules of mineral resin and exhibits no great evidences of the extreme metamorphic action, which seemed to characterize the Elk River, Crow's Nest Trough and Cascade Coal Basin, as mentioned by Dawson and McConnell, of the Canadian Geological Survey, in their respective reports. These coals have been subject to considerable flexure and are bituminous, semi-bituminous or, as in the Cascade Basin, anthracitic in character. It will be seen that there is abundant coal in this basin, of a marketable character, and the natural facilities for railroad construction being good, there seems to be no apparent cause for delay in its development and exportation.

Utilizing the Waste Heat of Slag.—Many propositions have been made for the utilization of the heat of slag in raising steam, but nothing practicable has hitherto been attained. News, however, comes from Australia that the owners of the Broken Hill Proprietary Mine, Broken Hill, New South Wales, have built a plant invented for that purpose by Messrs. Howell & Ashcroft. The molten slag is run into the bottoms of iron chambers, capable of withstanding internal steam pressure, and jets of water are then forced in on the surface of the slag. The water becomes vaporized, and in a short time the chambers become filled with steam of a certain pressure. It is said that the process has given satisfaction, but no exact data are to be obtained.

Wrought Iron versus Steel Tubes for Boilers.—Mr. A. Blechynden of Barrow-in-Furness, England, has published an account of some very interesting experiments which he undertook with a view to ascertaining the relative excellence of wrought iron and steel in the manufacture of non-leaking boiler tubes. He used tubes of Siemens-Martin steel and Scotch BB brand of wrought iron in his experiments. The general result was that after several successive heatings in a furnace and coolings in water the iron tubes were found to have contracted less than the steel tubes and that the steel tubes were much looser in their sockets than the iron tubes. His argument is therefore that wrought iron is more suitable for boiler tubes than steel, especially in high pressure boilers.

ELECTRIC HEATING AND SMELTING.

Written for the Engineering and Mining Journal by Stephen H. Emmens.

Newspaper readers have of late been frequently taught by their oracles that the day is close at hand when their houses will be warmed and their food cooked by electricity. And, even in technical circles, the phrase "electric smelting" is often used in a manner suggestive of some approaching industrial revolution. A plain statement of the facts and limits of the electrical heating problem in general may, therefore, prove useful.

One horse power, exerted for one hour and completely converted into heat, is capable of raising the temperature of 645·85 kilogrammes of water by 1° centigrade; that is to say, 1 H. P. hour = 645,850 calories.

One gramme of coal, if completely burnt, will yield heat sufficient to raise the temperature of 7½ kilogrammes of water by 1° centigrade, that is to say, the combustion of 1 lb. of coal generates 7,500 calories. There are 453·5926 grammes in 1 lb. avoirdupois. Accordingly, 1 lb. of coal will yield 7,500 × 453·5926 = 3,401,944 calories, and 1 H. P. exerted for 1 hour is capable of the same heating effect as $\frac{645,850}{3,401,944} = 1898$ lb. of coal.

To produce by means of a steam engine one effective horse-power hour of electric energy, and to convert it into heat requires the combustion of about 4 lbs. of coal.

Hence, to heat a room by means of steam-engine-generated electricity requires the consumption of $\frac{4}{1898} = 21\cdot07$ times as much coal as would be required by an ordinary stove.

When I say that to produce, by means of a steam engine, an effective horse power of electric energy and to convert it into heat requires the combustion of about 4 lbs. of coal, I mean "to convert it into heat-output in a form available for heating buildings and the like, i. e., into radiated heat emitted from the surface of an electric stove." Theoretically, if an electric current do no outside work it is all absorbed in heating the circuit, and in that case the efficiency of the apparatus (i. e., the circuit) is the same as that of the dynamo; but where outside work is done by some apparatus included in the circuit the efficiency is the dynamo-fraction multiplied by the apparatus-fraction.

We know fairly well the apparatus fraction of an electric motor or transformer; but, as yet, no published data are available as to the proportion of current energy given off in the form of radiant heat from the surfaces of electric heaters. The only actual figures in my possession are those of a trial of two "Burton" and one "McTighe" electric stoves (car heaters) at Lincoln, Neb., last November. Mr. T. J. McTighe (of Barry & McTighe, electrical engineers, for whom I had conducted some preliminary experiments, sent me the figures. The trials were made by Francis Daniells, electrical engineer, and were carried out by inclosing the stove in a large box and taking readings every ten minutes from a thermometer, the bulb of which was inside the box. It was considered that this showed the extent to which the internal atmosphere of the box was warmed by the action of the stove; but as the report is silent respecting any protective screen between the thermometer and the stove, I presume that the readings really showed the gain of heat on exchange.

The average result was as follows:

	Rise per minute.	Potential in volts.	Current in amperes.	Electrical H. P.
McTighe.....	.5° F.	225	2	.695
Burton.....	.4° F.	225	3	.9045

The McTighe stove was composed of 3·3 lbs. of carbon rods having a radiating surface of 1·35 sq. ft.

One horse power minute is sufficient to warm 1 lb. of water to the extent of 42·7° F. (i. e., $\frac{33,000}{772\cdot55}$); so that .605 H. P. minute should produce a rise of 25·8335° F. in 1 lb. of water.

Taking the specific heat of carbon at .2, the 3·3 lbs. would require .66 lb. degree F. for a rise of 1°.

Hence the .605 H. P. should have raised the temperature of the rods to the extent of $\frac{25\cdot8335}{\cdot66} = 39\cdot14$ ° F.

But the rise of temperature recorded by the thermometer was only .5°. In view of this slow rate of rise, added to the fact that the thermometer-reading remained at times constant for a period of 20 minutes, and in view also of the probability that there could not have been any great waste of energy by heat-radiation from the external surface of the box, I conclude that the average rise of temperature as recorded may be taken as representing the average available rise of temperature of the carbon forming the stove.

Hence the apparatus fraction of the McTighe heater was $\frac{.5}{39\cdot14} = .01277$ and that of the Burton stove was obviously much less.

Another way of considering the test is as follows: The difference between the actual temperature of the carbon rods and that recorded by the thermometer could not have been very great; for the reading at the expiration of the longest run (100 minutes) was only 117° F. as compared with 84° F. at the commencement. It is, therefore, reasonable to assume that the average difference of temperature between the stove and the thermometer was, say, 20° F.

Now, according to Péclet, 1 sq. ft. of lampblack loses (or absorbs) radiant heat energy in one hour to the extent of .8196 lb.-degree Fahrenheit units for every degree Fahrenheit of difference between its own temperature and that of surrounding bodies. Taking this figure (obviously an excessive one) for the carbons with their surface of 1·35 sq. ft., the radiation per minute for every 1° F. excess of temperature will be $\frac{1\cdot35 \times .8196}{60} = .018441$ thermal unit; and for 20° F. excess, the emission will be .36882 unit per minute.

But the energy employed is .605 H. P. = 25·8335 thermal units per minute; and, therefore, the apparatus fraction is $\frac{.36882}{25\cdot8335} = .0143$.

It may, however, be urged that the cost of electric heating should be

compared with that of the usual method of steam heating, rather than with the more economical but less convenient stove and fire-place system. Let us make this comparison.

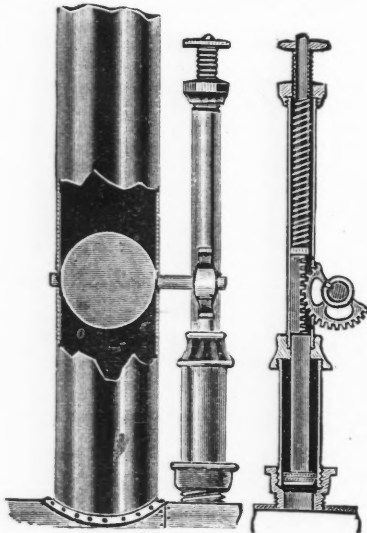
One pound of coal burnt in the furnace of a steam boiler will convert about 9 lbs. of water into steam at a pressure sufficient for travel and utilization in radiators, etc., and each pound of steam should deliver about 250,000 calories for warming purposes. Four pounds of coal, therefore, will, if employed in this manner, give out warmth to the extent of $4 \times 9 \times 250,000 = 9,000,000$ calories; whereas the consumption of the same amount of fuel for electric heating will give 645,850 calories. The electric heating system thus requires $\frac{9,000,000}{645,850}$ or 13.93 times as much coal as is required for ordinary steam heating.

If the heat be required for smelting, the comparison must, of course, be made with coal or coke consumed direct.

It will probably be admitted that the figures above given are utterly prohibitory as regards any general introduction of electric heating or smelting, though for certain special purposes, such as railroad and street car heating, electric welding, the convenient localization of high temperatures (e. g. in the Cowles aluminum process) and the like, it may well be that the extra fuel cost of electricity is more than compensated by practical advantages not otherwise attainable.

But the question assumes an entirely different aspect in localities where water power is procurable, and where fuel is scarce, as, for example, in the case of many mining districts. The cost of installing and maintaining a water-driven electric plant will be moderate, and although the effective output of heat at the point of consumption may still be a comparatively small fraction of the actual water power employed, its raw material, so to speak, will be obtained without charge. It is in this direction that the next great industrial development of electricity may be looked for. The judicious utilization of water power will provide remote mining districts with fuel, in addition to mechanical energy and means of transportation, and will thus enable work to be carried on where otherwise all effective labor would remain impossible.

The use of electricity for the actual smelting of ores as distinguished



AUTOMATIC DAMPER REGULATOR.

from mere mechanical concentration may seem open to doubt. But it is certain that electricity may be made to provide fuel in the literal sense of the word, and fuel, moreover, of a character eminently suited for metallurgical operations. The decomposition of water by an electric current is nowadays a phenomenon of quite hoary antiquity; but the actual figures of the case are seldom borne in mind. Yet as 1 H. P. hour, if employed electrolytically, is capable of yielding $7\frac{1}{2}$ cu. ft. of hydrogen and $3\frac{1}{2}$ cu. ft. of oxygen, it will be seen that practical quantities of reducing and oxidizing gases may easily be obtained for use in furnaces or other metallurgical apparatus. It is true that the combustion of the $7\frac{1}{2}$ ft. of hydrogen would yield only 645,850 calories, or the equivalent of 1898 lb. of coal; but the gaseous form of the fuel and its reducing character would render it vastly more applicable and effective. I therefore think it consistent with due sobriety of professional judgment to believe that by this method of utilizing electricity many a mine may so far smelt its ores as to largely reduce the cost of carrying them to market, and may also successfully treat various classes of so-called "refractory" ores.

A Steel Pipe Line Project in Persia.—A scheme has been propounded by M. Ragosine, providing for the construction of a steel pipeline from the Baku oil district on the Caspian Sea, through Persia, to the Persian Gulf, for the conveyance of kerosene. The laying of the proposed conduit would obviate transport from Baku to Batoum and through the Suez Canal, and would secure to the Russian kerosene considerable advantages over the American products so far as the supply of the Asiatic market is concerned.

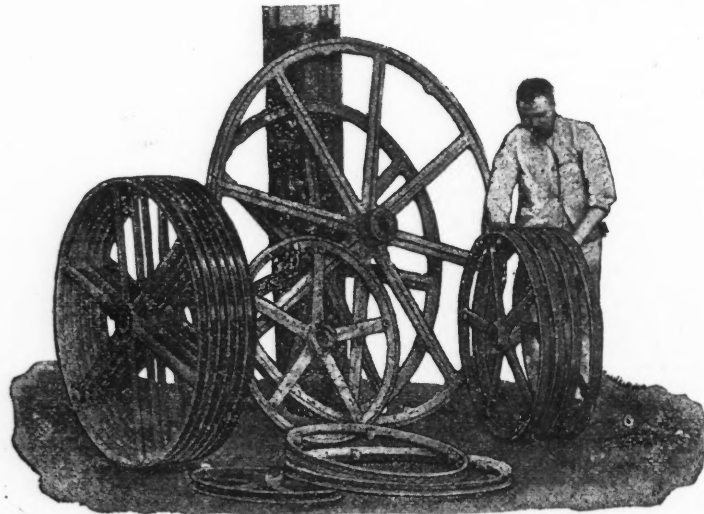
Basic Zinc Nitrates.—M. J. Ribau, in *Comptes Rendus*, describes some of his experiments on the formation of basic zinc nitrates. He acted on chemically pure zinc with nitric acid diluted with an equal volume of water. Neutral nitrate of zinc is first formed, but if the acid is boiled in presence of an excess of metal a white precipitate of a basic salt is formed. If, after this precipitate has been filtered, the solution is allowed to cool gradually, further deposits are formed, first of rhombic tablets and needles and subsequently of short needles grouped in stars. These precipitates when filtered off are found to be basic nitrates of zinc of various compositions, but the exact analysis has not yet been made.

AUTOMATIC REGULATOR FOR STEAM GENERATOR FURNACES.

The invention illustrated by the accompanying engraving is a radical departure from the general line of damper regulators, and is particularly interesting because of its direct action and the absence of detailed mechanism. The construction is extremely simple. The regulator is shown applied to a boiler smoke-stack. A sectional view of the device is also shown which clearly outlines the interior mechanism. The device is provided with a small cylinder which contains a piston. Upon the stem of the piston teeth are cut which engage with a section of a gear. The gear is centered upon the shaft of the damper. The piston stem is surrounded by a casing which contains an adjustable spring regulated by a screw which exerts its force downward on the head of the piston stem. When the device is to be applied to a boiler the damper is held in a plane which is vertical to the plane of the stack; in this position the cog wheel engages with the teeth on the piston stem, when the piston is seated on the bottom of cylinder. By setting the adjustable screw at the head of regulator the spring pressure may be arranged to withstand any desired boiler pressure. As soon as a certain pressure is developed in the boiler the piston will commence to rise, overcoming the spring pressure, and the damper will be slowly turned by the cog wheel; thus the draught will be regulated or entirely shut off. As the pressure subsides the damper will open again. The regulator is the invention of John Levy, of Lindsay, Can.

PULLEYS AND SHEAVES FOR ROPE POWER TRANSMISSION.

The necessity for high speed and economy in space in factory work has created a demand for a perfect system of power transmission. The use of a rope as a substitute for leather belting or line shafting is commanding increasing attention from all. With the subject of power transmission by rope another subject arises—the pulleys upon which the ropes are to be carried. The use of ropes for this purpose is not new, but the system and present application develops some interesting improvements in this line. The old style sheave, which was cast with a solid face



PULLEY FOR ROPE POWER TRANSMISSION.

and grooved by the lathe to suit the size of rope, is being superseded by more approved styles and designs.

The Link Belt Engineering Company, of this city, are pioneers in this line. This firm, realizing the aforementioned facts, has designed a new pulley, or, more properly, sheave, which has some novel features. By reference to the accompanying engraving the new sheaves will be seen, both singly and combined. The sheave is cast with a single groove and ordinary arms. The sheaves are made to accommodate any desired number of strands by adding extra arms and rings. This is done as follows: A singly grooved sheave is bolted between the rings; the sheaves are arranged with shoulders which surround the bolt holes and extend until they are flush with a line drawn from rim to hub. The ring is arranged in the same manner and thus the ring may be bolted on the rim of the sheave, on either side; this would make the pulley with three grooves. If the number of grooves is desired to be increased a groove with arms similar to the original one is bolted on either side of those already together and so on to any number required.

This system allows of the increase in power of plant after installation, as at any time addition may be made to the pulleys driving and driven, and additional laps of rope applied. The sheaves made in this manner are light and at the same time stronger than a solid cast sheave. They are made in all sizes and to accommodate any diameter of rope.

The Fumes from Dynamite.—In a recent number of *Le Genie Civil*, Mons. P. F. Charon says that the products of combustion from a charge of dynamite have been found to be approximately: Steam 19%, carbonic oxide and carbonic acid 58%, nitrous products 15% and nitroglycerine vapor in varying quantity. The carbonic oxide, nitrous compounds and nitro-glycerine vapor are very deleterious, and their formation should be prevented. This M. Charon says can be best done by using a more powerful detonator, say 1 to 13 grammes instead of one-half gramme of fulminate, thus making the combustion more perfect. To counteract the effects of the injurious fumes the author recommends a draught of strong, pure coffee and the inhalation of ammonia, sulphurous acid or concentrated acetic acid.

DETECTION OF NICKEL IN PRESENCE OF COBALT.

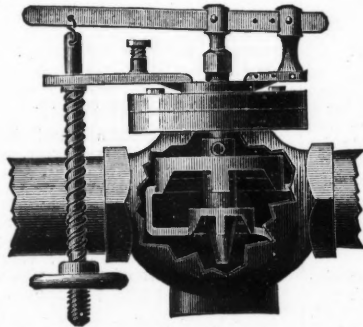
Liebig's cyanide method for the qualitative detection of nickel in presence of cobalt has been improved and simplified by Mr. F. J. Hambly, of Dundee, Scotland, says *Chemical News*. The conversion of potassium cobaltous cyanide into the cobaltcyanide by boiling with hydrocyanic acid (at best a dangerous experiment) is always incomplete; but that by means of a suitable oxidizing agent, in alkaline solution the cobalt may be directly converted into the soluble cobaltcyanide, the nickel being simultaneously precipitated as hydrated nickelic oxide. The method of detecting nickel in presence of cobalt is then as follows: Separate the mixed sulphides from the ammonium sulphide precipitate by means of cold dilute hydrochloric acid, and test a small portion on a borax bead. The presence or absence of anything more than a trace of cobalt is directly indicated by the coloration produced. Dissolve the sulphides in hot hydrochloric acid with the aid of potassium chlorate, boil off the excess of chlorine, and remove the excess of acid either by neutralization or evaporation to dryness. To the neutral solution add an excess of freshly prepared solution of potassium cyanide in cold water, beyond what is necessary to resolve the precipitated cyanides. Boiling is unnecessary. Make the solution decidedly alkaline with sodium hydrate, add about twice the volume of bromine water, heat gently, allow to stand a few minutes, and filter off the precipitated nickelic oxide. The nickel may be confirmed by the borax bead reaction after washing the precipitate.

There is no liberation of hydrocyanic acid at any stage of the process, so the operations may be safely conducted in the open laboratory. Commercial cobalt salts almost invariably give a precipitate of nickelic oxide. The cyanide method has the advantage over the precipitation of the cobalt as potassium cobaltinitrite, in that the separation is most frequently carried out with the object of detecting nickel, which metal is immediately separated as a precipitate readily available for examination.

If the analysis is to include a search for traces of cobalt, the alkaline filtrate from the nickel precipitate is placed under the hood, acidified with excess of sulphuric acid, and evaporated until the excess of acid is nearly expelled. The residue is taken up with water, made alkaline with ammonia, the cobalt, if present, precipitated by ammonium sulphide, and confirmed by the borax bead. Or, a portion of the neutral solution, containing the nickel, may be treated with acetic acid and potassium nitrite, and the traces of cobalt directly precipitated by allowing to stand for a few hours.

THE ACTON NOISELESS BACK PRESSURE VALVE.

This ingenious contrivance is constructed on a careful interpretation of the natural laws. It may be seen at work in the engine room of the Holland House, Thirtieth street and Fifth avenue. The engine discharges directly into the pipe close to the valve, and shows no signs of



jumping. Being set up immediately under the dining room floor, it was necessary to keep noise and vibration down to a minimum. This valve is readily adjusted to any point of the stroke, and will keep tight for years; so says the inventor. It is of the piston type, and can be operated horizontally or upright. It is invented and manufactured by John Acton, of No. 193 Worth street, this city.

THE COAL RESOURCES OF PERU.

The following are some notes on the resources of Peru by Mr. Edmund Lane, late engineer of the Callao and Oroya Railroad: The country is divided by the Cordilleras into distinct longitudinal regions, viz., the coast, the Sierra and the Montaña. The Sierra is the region of numerous mines and of the precious metals. The Montaña is an immense and heavily timbered region lying on the eastern slopes of the Andes and extends to the Amazon. In the beds of the torrent streams are found rich deposits of gold. On the coast exist large deposits of common salt, nitrate of soda, and petroleum, with shipping ports conveniently adjacent. In the spurs or branches of the Cordilleras of the Andes are found coal (both bituminous and anthracite), gold, silver, copper, lead, and cinnabar, besides a number of other minerals. As a general axiom, the more valuable a mineral deposit is the more difficult is the access to it. This eminently applies to the mineral regions of Peru. The lack of railways and even of good mule roads is the main reason why so much of the mineral wealth of Peru remains to this day in a more or less virgin state.

