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It is to be hoped that President HARRISON will name as our representatives to the international silver conference men who enjoy good reputations and that he will not misrepresent the nation by sending the head of the infamous Comstock mill ring to advocate the adoption of bi-metalism by European countries. Such an appointment as Senator JOHN P. JONES would not only be a disgrace to this country, but would inevitably greatly increase the difficulty of convincing foreign representatives that what we advocate is for the good of the whole world and not merely a job for the enrichment of some Comstock ring.

A COMMISSION recently appointed to investigate the causes leading to the steady decrease in production of gold in Victoria, from 3 150,021 oz. in 1853 to 1,694,819 oz. in 1863, 1,170,394 oz. in 1873, 780,253 oz. in 1883, and an estimated production for 1891 of 570,947 oz., has considered the question under three heads: What is the cause, what should be done to place the industry in a better condition, and what should be observed in promoting success in gold mining.

The Commission considered that the exhaustion of the rich but shallow placers, the difficulties and expense of quartz mining, the spread of agricultural pursuits and the consequent use of the lands by farmers, as well as the lack of faith in mining owing to stock manipulation were at the bottom of the matter. Notwithstanding the decreased production, the committee found that the present annual yield per miner was nearly as much as in 1856, the figures being approximately \$505 as against \$525.

It would seem probable that the conclusion of the commission, that the shallow but rich placers were exhausted, was at the bottom of the matter, and that it can be ascribed in only a slight degree to the cost or difficulties of quartz mining.

The placer mines can be worked by the individual miner, and appear to offer greater chances for sudden enrichment than do the quartz veins which require the combined capital of many persons, and in which the discovery of bonanzas is a slow and arduous operation; nevertheless, if the gold exists in paying quantities the capital can be found, and the output of gold from such mines is less liable to violent fluctuations, and probably on the whole is more profitable than in the working of placers.

THE SO-CALLED MacARTHUR-FORREST PROCESS.

The reports we receive from different parts of this and foreign countries concerning the cyanide process, though conflicting, are on the whole favorable to it. As the conditions of success and of failure become better understood the process will, no doubt, receive a wider application, especially for the treatment of ores containing both silver and gold. For plain gold ores in which the gold is in fine particles the barrel chlorination process makes a much higher extraction, and on ores of moderate or high grade is, we believe, is much more advantageous. Where the ore contains silver as well as gold the saving of a fairly high percentage of each may render the cyanide process a very desirable one.

We have investigated the question of patent rights or royalties quite thoroughly, and in an early issue of this journal will publish some of the information obtained. We are quite convinced, and we believe the data can leave no doubt in any disinterested mind, that the MACARTHUR-FORREST patents are not valid, and that the cyanide process is not now patentable.

It is possible that the special experience acquired by the company holding these patents may be of value to those introducing the process, but it appears certain that the use of both cyanide of potassium in solution for dissolving gold and silver, and of finely divided zinc for precipitating them from those solutions, were well known long before the MACARTHUR-FORREST patents were granted or applied for, and that the process can therefore be used without liability for payment of any patent right or royalty.

COAL LEGISLATION IN NOVA SCOTIA.

In our issue of April 2d we gave at some length the probable effect of the increased royalties on coal land, then proposed and since enacted by the Nova Scotia Legislature. It is interesting to note how promptly our predictions have been realized. Coal companies are already protesting against the increase in royalties, and capitalists are timorous of investing their money in a country in which the government seeks from time to time to change the conditions affecting their profits.

A brief review of the legislation enacted from time to time in Nova Scotia will show what slight protection is there given to capital.

In the original coal leases issued up to 1866, the royalty was fixed at 9-7 cents per ton of screened coal, the tax being paid annually. Slack paid no tax. In that year it was enacted (Statute 29 Vic.) that three renewals in terms of 20 years each should be granted upon application; the law also provided that "the Legislature shall be at liberty to alter and revise the royalty imposed under such lease in or after the year 1866." In the 4th Revision of the Statutes which came into effect in 1873, and in the 5th Revision of 1885, the provision above quoted was omitted. More than that,

the law of 1873 enacted that holders of coal leases issued subsequent to 1858 should be entitled to renewals upon the same terms, conditions and covenants as contained in the original lease.

In 1886 a coal royalty bill was passed changing the royalty to 7½ cents per ton, payable on both screened coal and block, and also providing that "all leases of coal mines issued after the passing of this act shall contain a provision that the royalties may be increased, diminished or otherwise changed by the Legislature." In 1886 many coal leases expired and renewals were issued, but in some of these renewals the clause just quoted was inserted, as in the case of a new lease. This occasioned some alarm, but the coal companies were assured that the intent of the clause was to enable the government to slightly revise the royalty in case it was found that the 7½ cent royalty on coal and slack was greater or less than the original royalty of 9·7 cents per ton. This view was borne out by the debates previous to passing the law, the Commissioner of Mines having stated that "the object of the government has been to get as nearly as possible an equivalent rate to the present rate of 9·7 cents." The Provincial Secretary, Mr. FIELDING, stated in debate that the government might be making a mistake and suggested the insertion of the proviso quoted. That at the time the government did not intend to change the royalty is made quite clear by a recent letter of Mr. FIELDING to the treasurer of one of the Nova Scotia mining companies. He says concerning this clause: "We did not desire at that time to obtain a larger royalty than the existing rate of 9·7 cents."