The coal deposits, vast as they are, have been practically untouched. Good bituminous coal is found in the department of Junin, within a short distance of Oroya on the Amazonian slope, to which town the Central Railway will shortly be opened. Coke made from this coal has already been successfully used on a large scale at Casapalca smelting works. At Cerro de Pasco, and close to the proposed line of railway, immense bituminous coal deposits exist. This coal will be available for smelting and general purposes when once brought within reach by the railroad, and industries, heretofore financially impracticable, will spring up. Some idea of the economy that will result may be formed when it is known that once the railroad is completed to Cerro de Pasco, this coal may be mined and placed on the cars at from \$1.80 to \$2.40 a ton. Bituminous coal is found in many other parts of Peru, but the deposits especially referred to

are those which the projected lines of railway will make immediately available. This coal is burnt in grates in the houses of Cerro de Pasco.

Anthracite coal is found in the Department of Ancacha in inexhaustible quantities, and immediately contiguous to the proposed line of railway from Chimbote to Caraz. Landing at the port of Chimbote, and following the Santa River up its at present almost impassable gorge, large measures of anthracite coal are found at various points. Within a quarter of a mile of the town of Caraz, which has a population of 8,000 people, coal deposits exist from which the coal can be readily mined and placed on the trucks for \$1.50 to \$1.80 a ton. Anthracite coal is also abundant in the province of Huamachuco. Numerous beds exist in the sandstone formation. Near Huamachuco there are two mines worked, the measures in which are 1½ and 2 metres thick respectively. In Llary the coal measure is 4 metres thick, and at the Victoria Smelting Works this coal is used for smelting the ores. The analyses of the various coal samples go to show that they do not compare unfavorably with American and English coal. Large deposits of lignite are found in the Departments of Arequipa and Puno.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

United States Circuit Court.

COAL MINES—PRIVATE CORPORATIONS—FORECLOSURE—RECEIVER'S CERTIFICATES—EQUITY JURISDICTION.

Case.—Where defendant coal company conveyed to complainant trust company, as trustee, coal mining properties in Vermilion County, Ill., to secure \$500,000 bonds. Suit to foreclose by holders of bonds.

1. In a suit to foreclose mortgage on a coal mining company's property the Court has no power as against the objections of any number of the mortgage bondholders, to authorize receiver appointed in the suit to issue first lien certificates on the property mortgaged in order to run the mines.
2. When it becomes necessary for a Court of Chancery to take possession of property subject to litigation, by placing it in the hands of a receiver, all expenses incident to the preservation of the property, are properly chargeable against it, and if there be no income such expenses will be paid out of the proceeds of the property before distribution to any creditors.

3. Private corporations owe no duty to the public and their continued operation is not a matter of public concern. It is only against railroad mortgages that the S. C. U. S. has sustained orders giving priority to receivers' certificates representing particular debts, and then only on principles having no application to a mortgage executed by a private corporation.

4. It is to enable him to operate the mines for the benefit of bondholders against the wish of part of them that the receiver desires to be authorized to issue certificates which shall be a prior lien upon the trust property. Extensive as are the powers of courts of equity, they are not authorized to thus impair the force of solemn objections and destroy vested rights.—From the Circuit Court, S. D. of Illinois, *Gresham, C. J.—Farmers' Loan and Trust Co. v. Grape Creek Coal Co.* [Decision, May, 7, 1892.]

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:

TUESDAY, JULY 5TH, 1892.

- 478,077. Prospecting Drill. Albert Ball, Claremont, N. H., Assignor to the Sullivan Machinery Company, same place.
- 478,110. Process for Reducing Zinc or Spelter from Ores. Christopher James, Swansea, England.
- 478,132. Ammonia Distilling Apparatus. William L. Rowland, Philadelphia, Pa.
- 478,138. Electric Mine Car. Elmer A. Sperry, Chicago, Ill.
- 478,141. Mining Machine. Elmer A. Sperry, Chicago, Ill., Assignor to the Thomson Houston Electric Co., Boston, Mass.
- 478,159. Separating Apparatus. Eugene L. Howe, Cleveland, O.
- 478,193. Process of Rolling Thin Sheet Steel or Iron. Bernard C. Laute, Philadelphia, Pa.
- 478,209. Ore Pulverizer. John J. Stuart, New York, N. Y.
- 478,225. Hydraulic Machinery. George S. Duncan, Melbourne, Victoria.
- 478,238. Solder for Aluminium. Joseph W. Richards, Philadelphia, Pa.
- 488,282. Apparatus for Coating Metal Sheets. Richard Heathfield, Darlaston, England.
- 478,479. Coal Washer. Sebastian Stutz, Pittsburg, Pa.
- 478,502. Fluid Support for Ore-Concentrating Belts. Frederick C. Corning, New York, N. Y.

TUESDAY, JULY 12, 1892.

- 478,551. Magnetic Separator. Clinton M. Ball, Troy, N. Y., and Sheldon Norton Hokendauqua, Pa.
- 478,595. Mine-Elevator. Stewart Hamilton, Weir, Kan.
- 478,626. Method of Forming Asphalt Blocks. Samuel McCarter, Norristown, Pa. Assignor to the International Pavement Company, Hartford, Conn.
- 478,643, 478,644. Method of Welding Metal Wheels. Emmet H. Scott, La Porte Ind. Assignor to the Niles & Scott Co., same place.
- 478,803, 478,804. Overhead Traveling Crane. John R. Morgan, Alliance, O. Assignor to Thomas R. Morgan, Sr., Thomas R. Morgan, Jr., and William H. Morgan, same place.
- 478,907, 478,908. Process of Reducing Metals. Henry S. Blackmore, Mount Vernon, N. Y.
- 478,915. Brick Machine. Walfrid Burkman, San Francisco, Cal.
- 478,922. Amalgamator. William J. Connors and William W. Eddy, Grass Valley, Cal.
- 478,936. Manufacture of Steel Ingots. Charles W. Kennedy and John W. Grantland, Philadelphia, Pa. Said Grantland assignor to said Kennedy.
- 478,971. Machine for Extracting Gold from Pulverized Ores. Thomas C. Simonton Paterson, N. J. Assignor to Thomas C. Simonton, Jr., same place.

Action of Water-Gas on Iron.—In the course of some experiments upon the utilization of water-gas in lighting, Messrs. Roscoe and Scudder observed that the ring of magnesia, used as the incandescent body, became covered, after some hours, with a light coating of oxide of iron which sensibly diminished the lighting capacity of the apparatus. Their researches have led them to ascribe this to the presence of a volatile compound of iron in the gas, probably the carbo-oxide of iron described by Mond and Quincke. The action of carbon monoxide upon iron is most marked when the water-gas is under a pressure of from five to eight atmospheres.]

PERSONALS.

Mr. W. R. George, mining engineer, of Brooklyn, has been appointed superintendent of the Candela Mining and Smelting Company, whose mines and works are located in Mexico.

Mr. W. de L. Benedict, mining engineer, of 18 Broadway, this city, intends to start for British Columbia about the 20th inst., to be absent several weeks at Illecillewaet, British Columbia.

Lord Thurlow and party are now in Deadwood. Captain Thomas, of the Dalcouth mine, Cornwall, England, refused to give an opinion concerning the Harney Peak Company, but will make a report upon returning to London.

Mr. Alex. de Barril, of Calvert County, Mo., is endeavoring to reorganize the Drum Point Telegraph and Telephone Company and secure the completion of the lines from Baltimore to Drum Point. Much of the work has already been done.

A new technical journal entitled "Transport" has made its appearance in London. It is a weekly review of docks and harbors, canals and railways, and in its make up, system of arrangement and method of treating matters it much resembles Mr. Labouchere's "Truth." It is very ably edited.

Messrs. Alfred Harvey, of Harvey Brothers, and Frank Kelley, of Kelley, Deut & Co., both of them prominent mining men, from London, England, have visited Oroville, Cal., with Major Frank McLaughlin, and have made an examination of the mines of that section. They also carefully examined the Golden Feather Company's property.

The last Iowa Legislature passed an act for a complete geological survey of the State, and appropriated \$10,000 annually for that work. The State Geological Board met on the 8th inst. to appoint a State Geologist. The members of the board are President Schaeffer, of the State University; President Beardshear, of the Iowa Agricultural College; Professor Nutting, of the State University; President of the Academy of Science, Auditor Lyon and Governor Boies. The salary of the State Geologist was fixed at \$2,500, he to pay his own expenses. Samuel Calvin, of the Scientific Department of the State University, was elected.

The second annual meeting of the Mechanical Engineering Teachers' Association will be held at Rochester, N. Y., beginning Aug. 18th, the place and time of meeting being coincident with that of the American Association for the Advancement of Science, in order to accommodate those who wish to attend both meetings. The object of the former association is stated to be "to determine upon and to secure by co-operation the best courses of study, and the general adoption of methods of instruction, leading to the highest efficiency of schools of mechanical engineering." The officers are S. W. Robinson, Columbus, O., President; A. J. Wiehard, Las Cruces, N. Mex., Secretary; Storm Bull, Madison, Wis., Treasurer.

John Schaeffer, a mining speculator well known on the Pacific coast, and who has been located at the city of Chihuahua, Mexico, was murderously assaulted on the 2d inst., and barely escaped with his life. He was returning from Jesus Maria with his assailant, with whom he had become casually acquainted on the road, and when nearing the night camp the Mexican dropped behind and opened fire on his companion. The first shot wounded Schaeffer in the neck, and another ball took effect in his jaw. The Mexican did not suffer, it is thought, from the return fire, and escaped. Meantime Schaeffer reached Chihuahua, where he is confined by his injuries. This following so soon after the murder of Andrew Fraser, of San Francisco, on the same trail, should force the Mexican Government to weed out these bandits.

The National Mining Congress met at Helena, Mont., on the 12th inst. The opening day was presided over by Mr. Champions Chase, of Nebraska. Governor Toole, of Montana, in a brief address welcomed the delegates to Helena. He said that the great West will have an opportunity to formulate its claims and present them to the American people. Francis T. Newland, of Nevada, referred to the growth of public spirit in the mining States. He compared the Northwest of 40 years ago to the Northwest of to-day, and said that by uniting common interest they could have much influence. The drilling contest took place in the evening. Many prominent men are present.

At the second day's session permanent organization was effected by the election of Francis G. Newland, of Nevada, president. On taking his seat Mr. Newland made a strong silver speech, urging the mining States to put the interests of silver before party interests, formulating a plan how party organization could be preserved in each mining State, and the people still be able to use their power to advance the free coinage of silver. A dispatch from Senator Stewart was read. The Committee on Resolutions submitted two reports. The majority report favored unlimited free coinage. The minority report favored a bimetallic congress. Pending the decision a dispatch was received announcing the defeat of the Silver Bill in the house. Action on the resolution was thereupon deferred.

OBITUARY

Horace S. Page committed suicide recently at Amador, Cal. He was interested in mining enterprises in Mexico.

Whitney A. Case, a prominent iron and copper manufacturer, of Buffalo, N. Y., died at Carlsbad, Germany, on the 12th inst.

The Hon. John Robson, Provincial Secretary of Mines and Prime Minister of British Columbia, died in London a few days ago, his death being the result of blood poisoning caused by the amputation of a finger that had been crushed in the door of a cab.

The death is announced of Dr. Carl Schorlemmer, F. R. S., the eminent chemist and professor of organic chemistry, at Manchester, England. He will chiefly be remembered as the author, conjointly with Sir Henry Roscoe, of Roscoe & Schorlemmer's "Treatise on Chemistry."

James A. Pierce died in Denver, Colo., on the 8th inst. Mr. Pierce went to Colorado from New Hampshire a young man of 20 in 1859, and it may be said, was the pioneer of pioneers of Summit and Park counties, where he has since resided and been universally respected. He was for many years engaged in prospecting and placer mining in Summit County, Colo., and was one of the party of six who discovered the Quandary lode at the head of Blue River in 1860 (now known as the Monte Cristo mine), the first silver mine located in Colorado, and represented Summit county in the legislature in the session of 1867 and 1868. In 1872 he joined the prospectors for silver on Mount Lincoln in Park County, Colo., where he continued to follow mining in all its various phases.

Cyrus W. Field died at his home at Ardsley Park, Dobbs Ferry, N. Y., on the 12th inst., aged 73 years. Cyrus West Field was born in Stockbridge, Mass., on Nov. 30th, 1819. He came to New York City at the age of 15, and secured a position in the employ of A. T. Stewart. At the age of 21 he began the manufacture and sale of paper on his own account, and soon had a prosperous business. In 1853 he spent about six months traveling in South America. The enterprise through which he has become best known is the laying of the Atlantic cable. Communication with England by this means was first established in 1858, but after working satisfactorily for a few weeks the cable ceased to act. It was not until July 27, 1866, that telegraphic communication between this country and England was successfully established. In 1869 Mr. Field attended the opening of the Suez Canal as the representative of the New York Chamber of Commerce. In 1876 he became interested in the elevated roads of this city, and devoted much time and money toward their construction. In 1880 he left New York for a trip around the world, and since his return he had obtained concessions from the Sandwich Islands for the laying of a cable between San Francisco and those islands, with a view to its ultimate extension across the Pacific Ocean.

SOCIETIES.

The summer meeting of the Engineers' Association of Virginia was held at Richmond July 4th and 5th. A large number of engineers were present. Mr. Herman Cruiger, of Roanoke, read a paper on "A National Railroad School" in which he dilated upon the technical requirements necessary to those holding positions in the railroad service, and outlined a course of instruction for a school which would prepare young men for railroad work.

INDUSTRIAL NOTES.

The Waterbury Brass Company, Conn., is erecting a new wire mill, with a wing for wire drawing.

The Shenandoah Brass Works at Charleston, W. Va., have been purchased by Victor Harder, of New York.

The Government of Nicaragua has finally adopted the metric system, which will be in force on and after Jan. 1st, 1893.

The municipal authorities of Berlin, Germany, have devoted 10,000,000 marks for an international exhibition, provided that it is not held later than 1898.

The Findlay Rolling Mill Company, of Findlay, O., and the Anchor Iron and Steel Company, of Newport, Ky., have signed the Amalgamated Association's scale.

The McVay Galvanized and Corrugated Steel Mill of Chicago, Ill., is to be torn down and moved to Muncie, Ind., where it will be run in connection with the Midland Steel plant.

The new works of the Baltimore Malleable Iron and Steel Casting Company, Md., are in operation. The plant is said to be the only one of its kind in the South. It consists of a foundry and an annealing house.

Evan Powell, president of the Powelton & Pocahontas R. R. Company, has made arrangement for a shipment of 1,000,000 tons of coke to Mexico. A steamer has already taken 1,847 tons of Pocahontas coke for Tampico, Mexico.

The Talladega Iron and Steel Company's furnace at Talladega, Ala., have been sold to William J. Parrish, 35 Wall street, N. Y., for \$140,000. The furnace has been idle for some time, but it is now understood that the plant will be started in operation at once.

The experimental concentrating plant of the Walborn-Swenson Manufacturing Company at Fort Scott, Kan., is working successfully, and is handling shipments from all sections of the country, thus proving to mine owners whether or not it is advisable to erect a plant at the mine.

The New York Board of Railroad Commissioners granted permission to the Second Avenue Street R. R. Company on Tuesday, July 12th, to change from horses to the use of storage batteries, the patent for which is owned by the Waddell-Intz Company. It will be interesting to note if this attempt at the use of storage batteries for traction purposes will be more successful than heretofore.

A successful effort is being made to secure 2,300 tons of steel rails, forming the cargo of the British ship "Abercorn," wrecked just north of Gray's Harbor, Portland, Ore., three years ago. A wharf has been built out to the wreck, a distance of 1,500 ft., and the rails are hoisted out by engines and derricks. Four divers are employed in attaching the hoisting gear to the rails.

The erection of a large foundry has been begun by the Carnegie Steel Company at Braddock, Pa., on the west side of Turtle Creek. It will make molds for the Edgar Thomson, Homestead and Duquesne Steel Works. It is expected to be finished by September; about 100 men will be employed.

Furnace No. 3 of the Troy Steel and Iron Company was successfully blown in on July 5th, the match being applied by Miss Jessie F. Thomas, of West Troy. Furnace No. 1, which was blown in in February, 1891, is doing excellent work. Furnace No. 2, blown out April 20th last, made a very satisfactory blast, producing 106,000 tons Bessemer iron. It is now being relined and repaired. The Bessemer steel works of this firm will start up on July 18th.

The Westinghouse Electric and Manufacturing Company, of Pittsburg, have brought suit against the Duquesne Traction Company and the Pittsburg, Allegheny & Manchester Traction Company, for infringement on the old Finney overhead patent trolley system. The suit is similar in many respects to the one recently brought against the Pittsburg & Birmingham Traction Company, which was compromised by the latter company agreeing to equip their entire system with the new Westinghouse single reduction and gearless motors.

The West Pullman Land Association has closed a contract with Levi Carter, of Omaha, President of the Carter White Lead Company, whereby the plant of this concern will be located in five acres in West Pullman. Fifteen buildings will be erected, costing in the aggregate about \$300,000. The structures will be of brick, from one to three stories high. The tonnage in and out of West Pullman from the inlay and output of the works will be between 50,000 and 60,000 tons per annum, it is stated.

Over 1,000 workmen employed in the nail factories of Montreal, Canada, are now idle owing to the strike of the 200 feeders and grinders. The strike started on July 1st. The work in the large manufacturing of Peck, Benny & Co., Montreal Rolling Mills, and Pillow, Hersey & Co. does not exceed more than 4 to 7 months per annum, and the men, being dissatisfied, decided to apply for a new scale. This was submitted to the firms, and no answer being given the men struck.

After fifteen years' experimenting, the Pennsylvania Railroad Company has decided to discontinue the use of steel ties. The steel ties are found to be too light, and they cannot be kept in line or made to take hold of the ballast firmly. The company has placed an order with the Pennsylvania Steel Company for 2,000 tons of steel rails, weighing 100 lbs. to the yard. The heaviest rail now in use on the tracks of the Pennsylvania Railroad weighs but 85 lbs. The new 100-lb. rails will be laid as an experiment on the mountain division of the main line.

Four terrific explosions occurred at the works of the Giant Powder Company, at Highland, on San Francisco Bay, Cal., on the 9th inst., the first being caused by a fire in the nitro-glycerine works. One large magazine and the black powder mills were destroyed. Three white employees were killed, and a boy was fatally injured. The bodies of two Chinese employees were also found, and it is thought that several others lost their lives.

The San Francisco Chemical Works, San Francisco, Cal., were damaged to the extent of \$150,000, and many windows were shattered and buildings damaged in the city of San Francisco, 12 miles away. The explosions were also felt at Sacramento, 80 miles off. The loss to the powder company may reach \$200,000.

The Neidringhaus Tin Plate Works at St. Louis, Mo., comprise a sheet mill 150 ft. long by 100 ft. wide, an annealing department 150 x 65 ft., and a tinning department 250 x 60 ft. The investment has

already reached \$400,000. The factory is at present engaged upon roofing plates for the new union depot in St. Louis. The works are run day and night, there being three relays of hands working eight hours each. Of the 350 men now employed only 15 learned their trade in Europe. A new mill of double the capacity is being built.

The Westinghouse Electric Company is at work on the apparatus for the World's Fair. The contract calls for between 89,000 and 90,000 lights. The plan is to build 8,500 light machines. Although built as 8,500 light dynamos their capacity will be more than that; so that they will more than supply the total amount of lights required. For each large machine a low speed will be required, and they will consequently be multipolar in construction. Their speed will be about 400 revolutions per minute. Two or three similar dynamos have been made by the company, and they are running in as many different stations.

The House of Representatives has granted \$151,000 for the enlargement of the heavy gun carriage works at the Watertown Arsenal. The house has also granted the amount estimated for completing the equipment of the south wing of the Watervliet gun factory. This will permit the manufacture each year of fifteen 12-in. and three 16-in. guns. In addition it has given \$125,000 for finishing and assembling heavy guns at this factory, and as a consequence during the next twelve months, beginning July 1st, there will be completed, for sea-coast defense, eighteen 8-in., fourteen 10-in. and six 12-in. guns.

The telegraphs of Great Britain were transferred to the Government Feb. 5th, 1870. In April, 1891, there were 31,824 miles of line, and 194,312 miles of wire (including 17,211 miles of private wire, but excluding railway companies' wires. The telegraphs earned over working expenses in 1891 £150,335, but as there is an annual interest of about £300,000 on capital, there is really a deficit; 66,409,211 telegraphic messages were forwarded from postal telegraph stations in 1891—an increase of a little more than four millions over the number sent in 1890. The House of Commons has now authorized the Government to assume control of the telephone trunk lines.

At Youngstown, O., a deal was consummated recently by which the interests of two of the largest iron and steel plants at that place have been consolidated under the name of the Union Iron and Steel Company, with a capital stock of \$1,500,000. The two plants referred to are the Enterprise Iron Works, operated by Cartwright, McCurdy & Co., Youngstown, O., and the Youngstown Iron and Steel Company, operating the Trumbull Iron Company, at Girard, O.; the Youngstown Rolling Mill Company, at Youngstown, O., and the Warren Iron and Steel Company, at Warren, O.

On Friday, the 8th inst., the Carnegie Steel Company, Limited, of Pittsburg, signed the Amalgamated Association scale for rod rolling for their Beaver Falls mills at Beaver Falls, Pa. The scale for rolling wire rod from 4-in. billets to No. 5 wire gage, 2,240 lbs. per ton, as signed by the firm was as follows: Roller, price per ton, 2,240 lbs., 30 cts.; roller's helper, 9 cts.; heater, 36 cts.; helping, 13 cts.; telegraphing, 11 cts.; rougher, 18-in. mill, 10 cts.; bull-dogger, 7 cts.; sticker, 12-in. mill, 7 cts.; troughman, 6 cts.; finishing, 10 cts.; diamond, 9 cts.; square, 7½ cts.; oval and shear, 8½ cts.; No. 1 hook, 6 cts.; No. 2 hook, 5½ cts.; reeler, 8-10 cts.

A second attempt is to be made to build an observatory at the top of Mont Blanc. As the workmen who tunneled last year through the snow did not come upon rock, M. Janssen has decided that the building should be erected on the frozen snow. The observatory is to be a wooden building eight metres long and four metres wide, and consisting of two floors, each with two rooms. The lower floor, which is to be imbedded in the snow, will be placed at the disposition of climbers and guides, and the upper floor reserved for the purposes of the observatory. The roof, which is to be almost flat, will be furnished with a cupola for observations. The whole building will rest upon six powerful screw-jacks, so that the equilibrium may be restored if there be any displacement of the snow foundations.

The Commissioner of Patents has rendered a decision awarding to Joseph W. Swan the right to a patent, on priority of invention, for electric lighting carbons, such as are used in the curved or loop form, in the glass vacuum bulb for interior lighting. Swan's date of invention is March 1st, 1880; he filed his application for patent April 12th, 1880, and his patent was issued Oct. 19th, 1880. Edison's preliminary claim is that he conceived the invention in August, 1879. In the testimony his claim is that he made the invention in October and November, 1879. He filed his application for a patent May 27th, 1881. The decision is rendered on an appeal from the decision of the examiners-in-chief awarding priority of invention to Edison.

The American Flint-Glassworkers' League met at Corning, N. J., on the 12th inst. At the morning session the annual reports of President Smith and Secretary Dillon were read. The president's report dealt with the action of the conference committees of the workmen and manufacturers. Secretary Dil-

lon reported the condition of trade during the last year. Mr. Dillon's report this year contains an addition, in the shape of a statement of the wages earned by the locals throughout the country. The glassworkers last year earned \$4,418,405.79, and the average of earnings of the 7,250 members was \$11.72 a week. The League has \$128,700 in the treasury, \$10,000 more than last year.

Mr. E. A. Jochenning, of Mount Clare, Mo., has invented an electric lock which can be controlled and operated from a distance. One of these locks is in use on each end of the Baltimore & Ohio Railroad bridge across the Susquehanna River. When a train enters the bridge on the east side a telegraph operator pushes forward a lever which controls an electric wire that locks the switch on the west side of the bridge, so that the operator on the west side cannot open the switches and let a train on the bridge from his side until he notifies the man on the east side by two rings of an electric bell. When he hears the two rings the operator on the east side, knowing that his train is safely across, draws back his lever and unlocks the switch on the west side. One of these electric locks is also in operation at Race street crossing, Philadelphia, and at the Fairmount Park tunnel.

The Pittsburg Iron and Steel Engineering Company have been awarded the contract for the erection of the new Bessemer steel plant to be built by the National Tube Works Company, at McKeesport, Pa. The main equipment of the plant will consist of two 8-ton Bessemer converters, a 34-in. blooming train, one pair of 36x48 in. reversing engines, a compound blowing engine with two 52x60-in. blowing cylinders and three five-hole raking pit furnaces. The converting house will be so arranged that the casting will be done on cars and stripping will be done by the same methods as are in practice at the Edgar Thomson Steel Works and also at the Sparrow Point plant of the Maryland Steel Company. The new plant will be located adjacent to and just south of the two Monongahela blast furnaces of the Monongahela Furnace Company, owned by the National Tube Works Company. The direct method of conveying the molten metal will also be used. The soaking pit furnaces will be charged and drawn by means of an electric crane, and a second electric crane will be built over the blooming train for use in changing rolls and doing other work. When completed the plant will have a capacity of about 500 tons of Bessemer steel every 24 hours. This product will be used in the manufacture of pipes and tubes, of which the National Tube Works Company are the largest manufacturers in this country. Work on the erection of the plant will be commenced in a short time, and it will be pushed to completion as rapidly as possible.

The lawless conduct of the striking workmen of the Carnegie Steel Company at Homestead, Pa., made it necessary for Governor Pattison to send a large body of the State militia to that place on the 12th inst. to enforce order. The salutary effect of this measure provokes regret that it was not taken earlier. The strike continues and the mills are idle, but the officers of the company declare that the places of the strikers shall be filled with non-union men within a fortnight and work be resumed. The strikers are reported as saying that no non-union men shall be permitted to accept employment in the Homestead works. A Congressional Committee, of which Representative Oates is the chairman, began an investigation on the 13th inst. into the causes that led to the riot of last week.

Mr. H. C. Frick, chairman of the Carnegie Steel Company, produced the pay-roll of the 119-in. mill for the month of May last, which contained the name of every man and boy employed in that department, the number of days worked, and the amount he received. The wages ranged all the way from \$40 to \$275 per month. The wages of the rollers were the highest. These averaged from \$250 to \$275 for the month. The heaters from \$185 to \$190; heaters' helpers about \$130; trainmen from \$97 to \$120; head shearers, \$100; shearers' helpers, \$95; gaugers, \$75, and a variety of other men averaging about \$75. The total amount paid in wages to this department for the month of May was \$20,202.95. Mr. Frick explained that the proposed reductions were based on the decline in prices during the three years. Tank steel plates were reduced 21%; beams and channels, 39%, and steel billets, 16%. The reduction in wages was about 15%. The investigation will do much to help the passage of a compulsory arbitration law, and also an anti-Pinkerton measure, both of which have been introduced in Congress. Most of the committee, it is said, favor both of these measures. On the 14th inst. the borough of Homestead was practically placed under martial law. This is the outcome of the unwarranted arrest of strangers on Wednesday by special policemen. The employees of the Carnegie Union Mills in Pittsburg went on strike on the same day out of sympathy with the locked out men at Homestead or because the company refused to confer with them. About 3,000 men are affected by the strike. The Beaver Falls (Pa.) plant, which is closed for repairs, was to have resumed operations on Monday next, but the men say they will not return to work unless the firm grants another conference to the Homestead workers. This action is not taken under orders from the Amalgamated Association, though sanctioned by it.

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, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at 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 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.

All 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.

- 2,727. Feed-cutters of every description for hand and steam power. Florida.
- 2,728. A good second-hand 100-H. P. boiler. West Virginia.
- 2,729. A small second-hand prospecting quartz mill; capacity 4 to 10 tons daily. California.
- 2,730. A second-hand concentrator. California.
- 2,731. A second-hand gasoline engine, 6 to 10 H. P. California.
- 2,732. A saddle tank locomotive, 3-ft. gauge, cylinder about 7 x 12. Maryland.
- 2,733. One mile 25 to 30 lb. T rails, fit to relay. Maryland.
- 2,734. A 25-H. P. horizontal slide valve engine, and a locomotive boiler 30 to 40 H. P. Maryland.
- 2,735. A good second-hand cupola complete, 3 to 5 tons, and a good second-hand Sturtevant blower No. 5. Alabama.
- 2,736. A double surface planing, matching and molding machine. Tennessee.
- 2,737. A resaw, swing, cut-off saw. Tennessee.
- 2,738. Electric light plant for a cotton mill. Alabama.
- 2,739. Roofing, belting, shafting and pulleys. Virginia.
- 2,740. A small second-hand locomotive, 3-ft. gauge, saddle tank; weight about 16,000 or 18,000 lbs. Virginia.
- 2,741. A second-hand gasoline engine, 10 H. P. Virginia.
- 2,742. Two heating furnaces for school building; one for wood and one for coal. North Carolina.
- 2,743. Phosphate machinery. North Carolina.

GENERAL MINING NEWS.

In the Senate on the 14th inst. the total of the appropriation for the United States Geological Survey carried by the Sundry Civil Bill was cut from \$562,000 to \$336,000—a reduction of about 40%. Heretofore the appropriation for the survey carried in the bill has been considered practically invulnerable, and the annual attacks made upon Major Powell and his work have failed most signally. A few days ago Senator Stewart renewed his efforts to reduce the sums granted for the various branches of the survey, but he was beaten with ease by Major Powell's friends. On the 14th inst. the assault was started afresh by Senator Wolcott, of Colorado, who made a pointed speech in criticism of the survey. Mr. Wolcott urged that this year's total appropriation should be reduced from \$562,000 to \$400,000, and after launching a general discussion on the question, he set about assiduously to muster as formidable a vote as possible in support of his proposal. His amendment got 24 votes to 28 in opposition—a bigger showing against the survey than had been made in many years. Encouraged by this relative triumph, Mr. Carey, of Wyoming, offered an elaborate scheme of reduction, covering all the various items of appropriation, and resulting in an even greater reduction than that proposed by Mr. Wolcott—namely, from \$562,000 to \$336,000. This substitute for the Appropriation Committee's more liberal allowances was carried in the Committee of the Whole by a vote of 26 to 23. In the Senate, where a second vote was taken, the figures were 28 to 25. Nearly all the far Western senators opposed the survey, and they voted for the reduction. Mr. Wolcott was able to secure the additional votes needed from Eastern and Southern senators, largely, it is said, on personal grounds.

ARIZONA.

Cochise County.

Copper Queen Consolidated Mining Company, Bisbee.—This company has taken a year's option at \$50,000 on the group of seven mining claims known as the Gardner group.

Maricopa County.

Phoenix Mining Company.—Mr. D. E. Wallace, vice-president of this company, said in an interview with our representative: "We have contracted with the Hubbard Machine Works, of Brooklyn, for five stamp mills with a total capacity of 100 tons per day. Two mills are to be delivered in three weeks

and the balance within a short time. The development work at Phoenix is progressing favorably, and in a short time we expect to be treating 100 tons of \$10 ore per day." From the last report of Mr. W. B. Gillingham, the superintendent of the mine, we take the following concerning this property: "There has never at any time been a systematic method of development of this property, the nearest approach to it being the Shipman tunnel. This tunnel runs between 800 and 900 ft. in the mountain, drifts being run on each side. In cutting the tunnel a well defined hanging wall was found, indicative of a true vein, but as yet no footwall has been found. It is the opinion of various experts who have examined the property that the deposits of rich quartz known as the black and red ledges are spurs from the main ledge, but this ledge has not as yet been found. None of the workings of this property are below the 60-ft. level, consequently there is a large field for exploration. Within the last 30 days development work has shown very favorable indications. The black ledge has been cut and ore taken out giving an assay value of \$50 per ton. The work connecting this ledge with the Shipman tunnel can be completed by Aug. 1st. If this connection is made it will cut rich ore at a depth of 115 ft." Mr. Gillingham estimates the ore in sight to be as follows: 1. In the Shipman tunnel, 1,120,000 tons, average assay value \$2.60 2. Between the black and red ledges, 675,000 tons, average assay value \$5. 3. Red ledge deposits, 45,000 tons, average assay value \$5. Lastly, a large amount of high grade ore in the black ledge running from \$30 to \$50 per ton. The quantity cannot be estimated until development work is completed. Continuing he says: "By milling a mixture of the higher and lower grades of ore I hope to keep an average of not less than \$10 per ton. The total cost of mining and milling 100 tons per day, working with steam power, wood costing \$5 per cord, will not exceed \$1.25 per ton. Using water power with a milling capacity of 250 tons per day, the cost will not exceed 65 cts. per ton." He further advocates the use of the diamond drill in exploration work.

Yuma County.

Yuma Copper Company.—This company has been reorganized under the name of the Harcuvar Copper Company. It is said that active operations will commence at once on the property. The company owns a large number of copper claims in the Harcuvar Mountains, which, however, are 97 miles from the nearest railroad point.

CALIFORNIA.

Golden Feather Channel Company, Limited.—The Feather River is falling rapidly, and shortly Major McLaughlin expects to turn the stream into the flumes and lay bare its bed. The Golden Gate and Golden Feather claims extend 8,000 ft. along the bed of the river. This year the river will be turned aside early enough to give the miners at least three mouths' work.

Amador County.

Kennedy Mining Company.—New sulphuret works are being erected at this mine. The present works were built under contract, and are said to be entirely inadequate to the requirements. The new and larger works will occupy the same site, so that a great deal of the present plant will be utilized, just as it stands.

(From our Special Correspondent.)

The mining assessments falling delinquent during the current month in this State aggregate \$32,500.

El Dorado County.

(From our Special Correspondent.)

Idlewild Gold Mining Company, Garden Valley.—At the end of the year 1890, after about \$50,000 had been expended in improvements, the average amount of ore hoisted from the Taylor mine, owned by this corporation, was 20 tons per day, this yielding under the stamp an average of \$6 per ton. Since then other improvements have been made, and working facilities so increased that an average of 70 tons of ore is taken out each day, the cost for extraction and milling being \$2 per ton. The 20-stamp mill is this season to be enlarged by 20 additional stamps, and it is proposed to obtain power from the electric plant, owned by the Dalmatia Mining Company, which is located at Rock Creek, about 8 miles distant. This innovation will be made at an expense of \$400 per month for 100 H. P. Recently two triple plunger electric mining pumps were placed in the mine, one on the 500 and one on the 200 levels. These pumps are driven by the "constant current" system, a device of Prof. Keith, under whose direction the electric mining plant at the Dalmatia and other mines has been so successfully worked. The 25 H. P. dynamo is placed in the mill and is run by a Pelton water wheel. The mine, mill, superintendent's home and all the company's buildings are illuminated by means of a 150-light dynamo. When all the improvements now contemplated are completed the total cost of manipulating the ore at the mine and mill will not exceed \$1.50 per ton, while the output will be largely increased. The ore body on the 500 level alone is very extensive and ranges 30 ft. in thickness. It consists of a mixture of quartz, lime, slate and feldspar.

Fresno County.

San Joaquin Valley Mining Company, Coalinga.—According to the Visalia "Times," there are two more tunnels at this company's mine which are not

worked for the present; one of them is 2,000 ft. long. The coal mined here has been tested repeatedly, and is said to compare favorably with the best English coal. Nearly \$100,000 has been expended by this company developing the mine, and it is now declared to be on a paying basis.

Mono County.

The following statements show the financial condition of the Bodie mining companies on the 30th ult.: Cash, Benton, \$55,000; Bodie, \$77; Bulwer, \$9,434; Mono, \$8,293; Syndicate, \$1,590; Standard, \$45,242.

Bulwer Consolidated Mining Company.—The latest official letter says: "During the week 128 tons of ore were hauled to the Bodie mill. One hundred and eighty-three cars of ore were extracted from the slopes. The ore stopes are looking well. No. 5 stope has developed a fine body of ore. The mill has been kept running steadily. Average battery samples \$20.22; tailings \$8.78."

(From our Special Correspondent.)

Standard Consolidated Mining Company, Bodie.—A bullion shipment, valued at \$19,669.56, being the product of the mine for the month of June, has been received in San Francisco.

Napa County.

Mirabel Quicksilver Mining Company, Calistoga.—The new furnace at the Mirabel quicksilver mine is finished, says the "Calistogian." It is a small, fine ore furnace. Being experimental, it was thought best not to make it large. Another new furnace is in course of construction, and will be a large one.

Placer County.

(From our Special Correspondent.)

Mayflower Gravel Mining Company, Forest Hill.—A shipment of bullion valued at \$2,000 has been received at San Francisco.

COLORADO.

The Globe Smelting Company, of Denver, expects to have its new refinery ready for business by Oct. 1st. The work on the plant is now progressing at a satisfactory rate. The estimated cost of the works is \$100,000. Some question has been raised as to whether the company can keep a refinery supplied with bullion.

El Paso County.

Anaconda Gold Mining Company, Cripple Creek.—A force of 25 men has been put to work on this company's Superior mine, and ore shipments, it is expected, will be resumed at once.

Gilpin County.

A vein thought to be the Zirney has been cut in the Silver Point tunnel at the mouth of Miners' Gulch in Vermillion district, says the Central City "Register-Call." It is now under the mountain 1,500 ft., and is the longest tunnel across country rock that has ever been driven in the county. The Zirney forms one of the group of veins belonging to the company operating the Silver Point, and was discovered a number of years ago by Mr. Alfred Wettstein. An assay of ore from the new strike was made at the Cyclops assay office lately which gave 5.30 oz. gold and 21.20 oz. silver per ton.

Spur Daisy Mining Company.—This company is sinking 100 ft. east of No. 1, or the 75-ft. shaft on the Two Sisters. Ore taken out 8 ft. below the surface is reported to be worth \$80 per ton and is solid mineral of a carbonate character and 8 ins. wide.

Lake County.

The Leadville "Herald-Democrat" reports that a strike was made recently at the Ben Butler, one of the oldest and best known properties in the Red Cliff district, which excels anything found there for some years. The ore was encountered in a very large body in the main incline and carries a high value in silver. Twenty men have already been added to the usual working force, and a number of large shipments have been made.

A. Y. & Minnie Mining Company, Leadville.—A new upraise, No. 3, has been started in this property from the main southwest level, which has now been driven 8 ft. through the blue limestone. This is going forward for the purpose of opening up the carbonate ore chute near the junction of Nos. 3 and 4 chutes, where the ore body is about 250 ft. wide. Although 25 ft. more will have to be driven before the main body is reached, some first-class ore has already been found below the channel, and large shipments are regularly made from that point. Nos. 4 and 5 chutes are not now being developed, and will not be before Aug. 1st, as the influx of surface water makes the expense too great to admit of profitable development. No. 1 chute, or the "sulphide chute," as it is termed, is held in reserve until this class of ore has become more in demand. Enough ore has already been blocked out in this chute to admit of shipping 200 tons daily.

Berdella Mining Company.—Negotiations are pending for driving a tunnel 700 ft. in length from the north end of the Berdella, in order to make connections with the large bodies of concentrating ores in this property, so that this production may be handled on a much cheaper basis. The mill has now been put in order and is treating a large amount of milling ore, although, as the assay office will not be completed for some days yet, the savings per ton are not known. Counter drifts have been run along the hanging wall from the lower cross-cut, in which some fine-looking stringers have recently appeared,

coming down from above, and a strike is expected at any time.

Crown Point Mining Company.—An upraise run from the lower level of the old Weir shaft, in order to connect with the ore body opened up at a corresponding point some time ago in the Crown Point workings, has succeeded in opening up a fine body of iron ore, entirely foreign to any chute so far encountered in those workings. In the meantime drifting has been going on from the 35-ft. point in the upraise, and it is expected connections will be made with the Crown Point chute within the next two weeks.

Holden Smelting Company.—An accident occurred recently at the new plant of this company which has already entailed a considerable loss and which will be greatly increased before the damage is repaired. It was noticed that the level of the matte in the settling well failed to rise above the tapping spout, and after an investigation it was found that the bottom of the well, constructed of fire-brick, had given way, and the molten bullion was escaping and circulating through the soft earth underneath. As a consequence it is now necessary to use large slag pots, into which the slag and matte is run directly from the furnace, and which necessitate the substitution of a second pot every six hours. A new scheme will be introduced which, it is anticipated, will obviate all difficulties of a similar nature. A new well is to be constructed, the bottom of which will be formed of an 18-in. stratum of granulated quartz, which, when mixed with other refractory materials, will be unattacked by the matte and slag. The slag is run after leaving the well into a sluice in which there is a stream of water; this obviates handling and causes a saving of expense.

Huckleberry Mining Company.—A strike has been made in the southwest raise in this property, consisting of an 18-in. streak of gray sulphurets. Shipments have been started and will be increased as soon as an additional force of men has been put on, which will be some time this week.

Montana, Leadville.—Thomas Waller et al. are developing a body of good ore in the north drift of this mine, on Iron Hill, from which average shipments of 15 tons per day are being made, says the Leadville "Herald-Democrat." The product of this property has, until lately, been sent to smelters at Pueblo for reduction, but with the starting of the new Holden smelter it was found that the ore could be treated at a greater profit by that plant than could be derived by sending it to Pueblo. Some time ago several drifts were run from various points in the shaft to encounter, if possible, an extension or undeveloped portion of the rich chute from which so much rich ore was taken shortly after the mine was discovered, during the early mining excitement. This, however, proved unsuccessful, but several large bodies of good iron ore were uncovered during the progress of the drifting, from which a large amount of ore was shipped. When the last chute was exhausted, some months ago, a large amount of dead work was carried on at the 220-ft. level, and the drift at that point was carried forward in a northeasterly direction to a distance of 225 ft. before any further encouraging results were met. At that point the body of ore opened up was larger than any previous strike in that property, some 20 ft. of upward stoping having now been accomplished without getting through the mineral. The chute has also been followed for some distance by the drift, but, instead of decreasing in size, seems to increase rapidly. Additional men are to be put on as soon as necessity requires, and the product will be increased to more than double its present amount.

Small Hopes Consolidated Mining Company, Leadville.—An important strike is reported in the Small Hopes. This discovery was made by the diamond drill in the 800-ft. level in the Robert Emmet shaft. The drift at that point was run out at 820 ft., and from there the drill was driven to a depth of about 120 ft. At this point the second contact, a body of sulphide ore, was opened up, being probably an extension of the identical chute encountered at a corresponding depth in the Mahala shaft, in close proximity to the Small Hopes, a short time ago.

Pitkin County.

Aspen Mining and Milling Company.—The suit brought by A. W. Rucker against Jerome B. Wheeler for an interest in this mine was decided at Denver July 2d, Judge Allen, of the Circuit Court, giving judgment against Wheeler for \$801,670.87, besides granting to Rucker the interest claimed in the mine. Wheeler has entered an appeal to the Supreme Court, and Judge Allen fixed the amount of the bond at \$1,000,000. This is the second decision in Rucker's favor. Briefly stated, this opinion is to the effect that the undivided one-twelfth interest of J. B. Wheeler in the Aspen mine be transferred to Rucker; that all the rights and interests which may have accrued to Wheeler from the one-twelfth interest be vested in the plaintiff; that the plaintiff is entitled to recover from Wheeler the sum of \$26,167.41, being proceeds received by Wheeler from the one-twelfth claim; also the sum of \$158,737.24, proceeds from the one-twelfth interest conveyed to the Compromise Mining Company; also that plaintiff is entitled to recover from Wheeler \$189,264.22, proceeds from the one-twelfth conveyed to W. B. Devereux, and that the plaintiff is further entitled to recover \$450,000, the present value of the one-twelfth conveyed to Devereux,

making a total of \$824,170.87, from which is deducted the sum of \$15,000, being the purchase price of said interest in said mine, and \$7,500 expended by Wheeler in protecting said interest.

San Juan County.

Keystone, Silverton.—This mine, an extension of the King mine, on Sultan mountain, has been sold for \$25,000 to St. Louis parties. One-third of the Thunder, below the Keystone, was sold for \$10,000.

San Miguel County.

Mr. J. H. Ernest Waters has taken a two-years' lease and bond on the Cincinnati and Flora groups of mines in Marshall Basin, near Telluride, and will commence development work at once.

Shipments of ore and concentrates from Telluride for the week ending July 2d have been: From Sheridan Con., 27 cars; from Smuggler-Union, 27 cars; from Boomerang, 1 car; from Crown Jewel, 1 car; from Hector Mining Company (Cimarron), 2 cars; total, 58 cars; total shipped since Jan. 1st, 1,620 cars.

IDAHO.

Boise County.

Beaver.—This mine is owned by capitalists of Elmira, N. Y., says the Salt Lake "Herald." It continues to be a good payer and is said to be growing better. This property employs 150 men.

Horn Silver.—A correspondent of the Salt Lake "Herald" describes this mine as consisting of five fairly well developed properties. The veins are true fissures of unusual size, and are traced on the surface over 10,000 ft, chutes and chimneys of ore showing on the surface in numerous places along the entire distance. The ores are rich and, it is said, are not surpassed by any surface ores to be found in Idaho.

Cassia County.

Badger Mine.—This mine is located on the south side of Connor Mountain. It is a fissure vein and is well defined, says the Salt Lake "Mining Journal." This ore assays 15½ oz. in silver, \$1.80 gold and 78% lead. The second assay was 23½ oz. silver, \$3.60 gold and 64% lead. The third assay was at a depth of 30 ft. and gave 2½ oz. silver, \$186.92 gold and 10% lead. The shaft is down 48 ft.

Kootenai.

Mena del Terra.—This mine has an 18-ft. ledge with several good pay streaks of from 2 to 12 in. in width. The average assay is said to be 50 oz. of silver and 40% of lead. A tunnel has been driven 16 ft. on the ledge and the vein seems to improve.

Pend d'Oreille District.—The mines of this camp are fairly active, but shipping facilities are so bad that miners labor under a great disadvantage. The Black Jack shows a vein from 3 to 7 ft. wide. A shaft has been sunk 24 ft. and 2 tons of rich ore taken out. The Keystone is now idle owing to litigation. There is a shaft 100 ft. deep which has opened a vein 5 ft. wide.

Tiger.—At the bottom of a 60-ft. shaft the ledge is 18 ins. wide. The value of the ore is 60 oz. of silver and 40% of lead to the ton.

Shoshone County.

The union miners of the Coeur d'Alene district went to Wardner on the 11th inst., and, taking possession of the mill of the Bunker Hill and Sullivan Company, threatened to blow it up unless the non-union men surrendered. On the following day the men surrendered. The miners captured by the union mob at the Gem and Frisco mines were taken to Wallace and turned loose, after all their arms and ammunition had been secured by their captors. The Governor of Idaho then formally called upon the President for the assistance of Federal troops in suppressing the disturbances in the Coeur d'Alene district, and President Harrison on the 12th inst. telegraphed the necessary order. Troops were ordered to be sent at once from Fort Sherman, Idaho, and from Fort Missoula, Montana. On the 13th the strikers were in complete possession of the mines and mills of the Bunker Hill and Sullivan and the Sierra Nevada Mining Companies, at Wardner, and threatened to fight the Federal and State troops, which were on the way to restore order. The Bunker Hill and Sullivan properties were "loaded with powder and dynamite," so that they could be destroyed at a moment's notice. Other mines were reported to be filled with explosives, and a dispatch from Spokane says that the strikers blew up the railroad bridge at Mullan early yesterday morning in order to prevent the troops from Missoula from reaching the scene of the disturbances. Telegraph wires were also cut, so that news from Wardner was very indefinite. It was reported that several more non-union men had been killed, and that one or two mine owners had been seized and held as hostages. General Schofield has ordered additional troops to the district.

Pine Creek.—The mining properties of this district are located about 10 miles south of Wardner. A number of prospectors have been quietly developing their claims. A tunnel has been run 75 ft. on the Sunny lode. Its face shows a body of ore which assays 77% lead and 42 oz. silver. The lead is 15 ft. wide and inclosed between two well defined walls.

KANSAS.

Cherokee County.

During the week ending July 9th the output of

ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,841,300; rough ore, pounds sold, 1,160,490; zinc ore, pounds sold, 842,290; lead ore, pounds sold, 245,880. Sales aggregated a total value of \$14,810.

MICHIGAN.

Copper.

Calumet & Hecla Mining Company.—The 33th level going north of No. 5 Calumet has been passing through somewhat barren ground until very recently, when a richer course was entered. This is the nearest opening on the Calumet conglomerate belt to the Centennial territory, and it is the most promising thing yet opened for that mine.

Huron Mining Company.—Report says that a rich vein has been struck at the Huron mine, and that a force of 75 men are now employed.

National Mining Company.—We are informed that drifting at the 14th and 15th levels on the south vein is going on, and that a winze on the same vein is being sunk from the 13th to the 14th levels, says the Portage Lake "Mining Gazette." This winze is down some 70 ft. and is said to be exposing a good lode which is turning out considerable copper; during the last few days the ground in both the above mentioned drifts has shown considerable improvement.

Tamarack Mining Company.—Sinking to the 17th level is now under way at this mine, says the Torch Lake "Times."

Tamarack Mining Company.—The mine in June produced 935 tons, against 930 tons for May. For the fiscal year ended June 30th the production was 11,150 tons of mineral, against 9,388 tons the previous year, an increase of 1,762 tons.

Tamarack, Jr., Mining Company.—Nothing of any value has yet been found in shaft No. 2, says the Torch Lake "Times." The lode is of fair width, but does not carry copper enough. With the attainment of greater depth something better may be encountered. In the bottom of No. 1, however, there is a good bunch of ground and it shows a lengthening territory.

Iron—Marquette Range.

Cleveland Iron Company.—This company has let a contract to work the old No. 1 mine. The contractors expect to put on a small force of men before long.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, July 11.

The national holiday was duly celebrated by the miners throughout the district, so but little work was done in the mines before Tuesday. There was a slight advance in the zinc ore market, best grades selling at \$26.50, with a general average of \$24.50 per ton. Lead ore remained firm at \$24 per thousand. Following are the sales from the different camps: Joplin mines, 1,135,050 lbs. zinc ore and 195,810 lead, value \$19,520; Webb City mines, 203,950 lbs. zinc ore and 41,920 lead, value \$3,587.20; Carterville mines, 1,563,460 lbs. zinc ore and 63,250 lead, value \$21,029.65; Zincite mines, 90,810 lbs. zinc ore and 1,160 lead, value \$1,164.70; Oronogo mines, 13,130 lbs. of lead, value \$308.25; Burch Center, 14,550 lbs. of zinc ore, value \$174.60; Galena, Kan., mines, 842,290 lbs. zinc ore and 245,880 lead, value \$14,810. District's total value, \$60,594.40.

MINNESOTA.

Iron—Mesaba Range.

Humphreys.—Developments at these properties are progressing favorably. On the New England six pits are in ore, proving the deposit to be at least 1,000 ft. by 700 ft. across the forty and containing several million of tons of ore. The Virginia has five pits sunk which penetrated 30 ft. north and south, showing an ore body. The Lincoln, which comprises two mines, has two pits in ore which seems to continue to a considerable depth. The Wyoming also has two pits in ore with a surface of only 8 ft.

Iron—Vermillion Range.

A Port Arthur dispatch says: "An important railway and mining deal has been made here. Minnesota capitalists have signed a contract with the Port Arthur, Duluth & Western Railway Company, which has been ratified by the Board of Directors, to mine 100,000 tons of ore per annum for ten years, 1,000,000 tons in all. The mines are situated in Minnesota, about four miles south of Gunflint Lake, the terminus of the Port Arthur & Duluth Railway. The arrangement provides for the building of the four miles of road before Oct. 1st.

MONTANA.

Deer Lodge County.

Royal Gold Mining Company.—This company owns seven claims. On the principal vein a tunnel has been run 400 ft., and 200 ft. in an upraise runs 100 ft. to the surface, ore being found of fair quality to within 5 ft. of the top. A Huntington mill was formerly used, but a 10-stamp Frazer & Chalmers mill has been purchased and will shortly be put in place.

Gallatin County.

Revenue.—According to the Montana "Mining Journal," R. B. Turner, of this place, has obtained a total of 42 lbs. of gold bullion by working 476 tons

of tailings with the cyanide process. The capacity of the mill for treating ores by this process has been so increased that now it can handle 20 tons per day.

Silver Bow County.

Anaconda Mining Company.—Many of the mines worked by this company have closed down. The St. Lawrence closed on July 3d, and it may be some months before work will be resumed. The Modoc and the Green Mountain are also idle. The High Ore has been closed down to put new clutches on the engine. At the Wake-Up-Jim the work of sinking will start soon. The mine is now 600 ft. deep and work will be actively prosecuted until the 1,000-ft. level is reached. It is likely that many of the shafts of other properties of the company will be sunk to a greater depth.

Anselmo.—At this mine a new engine is being erected. The old shaft has been retimbered and is now developed to a depth of 160 ft. Sinking will be continued until the 250 level is reached. During the week ending July 9th some 100 tons of ore were shipped.

Boston & Montana Consolidated Copper and Silver Mining Company.—Many of the miners are working half time owing to the suspension of traffic between the mines of the Great Falls smelter. It will be two weeks yet before shipments can be renewed. The Leonard shaft is filled with 100 ft. of water. The old water column was taken out and a new one put in.

Butte & Boston Mining Company.—A meeting of the stockholders was held in Butte July 6th for the purpose of discussing the issuing of \$2,500,000 of bonds, the money for which is to be spent in rebuilding the smelter and in the purchase of additional properties. 193,200 shares were represented at the meeting, 90,000 being held by the Davis estate. This block of stock was voted against the proposition, and the meeting was adjourned to meet in Boston July 18th. According to the Butte "Daily Miner" Mr. John A. Davis, the objector to the issue, was offered \$750,000 for the 90,000 shares, but the offer was refused.

Butte & Boston Mining Company.—There is nothing new concerning this company. The following statement of the company's operations from Sept. 1st, 1888, to April 15th, 1892, was prepared by Treasurer Bigelow for the Butte meeting of July 6th: Net receipts from 30,312,019 lbs. fine copper, \$2,357,252.51; net receipts from 792,031 oz. silver and 2,639 oz. gold, \$809,939.10; total, \$3,167,191.70. Less running expenses, \$1,749,801.67; running expenses silver mill, \$736,460.54; total, \$2,486,262.21. Mining profit, \$680,929.49. Receipts from sale bonds, \$320,000; receipts from sale stock, \$232,900; total \$552,900. Mining profits, 680,929.49; balance of liabilities April 15th, 1892, \$465,025.13. Mr. Bigelow continues: "It will be seen by above statement that the company has earned the handsome sum of \$681,000 notwithstanding the fact that it was not until February, '91, that it became prominent as a copper producer. This profit was all expended in a mining plant, besides what was received through sales of bonds and stock, incurred for floating debt. It is estimated that an outside expenditure of \$75,000 will place the plant in better condition than it was before the fire, and that by the middle of August or first of September next the company will be again producing from 1,500,000 to 2,000,000 lbs. of copper per month, on which it was earning from \$30,000 to \$60,000 a month according to the price of copper. Apart from the rebuilding expenses our construction account is practically closed for a long time to come. The proposed bond programme provides \$300,000 and upward of fresh cash capital. Therefore, when the company resumes operations it will be in a better condition than ever before, and should, with a fair price for copper, be able to show as good profits as heretofore, thus not only insuring all fixed charges, but in addition a balance that can be applied toward the payment of dividends."

Missoula Mining Company.—The shaft on this mine is now down to water level and will not be developed until machinery can be secured. Stopping out the rich pockets of ore near the surface is being pushed with vigor. An average assay of the free milling ore now produced will give a return of about 85 oz. to the ton. The Butte & Boston Company, from whom the property is leased for one year, receive a royalty of 30% for all ore assaying above 50 oz. The ore is treated at the Silver Bow Sampling Works at a cost of \$16 a ton. After these expenses and the expenses of mining are paid the ore yields a profit to the leasers.

NEVADA.

Elko County.

The following are the statements of the Tuscarora mining companies, showing financial condition on the last day of June: Cash, Nevada Queen, \$13,390; North Commonwealth, \$3,352. Indebtedness, Belle Isle, \$13,933; Commonwealth, \$28,982; Consolidated Imperial, \$2,179; Del Monte, \$21,625; Independence, \$205; Navajo, \$17,365; North Belle Isle, \$14,238.

Following are the latest official weekly letters from the superintendents of Tuscarora mines:

Belle Isle Mining Company.—South drift from the north line cross-cut, 250-ft. level, extended 12 ft.; the face shows some improvement. No. 1 cross-cut, same level, extended 4 ft. and a drift started south on the vein cut last week, which is yielding some very fine ore.

Nevada Queen Mining Company.—Second level: Work in south drift from No. 3 east cross-cut has been suspended; face in porphyry. Stopes have been started west side of south drift and are yielding some good ore. Stopes above the level have not changed since last report. Stopes from No. 1 chute, east vein, show a little improvement in the grade of ore, continue about the same width. Third level: The stopes show 1½ to 2 ft. of ore, average assays from which return \$125 per ton.

North Belle Isle Mining Company.—West cross-cut from No. 1 north drift, 350-ft. level, extended 15 ft.; rock very hard but breaks well. South intermediate drift above the south 500-ft. level extended 6 ft.

Storey County—Comstock Lode.

The following are the financial statements of the Comstock mining companies filed in San Francisco on the 4th inst., according to law. Cash, Alta Con., \$9,515; Alpha, \$10,859; Andes, \$16,429; Belcher, \$10,346; Best & Belcher, \$7,867; Caledonia, \$6,606; Challenge, \$2,267; Con. New York, \$2,083; Crown Point, \$15,672; Exchequer, \$5,620; Julia, \$6,490; Kentuck, \$1,496; Lady Washington, \$6,666; Mexican, \$20,068; Occidental, \$5,867; Overman, \$176; Scorpion, \$175; Seg. Belcher, \$8,269; Sierra Nevada, \$4,044; Silver Hill, \$4,224; Union Con., \$2,842. The indebtedness of other companies on the 4th is reported as follows: Bullion, \$6,556; Chollar, \$15,050; Con. Cal. & Va., \$1,643; Confidence, \$4,344; Gould & Curry, \$5,624; Grand Prize, \$5,792; Ophir, \$19,226; Potosi, \$28,464; Savage, \$1,954; Utah Con., \$3,118, with bullion on hand amounting to \$51,301.

According to the San Francisco "Report" a hopeful feeling exists in Virginia City regarding the future of the north-end mines. It is understood that the assets of Consolidated California & Virginia ore are well maintained, and that when a winze is sunk on the ore recently cut in the Ophir and Mexican mines a good showing can be made. Good reports also come from the far westerly workings on the 900 level of Union Con. and Sierra Nevada.

Belcher Mining Company.—The latest official weekly letter says: "The north drift on the 400-ft. level has been extended 30 ft., making its total length 175 ft. from the turn. The face is in porphyry. We are now extracting from the 300-ft. level from 30 to 35 tons of ore per day. It comes from the stope in the north drift and above the track floor, which is called the north stope, and from the stope which has been opened from the south cross-cut on this level and which is called the south stope. Have shipped to the Brunswick mill for reduction during the past week 129 tons and 570 lbs. of ore. No battery sample has yet been received from it."

Crown Point Mining Company.—The latest official weekly letter says: "The main west cross-cut on the 230-ft. level has been repaired for its entire length, and is now advancing in new ground composed of porphyry and streaks of low grade quartz. We are extracting from 10 to 15 tons of ore per day from the 160-ft. level stope and have shipped to the Mexican mill for reduction 159 tons and 1,530 lbs. of ore which had accumulated in our ore dumps. The reduction of this ore was commenced on the 5th inst."

Crown Point Incline.—Following is the official report of the pumping operations in the Crown Point incline for the week ended July 2d. The 1,700 station pumps have been working continuously during the week, and the flow of water is the same as at last report. The drain tunnel on the Suro tunnel level is now cleaned out and repaired 1,300 ft. from the station, and we have reached a portion of the tunnel where it is completely closed by a cave. The extent of the cave we cannot ascertain at present. On account of the extreme heat in the tunnel we find it necessary, in addition to the blower already in use, to set up another. We expect to have it running to-morrow.

Consolidated California & Virginia Mining Company.—Following is the latest official weekly letter from this property: 1,500 level—From the south drift at point of connection with the old stopes we continue to extract some ore and fillings of average milling value. From the upraise which was carried up from the end of the cross-cut run west 36 ft. in front the main south drift, 155 ft. south from the shaft station, we have continued to work upward and to extract ore of fair quality. 1,600 level—We have continued prospecting upward from the old sill floor of the old stopes, from which some ore of fair quality is being extracted, and from the ore streak on the east side of the old timbers. 1,650 level—Have extracted some ore of fair quality in prospecting west from the upraise 35 ft. above the sill floor, which was carried up 59 ft. above the southwest drift, and some ore from the drift run east from the winze No. 3 (down 73 ft.) in working upward from that point.

Hale & Norcross Mining Company.—The latest official weekly letter says: On the 1,100-ft. level have made some necessary repairs to main drift and station. 1,300 level: Are repairing south drift and retimbering main incline at this point. Main incline: Have cleaned out and repaired the main incline a distance of 45 ft. during the past week, making its total depth 135 ft. below the 1,700-ft. level. Are retimbering and repairing main shaft where most needed.

Occidental Consolidated Mining Company.—Bul-

lion valued by assay at about \$8,000 has been shipped from this mine, and ore concentrates of the estimated value of about \$7,000 are on hand at the mill.

Overman Mining Company.—The latest official weekly letter says that there were extracted from the 1,100 and 1,200 levels 64 tons and 200 lbs. of ore. Car samples averaged \$21.60 per ton. Shipped to the Vivian mill 131 tons and 200 lbs. of ore. There are 2½ ft. of fair grade ore in the face of the northwest drift on the 1,200 level.

(From our Special Correspondent.)

During the month of July the assessments falling delinquent will aggregate \$217,800.

The following is the weekly tabulated statement of ore extracted from Comstock mines and milled, with the assays, bullion shipments, etc.:

Mine.	Tons hoisted.	Car sample assay.	Tons milled.	Average bat. assay.	Bullion product for week.	Bullion shipped.
Belcher.....	*129	\$		\$	\$	\$
Con., Cal. & Va....	992	28.98	1140	20.81	25.30	\$1,406.28
Hale & Norcross..			381	27.08		\$452 lbs.
Occidental.....	179		179			
Overman.....	64	21.60	131			
Potosi.....	447	28.06	483			
Savage.....	*548	22.24	450	18.95	5,969.25	\$610 lbs.
Yellow Jacket.....				No report.		

* Shipped to Brunswick Mill.

† Worked at Vivian Mill.

‡ Last of accumulated ore.

§ Crude bullion.

¶ Cars.

NEW MEXICO.

Grant County.

Anson S., Silver City.—This copper mine has been bonded to the Southwestern Coal and Iron Company and the first payment on the property has been made. The bond has six weeks to run and the property will undoubtedly be taken and paid for in that time. The Southwestern Coal and Iron Company has a number of mines in the neighborhood of the Anson S. which have been in continuous operation.

Pacific Gold Company, Pinos Altos.—This company started up the Mountain Key mill on the 4th inst. The capacity of the mill is not sufficient to treat all the ore which the mine produces, and the Pacific mill will be started as soon as water can be obtained to run it.

Sierra County.

Comstock, Kingston.—A run of 100 tons of low grade ore from this mine will be made in the new smelter at Hillsborough. If this run is successful there will be large quantities of low grade ore from the Kingston mines treated in this smelter. Low grade ore has been accumulating on the dumps of the mines at Kingston ever since the camp was discovered, and many tons have accumulated there since the boom in 1884. The nearest railroad shipping point is 28 miles from the camp, and the expense of freighting the ore this distance, added to the railroad freight, makes it unprofitable to ship the low grade ore to outside smelters.

Inter-Republic Gold Placer Mining Company.—This company has been incorporated and has acquired a square mile of the placer ground in this county. Placer mines have been worked there for more than 20 years, but work has always been carried on in a small way on account of the scarcity of water.

PENNSYLVANIA.

Coal.

A. Pardee & Co. have commenced to sink a new slope in the Buck Mountain vein at the Crystal Ridge colliery.

It is asserted by engineers who have recently made a survey that large beds of coal lie in the Brookside mountains on the south side of Valley View, in the West Mahanoy district. In order to reach these veins, the Reading company will, it is said, sink slopes on the Valley View side and possibly erect a breaker at this point. This, says the Pottsville "Chronicle," would also require the railroad to be extended, starting from Keffer's and running along the gap to Valley View. To start new openings in the No. 3 and 4 slopes it is necessary to sink deeper, and on account of the great amount of water during the wet weather it is found difficult to ship, thus diminishing the amount of output from those slopes. The main slope at Brookside in the course of two years will be at East Brookside. Its present shipment is 80 wagons daily. This is supposed to be increased between 250 and 300 wagons.

Kingston Coal Company, Edwardsville.—An explosion of gas occurred in No. 1 colliery of this company. Two men were killed.

Lehigh & Wilkesbarre Coal Company.—It is announced that this company will drive two rock tunnels, one in the Hollenback, No. 2, from the Hillman vein to the Kidney, a distance of 400 ft., and the other in South Wilkesbarre No. 3, from the Hillman to the Kidney vein, distance 250 ft. Both will be given out on contract.

Silverton Coal Company.—This company has resumed work on the Albright tract, near Pottsville, and is engaged in reopening the tunnel and Salem slopes.

SOUTH DAKOTA.

Lawrence County.

Harney Peak Tin Mining Company.—The Black Hills "Daily Times" reports the following interview with Capt. Thomas, the English metallurgist, who came with Lord Thurlow's party to examine the property of this company. When asked to express himself regarding the property he said: "The mines, as far as developed, in my opinion are fully equal to those of Cornwall, if not better, as regards the quantity and quality of the productions." When asked if he thought the deposits would prove to be mere pockets that would play out after a time, he said he thought from the formation that they would prove inexhaustible, and when asked when the tin mill would be blown in he stated that it would probably be two or three months before the event would take place, as it would require that time to complete the railroad spurs from the several mines to the mill.

Iron Hill Mining Company.—The new discovery recently made in the Iron Hill is proving to be an unusually good one, says the Black Hills "Daily Times." The vein is said to be vertical and is several feet thick. The company is now making the largest shipment of ore ever made to an outside smelter.

Seabury-Calkins Mining Company.—The new shaft is now down to a depth of 40 ft., with a good showing in the bottom. This shaft is about 900 ft. north of the main shaft, and is sunk on the contact of the porphyry and trachyte. The work of timbering will be commenced soon.

UTAH.

Juab County.

Groesbeck-Brown Leaching Works.—It is stated that these works will start on July 20th, and that the delay has been occasioned by lack of water. A pump at the Lady Aspinwall mine now supplies the company in sufficient quantity.

Mammoth Mining Company.—The mill will soon be running on ore from the Spy mine, 10,000 tons having been contracted for.

Old Scotia.—The owners of this mine have 100 tons of ore ready for shipment. 2,000 tons will be shipped this season.

Pi Ute County.

Deseret Gold Mining and Milling Company.—According to a Salt Lake paper the report of the find on this property has been confirmed. The ore body on the Branch lode measures 17 ft. in width and has been stripped a distance of 100 ft. It assays 32 oz. in silver and from \$4 to \$9 in gold to the ton. The Branch is one of the claims owned by the company, and this strike may add one more producing mine to the district.

Salt Lake County.

Herkimer Mining Company.—This company, which was recently organized, has a steam hoisting plant ready to put on its property. The shaft on the mine is 130 ft. deep and there are two good veins of ore.

Nabob Mining Company.—A vein of ore was struck on a winze in the tunnel 1,400 ft. in. The vein is 10 ins. wide of high grade ore and 2 ft. of low grade ore.

Salt Lake.—The natural gas boom continues, says the Salt Lake "Herald." Mr. John Wolfe, a gas expert, and Mr. D. T. Davis are in the city from Findlay, O. Mr. J. E. Rhodes, of Rhodes Bros., Denver, Colo., is also at Salt Lake, and is ready, so it is said, to provide the necessary capital for a pipeline. It is reported that the Globe Smelting Company will erect a branch smelter in Salt Lake which will use the natural gas for fuel.

Stewart No. 2.—For 18 months work has been done on a tunnel to tap a vein back of the one heretofore opened. This tunnel was extended about 800 ft. to reach the strike made some time ago, since which it has been run into the vein 50 ft., and the heading is still in ore. This ore will mill more freely than the ore heretofore exposed in the mine. Prior to starting for this new vein there was blocked out in the old part of the mine fully 20,000 tons of gold ore about the same value as that of the new strike, but more difficult to work. Now the property is so well opened that the mill will soon be started.

WISCONSIN.

Iron—Gogebic Range.

Germania Iron Company.—This mine is looking more promising than for many months past. No. 4 shaft is down 600 ft. and has a cross-cut to the north of 50 ft. From this cross-cut ore is being taken which, although mixed with rock, indicates that a body of ore will soon be encountered.

WYOMING.

Albany County.

Centennial.—The Laramie "Boomerang" gives an account of the gold quartz vein discovered at this place. Seven assays showed from \$22 to \$708 per ton. The mine is about 300 yds. above the old

Centennial mine, and is thought to be on the Centennial lode.

Converse County.

Upper Box Elder.—Some zinc ore has recently been discovered in this district, says the Deadwood "Daily Pioneer." Development so far shows a strong lode of easily concentrating ore, carrying about 20% zinc. The location of the mine is only seven miles from the B. & M. Railroad. As soon as the ledge is developed concentrating machines will be put in and shipping will be commenced.

Uinta County.

Some important oil discoveries have been reported as being made near Hilliard, about 15 miles from Evanston. Sixty-five claims were filed in one day.

FOREIGN MINING NEWS.

CHIHUAHUA.

(From our Special Correspondent.)

Colorado Gold Mining Company.—A contract has been made with Jose V. del Collado by the Minister of Public Improvements for the operation of the property belonging to the above company, of which ex-Governor Sheppard is President. According to the contract the company will invest \$200,000 in exploitation during the first five years, and pledges itself to benefitate in Mexico at least three-fourths of the metal extracted. Students from the National School for Engineers will be admitted to the mine for the purpose of practical study.

Palmarejo Mining Company.—At the recent meeting of the shareholders of this company in London, England, the Board of Directors were authorized to issue debentures to the amount of \$200,000. The mineral railroad running to the mines is now practically completed, and ore is now being brought down.

MEXICO.

Monterey.

The San Juan Bautista mine near Garcia yields iron and carbonate of lead, and last month shipped 1,000 tons of ore to the smelter.

The recent ruling made by the Treasury Department of Mexico that the smelting companies are liable to a tax of 1/2% on the value of all precious metals contained in the products exported by them has called forth a loud protest from the smelting companies. Several of the latter have decided to ship no more of the class of product alluded to until the ruling is rescinded or a satisfactory arrangement is made with the government.

El Carmen Mining Company.—This company is working several mines in the Villadama mining district, and is at present employing over 300 men. During June 173 cars, averaging about 12 tons each, of ore were shipped to the Guggenheim smelter at Monterey. The company has a narrow-gauge railway, used to convey its ore to the Mexican National Railroad. The ore, although low grade, is very valuable for fluxing purposes, as it contains 25% excess of iron over silica.

TRANSVAAL.

Transvaal Silver Company.—Two bars of silver lead, assaying 149 oz. of silver to the ton, have just been forwarded to the president and the chairman of the Raad respectively by the Transvaal Silver Company. This company now possesses a well-developed mine, which has been proved to contain vast reserves of rich ore, and which is expected to produce 350 tons of silver lead from June 1st, and probably about 700 tons from Aug. 1st. The mine is almost on the line of the direct Charlestown route, and it is demonstrably certain that railway carriage for bullion would in time open up a great industry. It would probably pay the smelting works to give higher prices for concentrates than any of the chlorination works could do, and of course smelting could be carried on on a larger scale than is possible at present. So far, therefore, as the Natal line is concerned the difficulty of return loads, which is bound to handicap the Cape for some time to come, can hardly be said to exist.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, July 15th.

Heavy Chemicals.—The past week in the heavy chemical market probably has been the dullest this year. The closing of the glass works, after a season said to have been most unsatisfactory to many manufacturers, has thrown alkali and soda ash into almost absolute neglect. There has been an improved demand for caustic soda, but this chemical, as well as all the others in the list, has been very quiet. The market, generally speaking, shows no change worthy of mention in the features which characterized it at the time of our last report. It is very dull and prices remain as last quoted: Caustic soda, 70%, 2.95@3.10c.; 74%, 2.97@3.12c.; 76%, 3.12@3.25c.; 77%, 3.12@3.25c. Carbonated soda ash, 48%, 1.55@1.60c.; 58%, 1.47@1.52c. Alkali, 48%, 1.55@1.60c.; 58%, 1.47@1.52c. Sal soda, English, 1.05@1.10c. American, 1@1.12c. Bleaching powder, 2.15@2.20c. on the spot, according to quantity.

Acids.—Manufacturers continue to report a very good business in the various acids, the good consumptive demand of the past few months keeping up better than many anticipated. Prices, however, remain unchanged and no new features of interest can be reported. From Connecticut we hear that better prices are obtained, but it must be borne in mind that exceedingly low figures have prevailed in that section for some time past. We quote: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@\$.82 according to quality; muriatic, 18", 80c.@\$.1; 20", 90c.@\$.10; 22", \$1@\$.1.25; nitric, 40", \$4; 42", \$4.50@\$.4.75; sulphuric, 85c.@\$.1.10; mixed acids, according to mixture; oxalic, \$7.25@\$.7.75. Blue vitriol is quoted all the way from \$3.25 @\$.3.50; alum, lump or ground, \$1.55@\$.1.80. Glycerine for nitro-glycerine, 11 1/2@12 1/2c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone is firm and strong, but quiet. Quotations remain practically as last reported, as follows: On the spot, best unmixed seconds, \$25, best mixed thirds, \$24. To arrive seconds, \$24; thirds, \$23.

Fertilizers.—Generally speaking, the market of fertilizer chemicals shows but little improvement since our last report. Some sales have been made, but with the exception of dried blood prices have remained unchanged. Dried blood is slightly higher, due, as previously stated, to the limited supply available for prompt delivery. Our quotations this week are as follows: Sulphate of ammonia, \$2.85 for bone goods and \$2.90@\$.2.95 for gas liquor. Dried blood, \$1.95@\$.2 per unit for high grade and \$1.85@\$.1.90 for low grade. Acidulated fish scrap, \$13.50 f. o. h. factory; dried scrap, \$23.50. Azotine, \$1.85@\$.1.90. Tankage, \$17.50@\$.21, according to grade. Bone meal, \$22.50@\$.23.50.

Double Manure Salts.—Quotations are as follows for lots of from 10 to 50 tons ex-vease New York: 48-53%, \$1.13 1/2@\$.1.23 1/2; 90-95%, \$2.13@\$.2.23 1/2.

Kainit.—The season for this chemical is commencing. Sales ranging from 100 tons upward are being made almost every day. Arrivals are reported this week at Philadelphia, Boston and New York. Prices remain: \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia.

Muriate of Potash.—This chemical is very quiet just now. Since the 6th inst. arrivals aggregate 500 tons, all of which went into consumption. Prices remain as fixed by the syndicate, to wit: Fifty-ton lots or over, New York and Boston, \$1.81 1/2; Philadelphia and Baltimore, \$1.84; Southern ports, \$1.80 1/2.

Phosphates.—This market continues quiet and featureless.

Mr. Paul C. Trenholm, of Charleston, S. C., sends us the following interesting statistics showing shipments of phosphate rock from Charleston, June, 1890, 1891, and 1892: Domestic, 1890, crude, 14,297; ground, 188; 1891, crude, 29,321; 1892, crude, 16,124. Foreign: 1890, crude, 12,745; 1891, crude, 2,143. Grand total: 1890, crude, 27,042; ground, 188; 1891, crude, 31,464; 1892, crude, 16,124.

Nitrate of Soda.—This market is quiet. There is only a fair consumptive demand. Quotations are as follows: On the spot \$1.72 1/2@\$.1.75. June and July shipments \$1.75; later than this \$1.80.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo., Baltimore, Pittsburgh, Deadwood, Dak., St. Louis, Helena, Mont., London and Paris, see pages 70 and 72.]

NEW YORK, Friday Evening, July 15, 1892.

The mining market—if the small and unimportant volume of business at the consolidated Stock and Petroleum Exchange can be called such—has been exceedingly dull during the past week. Trading has been desultory, and sales small and devoid of any significance. The public persists in neglecting mining shares.

The Comstocks show no change of importance as to prices.

Trading in them during the week has been as small as usual. We note sales of 100 shares of Belcher at \$2; 300 shares of Consolidated California & Virginia, at \$3.50@\$.3.90; 200 shares of Crown Point, at \$1.15; 100 shares of Hale & Norcross at \$1.40; 170 shares of Ophir at \$2.40@\$.2.65; 100 shares of Sierra Nevada at \$1.00; 300 shares of Yellow Jacket at 90c. @\$.1; 100 shares of Best & Belcher at \$2; 200 shares of Barcelona at 5c.; 200 shares of Bullion at 65c.; 700 shares of Comstock Tunnel at 12@13c.; 200 shares of Consolidated Imperial at 12c.; 300 shares of Scorpion at 20c. and 200 shares of Utah at 40c. The financial statements of the various Comstock companies will be found in our mining news columns.

Eureka Consolidated had a sale of 200 shares at \$2. Of the California stocks a sale of 1,000 shares of Bode Consolidated took place at the New York Stock Exchange. Among other sales we note 200 shares of Plymouth at 90@95c.; 100 shares of Standard Consolidated at \$1.65; 1,240 shares of Belmont at \$3@40c. Brunswick Consolidated continues to show heavy transactions. This week the reported sales amount to 5,600 shares at 15@18c. The following telegram dated the 12th inst. has been received from the superintendent of the mine:

"The ore in the raise is good milling; the ore body is increasing so far."

Of the Colorado stocks we note sales of 1,900 shares of Leadville Consolidated at 14@15c. Of Little Chief only 300 shares were sold at 25c. Robinson Consolidated was levied at 40c., with sales of 500 shares.

Horn Silver was in considerable demand during the week and it was dealt in at both exchanges; sales amounted to 1,150 shares at \$3.90. Ontario shows a transaction of 100 shares at \$40.

Sullivan Consolidated show sales of 850 shares at \$1. Alice this week was dealt in to the extent of 900 shares at 65c.

The greatest transactions were in Phoenix Arizona, of which 5,500 shares were sold at 43@58c.

Boston.

July 14.

(From our Special Correspondent.)

There has been considerable activity in copper stocks the past week, but at the expense of value. The dealings have been largely confined to the two Montana stocks, both of which show a decline from last week and look as if they would go still lower. Boston & Montana declined from 35% to 33 1/2%, with sales of about 6,000 shares. The financial position of the company is not very promising, and the management has been severely criticised for its course in providing funds for building the smelter at Great Falls.

Butte & Boston declined from \$11 to \$10 on free selling by inside holders. The finances are in an unsettled state at present by the failure of the company to authorize the issue of \$2,500,000 7% bonds at the meeting of stockholders on the 6th inst. The company was in debt, April 15, 465,025, which has been increased since that time by development work at the mine on the expectation that the bonds would be issued and the debt canceled.

Calumet & Hecla has been the strongest stock on the list, selling at \$27@\$.27 1/2.

Tamarack is also quite firm at \$155@\$.153, but Tamarack, Jr., declined to \$32.

Centennial sold off to 8 1/2 and is quite heavy. Franklin holds steady at 12@12 1/2, and Kearsarge sold in a small way at \$11.

Oscuela declined from \$29 to \$28, in sympathy with the general weakness.

Atlantic sold at \$9 1/2.

Allouez sold at 80c. The company is entirely free from debt and has about \$9,000 cash in the treasury. Exploration work is being done, and it is said to be the intention of the management to keep the plant in good condition, so as to take advantage of any discovery that may be made.

Santa Fe advanced from 10@12 1/2c. for a 1,000-share lot.

It is reported that the tributors on the Huron mine have recently encountered some rich ore and the stamp mill is running day and night.

There have been no sales of Quincy reported for the week.

3 P. M.—There was an improved feeling after the noon hour. Boston & Montana advanced 1 1/2, with sales at 34 1/2. Butte sold at 10 1/2 to 10 1/4 and two shares of California & Hecla at \$277, an advance of \$5. Others unchanged.

Chicago.

July 13.

(Special report by Horace M. Johnson.)

Mesaba Range Mines.—Aurora, \$10; Birmingham, \$10; Buckeye, \$25; Biwabik, \$22.50; Cincinnati, \$3; Champion, \$10; Cosmopolitan, \$20; Chicago, \$12; Columbus (fee), \$6.50; Duluth, \$9; Great Northern Mining Company, \$7; Great Northern I. & S. Co., \$1.35; Keystone, \$10; Kanawha, \$10; Lincoln, \$12; Lake Superior, \$3.50; Licking, \$6.50; McKinley, \$25; Mesaba Mt., \$14.50; Mallman, \$1.35; Mountain Iron, \$55; Minneapolis, \$12; New England, \$10; Ohio, \$30; Shaw, \$6; Twin City, \$9.

Gogebic Range Mines.—Aurora, \$9; Ashland, \$48; Anvil, \$3.50; Brotherton, \$2.25; Germania, \$7; Gogebic I. Synd., 10c.; Iron Belt, \$2.65; Montreal River, \$8; Metropolitan, \$73; Minnewawa, 50c.; Odanah, \$15; Pence, 50c.; Section "33", \$6.50.

Marquette Range.—Champion, \$65; Cleveland, \$17; Jackson, \$100; Lake Superior, \$45; Pittsburg & Lake Angeline, \$160; Republic, \$17.50.

Vermillion Range.—Chandler, \$45; Minnesota Iron, \$80.

Denver.

Prices and sales for the week ending July 9th:

Company.	Open.	H.	L.	Clos.	Sales.
Mines.					
Alleghany	04 1/4	04 1/4	04 1/4	04 1/4	10
Amity	01 1/2	02 1/2	01 3/4	01 3/4	32,500
Bal. Smuggler	05	05	05	05	1,000
Bangkok C. B.	02 1/2	02	02 1/4	02 1/4	50
Brownlow	04	*04 1/4	04	04	7,200
Calliope	03	04	04	04 1/4	550
Claudia J.	01 1/2	*02 1/4	02	02	11,000
Emmons	150a	*48	45 1/4	45	8,000
Leavenworth	02 1/4	03	03	02	300
Paul Gold	01 1/4	01 1/4	01	01	1,000
Puzzler	07	08 1/4	08	08	3,800
Prospects.					
Big Six	03	03	02 1/4	02	2,400
Diamond B.	09	08	08	08 1/4	100
Gas Bird	11a	09 1/2	09 1/2	10	160
Gas & Oil Co.	08	10	08	10	45,000
Ironclad	11 1/2	*12	11 1/2	12 1/4	2,400
Justice	04	*05 1/4	04	04 1/4	9,800
Non-listed:					
Bi-Metallic	30a	25	25	24 1/2	1,000
Auburn	10a	10	10	10	3,000
Edgar Union	26	30	30	29	100
Total					132,100

*Buyer 30, †Buyer 60, a Asked.

San Francisco.

July 8

(From our Special Correspondent.)

The current week has ended with lower prices generally ruling and light sales. No news of im-

portance has been received from the mines and consequently small dealers have shown no inclination to sustain prices. The heavy guns of the mining market are not playing an important part just now. As the bullion product of the Consolidated California & Virginia mines during the month of June was sufficiently large to leave a respectable balance in the banks of the company at the end of the fiscal month, it might have been expected that the stock would have advanced a point or two. The reverse has been the case, the week's trading showing a decline of 15c. Of the remaining North End Comstocks, Mexican ruled to-day at \$1.60, Ophir at \$2.40, Sierra Nevada at 90c., Union Consolidated at \$1.05 and Utah Consolidated at 30c. Of these, Union Consolidated shows an advance during the week of 15c., but the others were from 10c. to 15c. weaker.

Albeit the situation of the middle group of Comstocks remains unchanged. Gould & Curry shows an advance to-day of 35 cents over the closing prices of last week. Potosi, too, has scored a 5 cent advance. Of the remainder, Best & Belcher at \$1.80; Hale & Norcross at \$1.35; Chollar at 80 cents and Savage at \$1.45, have remained stationary. As the annual election of Savage stockholders will take place on the 21st inst., it is not unlikely that this stock will be temporarily stimulated by the demand for stock for voting purposes. This is all the more likely to be true, as the methods of "Jim" Flood in ruling Hale & Norcross and the Savage mines has differed in no material degree from that of the old mill ring. Indeed, the reason for handing over the mines to his control, as was pointed out at the time, was on the simple assumption that it is better to treat with "a devil you don't know than with a devil you do know."

Of the South End Comstocks and Gold Hill stocks Belcher has continued through the week to be the only one in demand, it selling at \$1.65 this morning, with 800 shares sold. This afternoon it declined to \$1.45 under the sale of 1,000 shares. Alpha sold for 25c.; Alta for 20c.; Bullion for 55c.; Challenge Consolidated 60c.; Confidence for \$1.80; Consolidated Imperial for 5c.; Consolidated New York for 35c.; Crown Point for \$1.10; Lady Washington for 10c.; Overman for 70c., and Seg. Belcher for 35c.

The annual meetings of the Overman and Yellow Jacket companies take place on the 14th and 18th insts. respectively, and trifling advances are noted in both stocks, but sales have been light, particularly in Yellow Jacket, which has not been in demand at all.

Only scattering sales have been made of outside stocks, Del Monte selling for 5 cents and Nevada Queen for 45 cents. According to the showing of the last named mine the stock ought to be selling at a price 200% over current sale, but taking into consideration how the Tuscaroras properties are run it is reasonable that 45 cents per share is as much as the stock is worth.

SAN FRANCISCO, July 15.—(By telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$1.75; Bodie, 15c.; Belle Isle, 5c.; Bulwer, 45c.; Chollar, 65c.; Consolidated California & Virginia, \$3.60; Eureka Consolidated, \$2; Gould & Curry, \$1.05; Hale & Norcross, \$1.30; Mexican, \$1.60; Mono, 35c.; North Belle Isle, 5c.; Ophir, \$2.50; Savage, \$1.25; Sierra Nevada, \$1.15; Union Consolidated, \$1.65; Yellow Jacket, 70c.

MEETINGS.

Calhoun Mining and Milling Company, at the office of the company, in Denver, Colo., July 19th, at 12 o'clock, noon.

Bangkok-Cora Bell Mining Company, at the office of the company, room 40, Railroad Building, Denver, Colo., August 4th, at 10 A. M.

Live Oak Drift Gravel Mining Company, at the office of the company, room 5 No. 420 California street, San Francisco, Cal., July 30th, at 1 P. M.

Yellow Jacket Silver Mining Company, at the office of the company at Gold Hill, Nev., July 18th at 3:30 P. M.

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nt' in office.	Day of sale.	Amt per share.
Alta, Nev.	42	June 18	July 26	Aug. 16	.15
Belle Isle, Nev.	14	.....	July 17	Aug. 12	.10
Blue Bird, S. Dak.	8	June 10	July 11	July 30	.000%
Bodie Con., Cal.	14	June 20	July 22	Aug. 22	.25
Bullion, Nev.	38	May 24	June 28	July 19	.25
Chollar, Nev.	33	May 28	July 7	July 27	.50
Comm'wealth, Nev.	8	June 16	July 21	Aug. 18	.10
Cons. N. York, Nev.	8	June 28	Aug. 2	Aug. 23	.10
Cons. St. Gotthard, Cal.	5	June 9	July 14	Aug. 4	.05
Gould & Curry, Nev.	11	June 7	July 12	Aug. 4	.25
Gray Eagle, Cal.	29	July 6	Aug. 9	Aug. 30	.06
Himalaya, Utah	69	June 13	July 13	Aug. 13	.00%
Norway, Utah	.....	Dec. 24	Feb. 1	July 21	.02
Ophir, Nev.	58	June 3	July 7	July 27	.50
Peerless, Ariz.	18	July 6	Aug. 11	Sept. 7	.05
Ruby Bell, S. Dak.	11	June 13	July 11	July 30	.000%
Sierra Nevada, Nev.	102	June 11	July 13	Aug. 2	.25
Siskiyou Cons., Cal.	4	May 4	June 17	July 18	.01%
Summit, Cal.	12	May 20	June 27	July 29	.05
Yellow Jacket, Nev.	51	May 10	June 14	July 18	.25
Utah Cons., Nev.	15	June 7	July 11	July 29	.25

DIVIDENDS.

Homestake Mining Company, dividend No. 168 of 10 cents per share, \$12,500, payable July 25th, at the office of Messrs. Lounsbury & Company, Mills Building, No. 15 Broad street, New York. Transfer books close July 20th and reopen July 20th.

Aspen Mining and Smelting Company, dividend No. 27 of 10 cents per share, \$20,000, payable July 16, at the office of the company, No. 54 Wall street, New York. Transfer books close July 14 and reopen July 18th.

Deadwood Terra Mining Company, dividend No. 43 of five cents per share, \$10,000, payable July 20, at the office of Messrs. Lounsbury & Company, Mills Building, No. 15 Broad street, New York. Transfer books close July 15th and reopen July 21st.

PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.					
	Opening.	Highest.	Lowest.	Closing.	Sales
July 9.....	52 3/4	53	52 3/4	52 3/4	15,000
11.....	53 1/4	53 1/4	52 3/4	53	45,000
12.....	53	53	53	53	2,000
13.....	52 3/4	52 3/4	52 3/4	52 3/4	5,000
14.....	53	53	52 3/4	52 3/4	23,000
15.....	52 3/4	52 3/4	52 3/4	52 3/4	10,000
Total sales in barrels.....					163,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, July 15th.

Statement of shipments of anthracite coal (approximated) for week ending July 9th, 1892, compared with the corresponding period last year.

Regions.	July 9, 1892.	July 11, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region.....	424,690	450,542	Dec. 25,852
Lehigh Region.....	123,916	123,978	Dec. 62
Schuylkill Region.....	205,513	262,972	Dec. 57,459
Total.....	754,119	837,492	Dec. 83,373
Total for year to date	20,392,357	19,211,729	Inc. 1,180,628

PRODUCTION OF BITUMINOUS COAL for week ending July 9th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.....	1,298	45,857	54,795
Cumberland, Md.....	77,871	1,162,169	2,190,836
Barclay, Pa.....	3,643	105,718	96,533
Broad Top, Pa.....	6,777	235,268	259,459
Clearfield, Pa.....	54,301	2,085,236	2,144,888
Allegheny, Pa.....	18,273	638,320	682,120
Beach Creek, Pa.....	14,172	1,315,825	1,225,178
Pocahontas Flat Top.....	37,487	1,159,664	1,298,807
Kanawha, W. Va.....	55,201	1,289,683	1,229,083
Total.....	319,023	8,127,740	9,181,709

WESTERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Pittsburg, Pa.....	19,980	676,868	545,496
Westmoreland, Pa.....	25,536	845,522	939,814
Monongahela, Pa.....	11,200	301,030	306,285
Total.....	56,716	1,823,420	1,791,595
Grand total.....	375,739	9,951,160	10,973,505

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending July 9th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week 84,673 tons; year, 2,891,778 tons; to corresponding date in 1891, 1,832,258 tons.

Anthracite.

There is a feeling among those interested in the anthracite trade that the output arranged for July, viz.: 3,500,000 tons, will be too great for the requirements, at least so far as the maintenance of the stability of the market is concerned, and that it will hardly be possible to keep up the production to this figure throughout the remainder of the year. It is probable, therefore, that we shall hear of a more restricted output for next month. A week ago it appeared as if there was a limit to the desire for further rises on the part of the coal barons. Since then, however, a feeling of greater security from State interference has come over them, and we may therefore look for another advance at the beginning of August.

The legal proceedings and inquiries which are being conducted by Government and State authorities are being postponed and adjourned, and we cannot help reiterating our former opinion that a recourse to law for the stoppage of business abuses is useless and contrary to the principles of economics. If producers ask more for their article than the buyers think is just or care to pay, the buyers must cease to buy the article. There is no reason whatever why people should not gradually begin to use bituminous coal at least in new houses where open grates could be put in. At any rate during the summer they might use oil stoves for cooking.

At the present time the dealers quote trade as very quiet and dull, and all the business is on old contracts. The output during the week ending last Saturday is less than the average, but it must be remembered that the 4th of July came at the beginning of the week and reduced the number of working days by one. Our belief is, as considering the comparatively large output and the slowness of sales, that the producers must be stocking at all their distributing points. Our advice to consumers

is, if they cannot or will not go to bituminous, at least to lay in as much anthracite as they can at present, as they will only have to pay 25 to 50 cents per ton extra in a few months' time.

The proceedings on behalf of the State of New Jersey at Trenton against the three railroad companies have been postponed until July 20th at the request of the Attorney-General, who states that he is not yet ready. This looks as if the case was to be postponed until the end of summer.

Matthias Arnott is bringing an action in Lyeon County with the object of breaking the lease under which the Philadelphia & Reading Railroad Company now operates the Lehigh Valley Railroad and the Central Railroad of New Jersey. President McLeod and other magnates were examined, but nothing of importance was elicited. This litigation will be no more useful than the others already on foot.

The well known boiler expert, Mr. John A. Mason, has been conducting a series of tests as to the thermal value of the various sizes of anthracite, when used in a steam boiler of the Hazleton type. The tests were made at Haddock, Shouk & Co.'s Black Diamond Colliery, at Lucerne Borough, and a boiler of 250 H. P. nominal capacity, but capable of being worked to 400 H. P., was employed. The general result showed that No. 1 buckwheat gave the highest thermal efficiency. These small sizes have been somewhat neglected by steam users, and consequently the price is low. The idea, of course, is to show that with proper stoking the buckwheat size can be made efficient, and thus to tempt the steam user away from bituminous by the low price offered for the small anthracite. The price quoted by the Haddock for No. 1 buckwheat used in these tests is \$2.24 per ton, and according to the tests 100 H. P. can be supplied from the boiler at a cost of 32 cents per hour.

Bituminous.

The trade in bituminous coal is still very unsatisfactory. The blockade on the Pennsylvania Railroad is by no means cleared off yet. It is hoped, however, that they will have their new piers ready early this fall, and then there will be some chance of the trade pulling itself together again. There is also a scarcity of vessels except at Philadelphia, and this, of course, adds to the congestion. The shipping rates are lower than they were some time ago, and for once in a while the rates from the various ports are about equal. They may be quoted as follows: From Philadelphia, Baltimore, Newport News and Norfolk to Sound ports, 70 cents, and to Boston, Salem and Portland, 75c.

The people interested in bituminous are naturally interesting themselves at present in various designs of smoke consuming furnaces in order to compete with anthracite. A new boiler is now being introduced by the Edgar Boiler Company, of No 1 Broadway, this city. It answers its purpose as far as its claims for non-emitance of smoke is concerned, but before reporting on it fully we intend to inspect it thoroughly. In the meantime we may mention that Mr. C. E. Emery has tested it and written a very favorable report.

Our young contemporary, the *Canadian Coal Trade Journal*, states that on the 17th ult. the first barge load of English coal from Newcastle arrived in the coal basin at Ottawa, Ontario. This coal was imported via Quebec and it is stated that it can be put on the market in Ontario at lower rates than all-rail United States coal can be offered at.

By the-by, in speaking of the *Canadian Coal Trade Journal*, we wish to remind our contemporary that it should not rely on scissors and paste too much in its make-up. In its issue of July 1st there is an editorial note on "Piping Coal to Market," which is word for word with a paragraph we printed in our issue of June 18th and the whole of the coal market report from New York in that issue is identical with part of ours of June 25th. One paragraph only out of the three in this market report is credited to the *ENGINEERING AND MINING JOURNAL*. We do not make this remark in anger, but rather as advice, for seeing that all coal people throughout the American continent read our journal, our Canadian contemporary should really prepare something different for its readers from what they have already seen in our columns.

Boston. July 13.

(From our Special Correspondent.)

There is actually nothing new or interesting to say in regard to the anthracite coal market in this city. The most noticeable thing is the firmness there is in prices. It is a foregone conclusion that the purchaser of hard coal has to pay circular prices. There are no cutters. Even the outside companies act in perfect unison with the combination. Though prices are very firm and all the retail dealers here are as confident as can be that the combination means to advance prices from month to month, they are purchasing very little. Since the first of the month business has been at a standstill.

Quotations are: Net f. o. b. at New York, stove, \$4.50; egg, \$4.20; free broken, \$3.90; chestnut, \$4.40. Lykens Valley, f. o. b. net, Philadelphia, broken, \$4.75; egg, \$5.25; stove, \$5.75; chestnut, \$4.75.

The soft coal market here is actually featureless. The dealers are all well stocked and no one seems desirous of buying. A purchaser could probably have things very much his own way. The companies are better able to ship than they were a week or two ago, when vessels were anything but plentiful. On cars here Clearfield can be had for \$3.15 and George's Creek, \$3.45 per ton.

There is very little change to note in regard to freight rates except what I stated above in reference to soft coal. From Baltimore the average rate is 80 cents, while from Newport News it is 70 cents. There is a feeling in the trade here that if this inactivity continues there will be a general easing in rates. We quote: From New York to Boston, 60@65c.; from Philadelphia to Boston, 70@75c.; from Philadelphia to Portland, 70@75c.; to Bath, 75@80c.; to Providence, 65c@70c.; from Baltimore to Boston, 80c.; Newport News to Boston, 70@75c.; Sound points, 70c.

The advance that we anticipated would be made by last Monday, in consequence of the recent advances made by the wholesale dealers, has not materialized. Meetings have been held, but have ended in disagreements. Some of the larger dealers here were strongly in favor of having prices on soft coal advanced, but others were as strongly opposed, and so nothing up to date has been accomplished. In regard to this matter one of the largest Boston dealers said to me very recently. "The retail dealers of this city have not made any money on bituminous coal for the past two years, and it is now time that they should." This sounds rather odd from one of our largest dealers, for they have made money if anybody has. It is a notorious fact that the small fry in the trade here have not been eminently successful in handling soft coal for some time. Their profit and loss accounts have not shown much excess on the credit side.

We quote: stove, \$6; nut, \$6; egg, \$5.75; furnace, \$5.50; Franklin, \$7.25; Lehigh egg, \$6; Lehigh furnace, \$6; wharf prices 50 cents less than the foregoing.

The receipts of coal at this port for the week ending July 9 were 5,942 tons of anthracite and 9,279 tons of bituminous, against 56,846 tons of anthracite and 19,769 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,062,681 tons of anthracite and 392,140 tons of bituminous, against 950,856 tons of anthracite and 570,736 tons of bituminous for the same time last year.

Buffalo. July 13.

(From our Special Correspondent.)

Since July 1st the following schedule of prices for anthracite coal has prevailed in Buffalo: Free on board vessels at Buffalo, per gross ton, grate, \$5.05; egg, stove and chestnut, \$5.30; on cars at Buffalo or at Suspension Bridges, per gross ton, grate, \$4.75; egg, stove and chestnut, \$5.00. Retail, per 2,000 lbs., screened and delivered, grate, \$5.25; egg, stove and chestnut, \$5.50, and pea \$4.00; Blossburgh coal selling at \$4.00 per net ton delivered. Bituminous coal, according to location of mine, from slack to screen lump, per 2,000 lbs., on track by the carload, \$1.50@2.45; coke selling on cars on track, at Buffalo, at \$4.30 for foundry and \$4.65 for crushed.

The advance in hard coal was a surprise; as a dealer says, "of course, the use makes no difference to the man who uses natural gas, but all are not so happily situated." The non-observant consumer will receive a shock when he orders his winter supply of fuel and some profanity may be expected.

The anthracite coal trade is very quiet, but bituminous is in good demand for propellers, factories, etc.

It is understood that the Bell, Lewis & Yates Company and the Fairmount Coal and Coke Company have secured the contract for one and a half million tons of bituminous coal from the New York Central & Hudson River Railroad Company. Price not stated by the Buffalo firms interested.

The Michigan Central contract for 150,000 tons of soft coal has been awarded (but price not stated) to Mr. O. W. Shipman, of Detroit; to Bell, Lewis & Yates Co., of Buffalo, and to C. N. Shipman, of Buffalo.

The local coal dealers are not satisfied with the present prices of anthracite, and would like a further advance of 25c. per net ton delivered. Consumers prefer the present quotations.

Lake freights active and strong; shippers complain that coal comes in very slowly. No change in quotations, which are the same as given in the statistics annexed hereto, but indications point to an advance before long in rates.

The following statistical information is of value: Railroad receipts and shipments of coal at the port of Buffalo are not reported by request. Receipts of coal by lake thus far this season to July 1st, none. Shipments by lake westward for month of June, 723,640 net tons, as compared with 387,140 net tons in 1891 and 242,000 net tons in 1890; for the season to July 1st, 1,128,010 net tons, as compared with 832,750 net tons in 1891 and 596,970 net tons in 1890. The receipts of coal by canal for month of June, 266 net tons, as compared with none in 1891 and 1,547 net tons in 1890; the shipments for June, 3,758 net tons, as compared with 4,784 net tons in 1891 and 1,383 net tons in 1890. The total receipts by canal to July 1st, 409 net tons, as compared with 481 net tons in 1891 and 2,514 net tons in 1890; the shipments to July 1st, 10,490 net tons, as compared with 10,703 net tons in 1891 and 1,003 net tons in 1890. The aggregate shipments westward by lake shows an increase thus far this season of 295,260 net tons as compared with 1891, and 531,040 net tons as compared with 1890. During June this year the ruling rates of freight on coal by lake were as follows: 60c. to Chicago and Green Bay, 50@55@60c. to Milwaukee, 30@35c. to Duluth, 40c. to Saginaw, 30@35c. to Bay City, 25c. to Detroit and Toledo and 65@70c. to Racine.

The shipments of coal by lake from Buffalo from

the opening of navigation to July 1st, 1892, were distributed about as follows:

City	Net tons	City	Net tons
Buffalo to	292,930	St. Clair	1,420
Chicago	168,105	Alpena	300
Milwaukee	66,608	Algonac	1,100
Duluth	53,635	Owen Sound	460
Superior	16,500	Marquette	9,550
Gladstone	9,305	Marquette	650
Green Bay	12,675	Manitowoc	2,480
Racine	26,940	St. Ignace	200
Toledo	6,650	Menominee	650
Detroit	2,000	Windsor	1,240
Ashland	5,300	Marine City	640
Bay City	16,300	Sheboygan	650
Saginaw	2,640	Kenosha	2,260
Sheboygan	750	Travers City	40
Escanaba	3,326	Pt. Dover	764
Pt. Huron			

The shipments of coal by lake from this port from July 1st to 13th, both days inclusive, were 125,918 net tons distributed about as follows: 45,630 to Chicago, 40,200 to Milwaukee, 13,400 to Duluth, 5,800 to Superior, 1,250 to Toledo, 300 to St. Clair, 1,000 to Sheboygan, 4,775 to Green Bay, 2,050 to Bay City, 550 to Saginaw, 550 to Detroit, 1,000 to Marquette, 70 to Menominee, 3,300 to Gladstone and 4,313 to Fort Williams.

The rates of freight were as follows: 60 cts. to Chicago, Milwaukee, Fort William, Green Bay and Menominee; 35 cts. to Duluth, Superior, Bay City and St. Clair; 25 cts. to Toledo and Detroit; 40 cts. to Saginaw, 50 cts. to Gladstone, 65 to Sheboygan and 45 cts. to Marquette.

The movements of coal by canal at this port for the first week in July was as follows: Receipts, 336 net tons; shipments, 474 net tons.

The freight rates by canal on coal were as follows during the month of June: Five loads to Syracuse, 50c.; 1 load to Jordan, 50c.; 2 loads to Fulton, 55c.; 1 load to Illion, 60c.; 1 load to Utica, 60c., and 2 loads to Oriskany, 60c.; all gross ton and free on and off.

Chicago. July 14.

(From our Special Correspondent.)

Trade still continues quiet and free of all noteworthy incidents. Country orders are few and far between, and the hand-to-mouth policy remains in force with most of the dealers. From recent results which have come to our knowledge, we are inclined to think that the fall trade will not be as heavy at the opening of the season as has been anticipated. The tremendous shrinkage in the stocks here between January and June, to which attention had been called about the opening of navigation—docks and yards being well cleaned up—show that a very large amount of coal has gone into consumers' and dealers' possession, over and above legitimate consumption. One dealer here estimates that he had delivered about one-third of his annual retail sales previous to May 1, when the advances took place, and by comparison of notes with other dealers he finds there was a very general disposition on the part of consumers to avail themselves of their supplies on loose and unlimited contracts made last year and extending as late as July 1. As an example of this, one large corporation secured about 6,000 tons at 55c. a ton less than their contract with the same parties for the ensuing year. The evident irritation and friction between some of the minor parties of the consolidation, while provoking a good deal of comment, does not affect the market, except as to making certain dealers and shippers feel uncomfortable at not being allowed to meet this competition as in the past. Most of the railroads, that is, the larger systems, have placed their contracts for hard coal. The Illinois Central, Rock Island, Chicago & Northwestern, C., B. & Q., Milwaukee & St. Paul, and other big corporations, and the tonnage (estimated maximum) is in nearly every instance heavier than the previous year, together with better prices.

Retail business is fair and prices are well maintained; indeed, under the present regime and status of the situation, there is small chance for shading. A dealer who cuts prices simply gives so much of the difference between the wholesale price and the cartage. Some agents of individual operators who receive their coal "all rail," say that supplies are not coming forward as rapidly as they could wish. Vessel coal is somewhat less active.

Bituminous coal is active so far as regards large wholesaling contracts. Most of the railroads, county, city, Board of Education and other big contracting parties have closed up contracts for the ensuing year, and in almost all instances a steady market has been maintained. June prices have been low, but they were a little better than were realized last year. Otherwise than the foregoing general trade is dull, and it could not well be otherwise with the usual shut down of so many concerns receiving large quantities of coke coal. This though is only temporary and probably by end of month most of them will be in operation again. Some degree of strength has been added to the bituminous coal market from the recent advances and general steadiness in price of anthracite, and these will, no doubt, lead to increased activity in the former in the northeastern territory and country west of us. Indications all point to the best trade in years.

Coke shows some little improvement, foundries are taking in more work, and though this in a measure is counterbalanced by the shut down of other branches, there is evidently more coke selling than during the previous week. Best grades are held very firm despite the fact that 50 per cent. of the ovens are cold; other grades are shaded.

Quotations are: \$4.65 furnace; \$5.05 foundry crushed; \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.60; small egg, range and chestnut, \$5.85. Retail prices per ton are: Large egg, \$7; small egg, range and chestnut, \$7.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, arc: Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.35.

Pittsburg. July 14.

(From our Special Correspondent.)

Coal.—The local markets are not very active. The shutting down of most of the iron mills and glass factories has left the local coal trade with very little to do. There has been no shipment by river since our last; a rise in the Ohio is not wanted at present. The season has been a long one, although the shipments are less than the first six months of last year. Most of the mines along the Monongahela have closed for the season. The big tow boats that tow Pittsburg coal between Louisville and New Orleans have mostly returned home to undergo repairs for the fall and winter trade. In case of a rise only the small boats would be sent out. The railroad mines are still running up to their full capacity, their only drawback being a scarcity of cars. The railroad coal business has been a very satisfactory one and shows no signs of falling off. The shipments to the Shenango and Mahoning valleys have ceased for the present, as they have shut down.

Connellsville Coke.—The trade still remains in a very unsatisfactory condition. Everything is hinging on the settlement of the labor troubles among the iron and steel men, and no settlement is in sight. In fact the situation becomes more strained every day between the employers and their workers, and many persons look upon the situation with considerable alarm, fearing a repetition of the labor riots of 1877, which cost the county of Allegheny fully \$3,000,000. Coke shipments for the week were the largest for some time past, exceeding the previous one—611 cars. The Frick plants along with the joint ovens all made 6 days. The Southwest Coal and Coke Company's 4 plants, with 1,202 active ovens, made 6 days, as did the active plants of the McClure Coke Company with 1,431 ovens in blast. The remainder of the active ovens in the region did not materially change their running order. Week's shipments aggregated 129,365 tons, distributed as follows: to Pittsburg, 1,800 cars; points east of Pittsburg, 1,472; points west of Pittsburg, 3,824; total cars, 7,196. Nominally prices are unchanged with sales made materially below quoted rates.

METAL MARKET.

NEW YORK, Friday Evening, July 15th, 1892.

Prices of Silver Per Ounce Troy.

July	Sterling Exchange.	London, Pence.	N. Y. Cents.	Value of sil. in \$.	July	Sterling Exchange.	London, Pence.	N. Y. Cents.	Value of sil. in \$.
9	4.88 1/4	39 1/2	87	.672	13	4.88	39 3/4	86 3/4	.669
11	4.88 1/4	39 1/2	87 1/4	.674	14	4.88	39 3/4	86 3/4	.669
12	4.88 1/4	39 3/4	86 3/4	.671	15	4.88	39 3/4	86 3/4	.671

Silver has been steady to quiet the past week. The fiasco in legislation at Washington was discounted at home and abroad and the result fell flat. Inquiry from abroad, though not large, is still a factor in the market, and the floating stock is insignificant. The United States Assay Office at New York reports the total receipts of silver for the week to be 132,000 ounces.

Government Silver Purchases.

WASHINGTON, D. C., July 15 (by telegraph).—Treasury Department purchased to-day 481,000 ounces of silver at prices ranging from '873 to '8735 per ounce fine.

Domestic and Foreign Coin.

The following are the latest market quotations for the leading foreign coins:

	Bid.	Asked.
Mexican dollars	68 1/2	69
Peruvian soles and Chilean pesos	64	68
Victoria sovereigns	4.90	4.93
Twenty francs	3.90	3.93
Twenty marks	4.75	4.78
Spanish 25 pesetas	4.79	4.81

Gold and Silver Exports and Imports at New York.

	Week ending July 9.	Since Jan. 1.	Imports.	Week ending Jan. 1.
Gold	\$1,303,921	\$41,861,263	\$24,185	\$6,522,115
Silver	449,551	11,594,682	48,475	876,621
Totals	\$1,753,472	\$56,855,945	\$291,661	\$7,398,736

The exports and imports of gold and silver from January 1st to July 9th of 1891 were: Exports, gold, \$71,603,771; silver, \$7,311,265; imports, gold, \$1,752,956; silver, \$942,754. During the present week but \$750,000 in gold has been exported.

The present small exports of gold verifies our remarks on the subject made July 2. It is possible, as some papers predict, that a large quantity of gold may be exported on Saturday, but if it does take place it can hardly be considered as more than a spasmodic effort. All indications point now to a heavy importation of the yellow metal. The balance

of trade continues to be in our favor, and this balance must be paid in gold coin or gold securities, for it is assumed that most of our general securities have already come back to us.

The decisive defeat of Stewart's free coinage bill in the House has removed all present fear on the part of investors that our securities will be paid in silver.

Lastly, it is possible that our currency will be established on a still firmer basis by the repeal of the Sherman Act of July 14th, 1890, as Senator Sherman himself has introduced a bill in the Senate repealing the provisions of the former act requiring the purchase of 4,500,000 oz. of silver per month and the issue of Treasury notes in payment of the same. The proposed bill stipulates that "nothing in this act shall impair or change the legal character of the notes already issued."

This is a wise move and will greatly improve our chances of success in the International Monetary Conference soon to take place.

Copper.—The market continues in its most unsatisfactory condition. Lake is, if anything, weaker than we reported last week; the business done has not been much in volume, less on account of the quantities offering than of the absence of legitimate demand from manufacturers, who look upon the market most indifferently. It seems that their attitude is caused by a very marked falling off in the receipt of orders; in fact, such a large difference that the quantities of copper which they had previously contracted for, expecting they would be used by the end of this month, will last them for some time to come.

As to the prospects in the manufacturing line, they are not very promising at this season of the year, but it would seem that, with the setting in of fall, there should be lower values ruling. Thus a reaction will set in, and prices be affected, probably for the better. During the week several hundred thousand pounds of Lake changed hands at from 11⁴⁰ down to 11¹⁵, which is about the closing figure. Most of the Lake companies are entirely out of the market; others again would sell at 11¹⁵, and but a few below that. However there seems to be enough copper in second bands to satisfy any demand which may arise. It would also appear as if, unless there should be heavy sales for export, the market would rule lower at an early date, as the production here of the finer grades of copper is in excess of the demand, and mining companies generally have been accumulating stocks for some time. Another thing which is likely to interfere with the improvement is the ever increasing production of electrolytic copper, which is assuming such proportions that it is probable it will reduce the difference between Lake and the cheaper grades. Arizona copper we quote at 9¹⁰@9¹⁰¢, according to brand and quantity. Casting copper is nominally 10¹⁰@10¹⁰¢.

The market abroad has fluctuated, receding and then returning to its former level, but the closing figures, which are £44 12s. 6d. for spot and £45 for three months prompt, show a loss from those of last week which were £44 17s. 6d. @ £45 for spot and 10s. higher for futures. Manufactured descriptions are without change.

We are advised that a meeting of large copper producers was held in London to-day (15th July) and a similar meeting in this city, at both of which the condition of the trade was discussed and an understanding was arrived at which, it is hoped, through the collection of statistics of production, of sale and of export, and through the communication of information to those interested in the trade on both sides of the Atlantic, may result in giving greater stability to the market than it has possessed of late—a most desirable object. We will discuss the matter fully in our next issue.

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

To	Copper Matte.	Lbs.	
S. S. Belgravia.....	1,161 bags	136,670	\$8,000
S. S. Arizona.....	3,126 "	363,142	18,000
S. S. Horrox.....	3,294 "	361,548	18,000
To Antwerp.....	Copper Matte.	Lbs.	
S. S. Wensland.....	9 casks	11,250	\$1,400
S. S. Pennland.....	36 "	44,800	4,700
To Havre.....	Copper Matte.	Lbs.	
S. S. La Bourgogne.....	54 casks	67,200	\$7,000
To Rotterdam.....	Copper Matte.	Lbs.	
S. S. Spandam.....	640 pigs	225,512	\$23,725
	19 casks	23,750	2,750

Tin.—The passing by the House of the repealing act, of which there is, of course, at this time not the slightest chance of getting it through the Senate, was made the means of a sharp decline, which was over done, and from which there has been a reaction. The lowest prices reached during the week were 20⁴⁵ for spot and 20⁷⁵ for futures, while closing figures are 21 for spot, 21²⁵ for August-September, and 21⁵⁰ for delivery during the rest of the year. Abroad, the market was also affected by the action of the House, and from the opening figures of £97 2s. 6d. and £96 10s. there was a decline to £95 2s. 6d. for both spot and futures, but the closing figures are £97 2s. 6d. and £96 15s.

Lead.—As foreshadowed in our last report, the market has given way considerably, caused by the desire of the speculating clique and those refiners who had together tried to innovate higher values, meanwhile getting and accumulating heavy stocks, to realize, which could not be done except by anticipating the market, the demand being very slow. The closing figures are 4¹⁰@15. The market in London remains unchanged.

Chicago Lead Market.—The Post, Boynton, Strong Company telegraph us as follows: "The market has been quiet with signs of weakness. Sales of some 400 tons have been made at 4¹²/₂¢, at the close values are nominal at 4¹⁰ asked with no bids."

St. Louis Lead Market.—The John Wahl Commission Company telegraphs as follows: "The decline in pig lead at the sea board has caused our Western buyers to become distrustful of prices and in consequence very little business has transpired here this week. The metal has sellers at 4⁰¢, down to 4³²/₂¢, but this does not seem to interest the buyers."

Spelter.—While not very firm this article continues quite steady, which is about all that can be expected in view of the continually increasing production, which, if it had not been interfered with and decreased by the Western floods, would undoubtedly have caused lower prices to rule, even though the galvanizing trade did start up so unexpectedly strong. However, with the momentary curtailment, prices are maintained at \$4.75 for spot and \$4.70 for futures. The London quotation for ordinaries is £21 11s. 3d., and for special brands £21 13s. 9d.

Antimony.—We have still to quote Cookson's at 14¹/₂¢, L. X. at 12¹/₂¢, and Hallett's at 11.

Nickel, though steady at 60@62¹/₂¢, is a little firmer.

The Quicksilver Trade.

The receipts of quicksilver at San Francisco for June and for the first six months of the year were as follows:

	For	Jan. 1 to
	June.	June 30.
1890.....	flasks 855	6,000
1891.....	" 891	7,044
1892.....	" 1,521	8,677

The exports by sea for June were 271 flasks, valued at \$11,804, including 150 flasks to Mexico, 100 flasks to Australia and 20 to New Zealand. The shipments by sea for the first six months of the year were as follows:

	Flasks.	Value.
New York.....	2,300	\$98,700
Australia.....	612	24,447
New Zealand.....	70	2,910
Central America.....	39	1,537
Mexico.....	1,350	53,205
British Columbia.....	202	7,889
Total.....	4,573	\$188,688
In 1891.....	2,062	93,050

The quantity exported this year is more than 100% larger than last year.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, July 15th, 1892.

The Homestead difficulty is still the prominent topic of conversation in the iron and steel trades in this city. The calling out of the National Guard of Pennsylvania by General Pattison has had the effect of quieting the strikers temporarily and of checking any violence against law and liberty, but it has not by any means made the men give in to the Carnegies. The effect of the presence of the guard will only be to prevent immediate outrage and it is quite impossible at present to estimate what the temper of the former employees will be when non-union men are introduced. This morning the news arrives that the men at the Lawrenceville and Beaver Falls Mills of the Carnegie Company are going out quietly to-day to show their sympathy with the Homestead strikers. Thus there will be about 10,000 men idle. Seeing that the men in the Lawrenceville and Beaver Falls mills belong to the Amalgamated Association and the Carnegies signed their new scale a fortnight ago, the Amalgamated Association have violated their contract and are now clearly in the wrong.

Pig Iron.—The following tables give the estimated output of the blast furnaces for the week ending Saturday, July 2nd, 1892, and for the first 26 complete weeks of the year 1892 up to and including June 30th, together with the output of the week ending Saturday, July 1st, 1891, and for the first 26 complete weeks of the year 1891 up to and including June 29th, 1891:

ESTIMATED OUTPUT OF BLAST FURNACES FOR WEEKS ENDING JULY 2D, 1892, AND JULY 1ST, 1891.

	Anthracite.		Coke.		Charcoal.		Total.	
	No. of furnaces in blast.	Output in gross tons.	No. of furnaces in blast.	Output in gross tons.	No. of furnaces in blast.	Output in gross tons.	No. of furnaces in blast.	Output in gross tons.
1892	74	32,000	140	127,000	42	10,000	256	169,000
1891..	92	36,900	152	121,600	51	10,700	295	169,200

ESTIMATED OUTPUT OF BLAST FURNACES IN 1892 AND 1891 FOR FIRST 26 WEEKS UP TO JUNE 30TH AND JUNE 29TH, RESPECTIVELY.

	Anth'cite.	Coke.	Charcoal	Total.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
To June 30th, 1892.	967,400	3,549,900	278,700	4,796,000
To June 29th, 1891.	982,400	2,236,100	287,100	3,505,700

Pig Iron.—The make of pig iron in the United States is decreasing steadily. From April, 1891, to March of this year the output increased gradually from 114,000 tons per week to 194,000 tons per week, and since then the rate has gradually fallen until it stands at 169,000 tons per week at the beginning of the month. The details are given in the table above. As regards the state of the market, we learn that the reduction of the prices by the Thomas Iron Company has had a strengthening effect, and buyers are no longer hesitating about laying in stocks. The buying is fairly good, though there is no very remarkable improvement. Among many merchants there is a feeling that bottom prices have been touched, and that if it were not for the curtailment of demand owing to the Pittsburg difficulty the continued decrease in the output would have the effect of stiffening the prices again shortly.

Spiegeleisen and Ferromanganese.—To use the words of the dealers, "spiegeleisen is dead." Ferromanganese is very quiet at present, and very little business is done and in small lots. One importer states that he tendered \$60.50 for a 500 ton lot for Troy, but he was told that he was "not in it," so that probably the selling price was \$58.50@59. This is the only transaction that in any way indicates the price.

Steel Rails.—We hear of no orders of any importance having been received during the week, and the market may, therefore, be characterized as dull. No new lines are being planned at present. Old rails are at present useless, owing to the low price of pig iron, and this branch of the market is therefore absolutely dead. Some time ago there was a rumor that old rails were scarce, and some foolish speculators bought up all the available supply. They are scarce, as a matter of fact, but as they are not wanted at all, the speculators are in a bad way.

Rail Fastenings.—This department of trade is lifeless, in sympathy with the state of the rail trade. Prices are as follows: Fish and angle plates 1⁵⁵@1⁶⁵¢ at mill; spikes 1⁹⁰@2²¢; bolts and square nuts 2⁵⁰@2⁷⁰¢; hexagonal nuts 2⁷⁰@ 2⁸⁰¢ delivered.

Merchant Iron and Steel.—Prices in this branch are unchanged, and the market is quiet and dull. Quotations are given as follows: Muesel's special, 48¢; English tool steel, 15¢ net; American tool steel, 6¹/₂@7¹/₂¢; special grades, 13@18¢; crucible machinery steel, 4⁷⁵¢; crucible spring, 3⁷⁵¢; open hearth machinery, 2²⁵¢; open hearth spring, 2⁵⁰¢; tire steel, 2²⁵¢; toe calks, 2²⁵@2⁵⁰¢; first quality sheet, 10¢; second quality sheet, 8¢.

Tubes and Pipes.—The market is reported by the American Tube Works Co. as being an open one, and that there are no prices to be given.

Structural Material.—The makers of beams and angles in the East report a much stronger market on account of the orders, which, as a usual thing, would go to Pittsburg district, coming to them instead. Angles are becoming scarce and the prices are stiffening. Prices are as follows: Beams, 2²⁰@2³¢; angles, 1⁹⁵@2¹⁰¢; sheared plates, 1⁹⁰@2¹⁰¢; tees, 2⁴⁰@2⁶⁰¢; channels, 2³⁵@2⁵⁰¢; universal plates, 2@2¹⁰¢; bridge plates, 2@2¹⁰¢ on dock. The housesmiths' strike continues and is having a bad effect on the local demand for building material.

Buffalo.

July 14.

(Special report by Rogers, Brown & Co.)

The most encouraging feature is the increased consumption of pig iron throughout the market tributary to this point. Foundries as a rule are melting much more than at any time earlier in the year, and the agricultural implement works are busy. The abundance of iron, however, holds the prices where they are, steady at quotations which furnaces seem now unwilling to shade. Any irregularities in figures indicate more the necessities of the seller than a change in the market conditions. Charcoal iron is not as active, owing to the fact that the large orders for malleable iron brands have mostly been placed for this season. Our quotations below are on the cash basis, f. o. b. cars at Buffalo: No. 1 X Foundry Strong Coke Iron Lake Superior ore, \$15.50; No. 2 X Foundry Strong Coke Iron Lake Superior ore, \$14.50; Ohio Strong Softener No. 1, \$15.50; Ohio Strong Softener No. 2, \$14.50; Jackson County Silvery No. 1, \$18; Jackson County Silvery No. 2, \$17; Lake Superior Charcoal, \$16.50; Tennessee Charcoal, \$17; Southern Soft No. 1, \$14.50; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

Chicago.

June 11.

(From our Special Correspondent.)

About the only class of steel or iron which has been materially effected as regards values by the trouble in and near Pittsburg has been structural, which has appreciated to the extent of several tenths. Stocks here are said to be light and some of the larger sizes scarce. The general shut down of mills east of us have strengthened finished iron in some slight degree, but manufacturing consumers are apparently content to wait until the wage question is settled, judging from the light demand for nearly all classes of manufactured material. Crude is much quieter, though that in a measure is to be expected after the activity in June. The most noticeable feature has been the deep cuts made in southern pig iron. Many transactions are reported for long scattered deliveries

at lower prices than ever reached before, due in a large measure to the rivalry between some of the furnaces in Tennessee and Alabama. The former, making the same price at furnace as the latter, are quoting and giving the benefit of the difference in freight. Another reason assigned is that some of the furnaces are in financial straits. Lake Superior charcoal iron holds its own remarkably well, though a few transactions have gone through at very low figures; but leading furnaces are not meeting these prices. Still, there is a marked weaker feeling for charcoal as well as for local coke iron, but open market quotations remain unchanged.

Pig Iron.—The past week, broken by a holiday, shows fewer sales and far smaller amounts than the one previous. There was a moderate amount of business done in local coke iron, but the tonnage was light. Some little shading was indulged in on account of the deep cuts made in Southern coke, though on the whole the product of furnaces in this vicinity fetches relatively better prices than that made South, still the situation is a grave one, and occasions much uneasiness. Agents of Ohio coke irons have booked a number of large orders at current rates, and one of 500 tons of Hanging Rock No. 2 at \$16.80 cash, Chicago. Charcoal iron continues in good demand, and some round lots were closed at equal to \$16.35@16.50, Chicago. Several isolated sales are reported at less than \$16. A few large sales of Southern coke iron have been made in a quiet way, the details of which has been kept very quiet, but enough has leaked out to show that the less said about prices the better.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@17; Lake Superior coke, No. 1, \$14.50@15; No. 2, \$14@14.25; No. 3, \$13.75@14; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@16; American Scotch, \$16.75@17.75; Southern coke, foundry No. 1, \$14.75; No. 2, \$14.25; No. 3, \$13.75; Southern coke, soft, No. 1, \$13.50; No. 2, \$13.10; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

Steel Billets and Rods—a fair inquiry is noted for billets at \$24.50, which is steady. Rods are in good demand at \$34.50.

Structural Iron and Steel.—Demand continues active, and prices on beams, angles, etc., have advanced. Small orders from stock are also a feature, and largest sizes somewhat scarce. Regular quotations, car lots f. o. b. Chicago, are as follows: Angles, \$1.90@2; tees, \$2.20@2.30; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.10@2.25.

Plates.—Eastern mills are now securing the large orders. Boiler shops here are running to about two-thirds of their capacity, and demand from warehouse is better. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, 2 1/4 in. and smaller, 60%; 7 in. and upward, 70%.

Merchant Steel.—Numerous contracts from implement makers were closed last week, and others are still pending. Most of the larger orders have been placed, though every season brings with it a heavier tonnage. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.10@2.20; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.80; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

Galvanized Sheet Iron.—Agents claim they cannot get from mills enough material to fill back orders. Demand is active and stocks becoming badly broken. Discounts remain steady at 7% on mill lots, and 6 1/2% off on Juniata, and 6 1/2% and 5% off on charcoal from warehouse.

Black Sheet Iron.—Many mills now refuse to quote for future delivery of the lighter gauges. Some manufacturers and jobbers are inquiring for sheets. Quotations are firm at 2 1/2@2 3/4, basis of No. 27 Chicago, for delivery before July 1st. Steel sheets are 10c. higher. Dealers quote 3 1/2@3 3/4, on stock same gauge.

Bar Iron.—Buyers generally understanding the condition of affairs with mills are amply withholding orders. Demand is very light for immediate specification. Mill quotation is 1 1/2@1 3/4, half extra. Warehouse business is very fair, and stocks in agents' hands short on standard sizes. Jobbers quote 1 1/2@1 3/4.

Nails.—Wire nails are in better demand from mill at \$1.70 base Chicago, jobbing price is firm at \$1.75 in small lots from stock. Steel cut nails are decidedly firmer for mill quantities, owing to the shut down of most of the manufacturers, and \$1.60 regular average is the best any will do. Jobbing prices are very firm at \$1.70, and car lot orders not wanted.

Steel Rails.—Business in small to medium lots is fair and there is a noticeable increased inquiry from Western systems. If crops are good there will be an excellent demand. Price is steady at \$31@32 as to quantity. Other track supplies are in moderate demand at \$1.70 for iron or steel splice bars; spikes \$2.05@2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

Scrap.—There is no recovery of wrought iron grades; cast scrap is taken to a limited extent, and prices nominal only. No. 1 railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$10.50; fish plates, \$18; axles, \$21;

horseshoes, \$16.50; pipes and flues, \$7; cast borings, \$6.50; wrought turnings, \$9; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.60; coilsteel, \$14; leaf steel, \$15; tires, \$15.

Old Material.—The demand for old railroad stuff is down to zero—entirely devoid of life; and in the absence of sales of sufficient volume to govern values, quotations are nominal. Iron rails, \$18, old steel rails, \$12.50@13.50, according to length and condition, and car wheels \$14.50.

Louisville. July 9, 1892.

(Special Report by Hall Brothers & Co.)

A few fair sized orders have been booked during the past week but the volume of business is by no means large. The unsettled condition of labor troubles at the Homestead mills, and the uncertainty of any early amicable adjustment of the question, naturally has its weight upon the general iron interest. The orders that are placed are fairly well distributed between the different grades of coke and charcoal metals. There is no improvement to note anywhere.

Hot Blast Foundry Irons.—Southern coke No. 1, \$14@14.25; Southern coke No. 2, \$13@13.25; Southern coke No. 3, \$12.75@13; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16; Missouri charcoal No. 1, \$17@17.50; Missouri charcoal No. 2, \$16.50@17.

Forge Irons.—Neutral coke, \$12.50@12.75; cold short, \$12.25@12.50; mottled, \$11.50@12.

Car Wheel and Malleable Irons.—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.80.

Philadelphia. July 11.

(From our Special Correspondent.)

Pig Iron.—Nothing has occurred to check the restriction in the output of pig iron, and the sales made since last report was written show that buyers are not concerned about the future course of prices. Standard irons are \$15 for No. 1; No. 2, \$14.50@15. Scarcely any forge has been sold during the week. Virginia stock of good quality has been offered as low as \$13. Negotiations we are assured are likely to result soon in large transactions in this market in Southern iron. Standard Bessemer sold at \$16.50; phosphorus at \$17.50.

Steel Billets.—Large consumers hardly know what to do in regard to ordering. The situation is about this: Large stocks of billets will, of course, be wanted, but the uncertain point is as to the supply, consequently there is a feverish feeling, and in some instances offers have been made to large buyers to furnish them all the billets they will want for the next three or four months at certain prices not made public, but supposed to be very low. Ordinary quotations \$24.75@25.

Muck Bars.—Muck bars have slightly hardened in price, and to-day \$24.75 was paid for best makes for late August deliveries.

Merchant Iron.—Prices have been advanced all around for the first time this year; the effect has been to rather check the threatening expansion of demand than stimulate it. Manufacturers say they will yet have all they can do. For the present, immediate wants are being filled, and prospective requirements are not being considered. Repairing is being hurried to a conclusion, and a good many mills will start on Monday. Best refined is now quoted at \$1.80, and several mills are selling a good deal of material at that price, but of course in a small way.

Skelp Iron.—Skelp iron has also advanced, and within 24 hours inquiries have come from Western parties which look as though some orders will be placed on Saturday. The delivery price for grooved is \$1.65, and sheared \$1.80.

Sheet Iron.—There is a good demand all around for galvanized and for plain sheet iron. Mills will soon be running full time, and the indications look as though there would be no dullness this summer or fall.

Wrought Iron Pipe.—Various prices have been quoted this week on good sized orders, and as soon as the market takes shape there will be large orders placed, especially for galvanized. Tubes are strong, and orders are hurrying in.

Nails.—Nails have picked up wonderfully, and there is now an actual demand for all kinds. They are selling on a basis of 1 1/2 for cut.

Plate and Tank Iron.—Some of our Eastern mills have just picked up some orders from the West. Steel tanks sold yesterday at 1 1/2; shell, 2 1/2; flange, 2 1/2. Those who are negotiating say large orders will be hurried in within a very few days, but that statement is made on the supposition that there will be a prolonged suspension in the West.

Structural Iron.—A large amount of business has been offered since Monday. Manufacturers give the assurance that big contracts will be made next week; indications all point that way. It would not be stretching the facts to say that prices are a tenth higher, although a good deal of the business now pending will be closed at the old figures. Angles, \$1.80; but parties who want stock at that price had better place orders soon.

Steel Rails.—The only activity for the past two weeks has been in light sections, at prices ranging from \$32 to \$40. Standards, \$30.

Old Rails.—Iron are quoted at \$19, delivered; steel, \$15.

Scrap—There is plenty of scrap now being called for by mill men, and they are willing to pay about \$17 delivered.

Pittsburg. July 14.

(From our Special Correspondent.)

Iron and Steel.—Business during the week has been very much restricted, sales confined to limited amounts principally for use as mixtures. As a matter of course large operations are not expected, as the labor troubles for some time past have been the principal theme under discussion. The shutting down time, which affords the opportunity for finding out the results of the last half year's operations, is at hand, and in many instances its occurrence will be welcomed.

Uncertainties are tiresome when they are prolonged beyond stated intervals, and no matter what may be the degree of uncertainty, a strain is produced which but few men relish. At the present time trade is moving heavily; the present is certainly the buyer's opportunity, but he seems to be timid about taking advantage of the same. It is not impossible that prices will go lower, but it is certainly very improbable; many persons are of the opinion there will be no particular change before the fall trade opens. There is an old rule that advises buyers to replenish stock, when possible, at the lowest price ruling between seasons; this seemed advisable because prices are certain to stiffen just about the beginning of the spring and fall seasons, and as has frequently been the case they generally retain the stiffness then acquired until well into the season. The consumer who lays in a good stock of Standard Bessemer pig metal at \$14@14.25 does well, and so does the purchaser of Grey Forge at \$12.75; the chances against his doing any better are not very promising, and the risk he runs in not doing as well is very great. Various influences are depressing prices at present.

Surplus stocks, excessive production and apprehension about the result of the annual disagreement about the scale; all of these have gotten in their work and forced prices down until they are really at the bottom for some productions and below it for the others; and the producer who cannot possibly hold his product for better prices, rather than give it away, is shaky, and the day upon which his non-survival will begin is not far off.

A leading Eastern dealer has this to say: "Prices of outside brands of pig iron are weak and irregular, owing to the persistence with which the furnace-men force their iron on an unwilling market. Many of the Southern producers are especially anxious to realize on current production, although they are not alone in this respect. Contracts have been accepted for deliveries running well up to the close of the year at the present low prices—a practical avowal on the part of such furnaces that they look for no improvement in prices this year."

On the other hand, makers of standard brands will not make contracts for the balance of the year except at prices fully \$1 above those quoted. The situation shows little change. The men employed in the Carnegie mills at Twenty-ninth street and Thirty-third street have gone out, not on account of wages, for they have signed the scale for a year. This movement is expected to force Carnegie to give the Homestead men what they ask. The outlook is gloomy.

Coke Smelted Lake and Native Ores.

2,000 Tons Bessemer, City Furnace, Aug. Sept.	\$14.00 cash.
Oct.	14.00 cash.
1,000 Tons Bessemer, August.	12.75 cash.
600 Tons Grey Forge, Sept.	14.15 cash.
500 Tons Bessemer.	14.00 cash.
500 Tons Grey Forge.	12.75 cash.
500 Tons Mill Iron.	13.70 cash.
500 Tons Grey Forge.	12.75 cash.
200 Tons Bessemer City Furnace.	14.25 cash.
200 Tons No. 1 Foundry, City Furnace.	15.00 cash.
200 Tons No. 2 Foundry, City Furnace.	14.00 cash.
200 Tons Tons White and Mottled.	12.25 cash.
100 Tons Open Mills.	12.00 cash.
100 Tons No. 1 Silvery.	16.75 cash.

Charcoal.

100 Tons Cold Blast.	26.75 cash.
100 Tons Warm Blast.	17.50 cash.
75 Tons Southern Cold Blast.	24.00 cash.
50 Tons Cold Blast.	26.75 cash.
50 Tons Cold Blast.	26.75 cash.

Spelter.

200 Tons Spelter.	4.75 cash.
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Steel Slabs and Billets.

1,000 Tons Steel Billets, prompt.	23.00 cash.
50 Tons Steel Billets, prompt.	23.25 cash.
500 Tons Steel Billets, July, August.	23.25 cash.
300 Tons Steel Billets.	23.90 cash.

Muck Bar.

350 Tons Neutral, July, August.	24.75 cash.
200 Tons Neutral.	24.75 cash.

Ferro-Manganese.

85 Tons 80%, Baltimore.	59.00 cash.
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Iron Skelp.

250 Tons Narrow Grooved.	160 4 m.
150 Tons Wide Grooved.	162 1/4 4 m.
750 Tons Sheared.	180 4 m.

Steel, Skelp.

400 Tons Wide Grooved.	142 1/4 4 m.
350 Tons Wide Grooved.	145 4 m.
100 Tons Wide Grooved.	140 4 m.

Old Iron and Steel Rails.

600 Tons Old Steel Rails.	15.50 cash.
400 Tons Old Iron Rails.	20.00 cash.
200 Tons Old Iron Rails.	19.75 cash.

Scrap Material.

100 Tons No. 1 RR. W. Scrap, net.	14.10 cash.
100 Tons Country W. Scrap, net.	13.50 cash.
75 Tons Soft Steel, net.	16.50 cash.
50 Tons Cast Scraps, gross.	11.80 cash.
58 Tons Car Wheels, gross.	14.75 cash.

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

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from July 9 to July 15, and Sales. Dividend-paying mines are on the left, non-dividend-paying on the right.

*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 7,630. Non-dividend shares sold, 15,190. Total shares sold, 22,810.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations with columns for Name of Company, dates from July 8 to July 14, and Sales.

Dividend shares sold, 7,311. Non-dividend shares sold, 7,702. Total shares sold, 15,013.

COAL STOCKS.

Table of Coal Stocks with columns for Name of Company, dates from July 9 to July 15, and Sales.

Total shares sold, 246,013.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations with columns for Names of Stocks, dates from July 8 to July 14, and Sales.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date & amount of last), and similar columns for the second section.

G. Gold, S. Silver, L. Lead, C. Copper, B. Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Con. Virginia \$11,000,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ‡‡ This company acquired the property of the Raymond & Ely Company, which had paid \$3,075,000 in dividends. *** Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends, against \$425,000 in assessments.