In 1891 the government notified coal lessees that the royalty would be increased, and at its meeting this year the Legislature raised it to 10 cents per ton on all coal sold subsequent to Feb. 23, 1892, and even holders of leases which do not expire until 1906, wherein the royalty is fixed at 7½ cents, are expected to pay the new rate.

In the face of such contradictory and arbitrary legislation as this, capitalists will certainly avoid investing in Nova Scotia coal mines. It is not the 2½ cents additional royalty that frightens capital, although it is doubtful whether the coal companies can stand even this increase and work at a profit, but the pernicious policy that the legislature can and will at its pleasure arbitrarily change the terms upon which investments are made. It is certain that the mining industry of Nova Scotia has had but slow growth, and even where its natural advantages have seemed exceptionally great, it has uniformly disappointed investors; the government should therefore seek to counterbalance, by fair and liberal treatment, the drawbacks which have discouraged investors—to add a further risk to investments that are already unsatisfactory, is, in the highest degree, unwise. It is now extremely difficult to secure the attention of capitalists for Canadian mining enterprises; with such legislation it will become impossible.

THE END OF THE HOMESTEAD STRIKE.

It is highly satisfactory that the contest between owner and employé, order and riot, law and anarchy at Homestead, Pa., should be now virtually decided and that the mills are again in operation, filled with non-union workmen, to the discomfiture of the Amalgamated Association. Everyone who has studied this strike and its causes from their incipency must admit that the course of the Carnegie company has been marked throughout with moderation, justice and firmness. The issue has developed not into a question of wages, but into the recognition of a principle; whether the owner of works has a right to manage them himself, subject to the law, or whether the control of works is hereafter to be in the hands of an irresponsible committee of the workmen.

It is a matter for sincere congratulation that the calm, firm stand of the officers of the Carnegie Steel Company, and their clear exposition of the facts and dangers of the case to the State authorities, and the prompt action of these, won the victory.

There is no greater or more arrogant tyrant than organized labor when it is powerful enough to enforce its decrees. In this case the Amalgamated Association took possession of the mills, denied entrance to the officers or employés of the company, and even refused obedience to the civil authorities of the county, assuring them with an effrontery which would be ludicrous were not a great principle involved, that they, the law-breakers, would guard the property of which they were in illegal possession.

When the company, finding the civil authorities incapable of protecting its property, and fearing, not without cause, that their works might at any moment be destroyed by the worse element of the strikers, decided, as any law-abiding citizen would, to employ watchmen for its protection. The striking workmen declared with much incendiary talk that no watchman or workman, except themselves, should enter the mills alive. It was, therefore, clearly a necessity for the company in this condition of affairs to employ seasoned and well-trained men, who had experience in such matters, and, while doing their duty, would act with judgment and discretion. It applied to the Pinkertons to supply them. No firm of detectives in this or any other country enjoys or deserves a better reputation for its excellent work and for the entire reliability of its employees, who are all

selected for honesty, prudence and courage, that is, for especial fitness for such work as this.

In employing these watchmen the company was transgressing no law, written or unwritten, nor were the Pinkertons violating any law in supplying them. These men, peaceably proceeding to their duties, were fired upon by the strikers and a number were killed before they armed and defended themselves. While confined in the barges in which they had gone to the works, and while on the property they were employed to protect, they were fired upon from rifles and cannons, bombarded with dynamite and showered with petroleum, weapons which suggest themselves to communists and anarchists rather than peaceful workmen, however excited.

Finally, overcome by the thousands in the infuriated mob, they surrendered to the committee of the Amalgamated Association and were by it guaranteed safety to person and property, but nevertheless when unarmed they were subjected to such brutal treatment by the strikers that many of them subsequently died. It was not until the State troops arrived that order was restored in Homestead, and that a peaceable citizen could enter the works or even the town. All comers who appeared like laboring men seeking work were summarily arrested, arbitrarily questioned by the committee of the Amalgamated Association and driven from the town regardless of protests. This is a sufficient demonstration of what might be expected if the claims of this association to dictate who shall be employed and what wages shall be paid should ever be recognized.

The very highest praise must be accorded to the State troops, composed for the most part of workmen, who behaved in the most creditable manner, discharging their unpleasant duties like veteran soldiers, and maintaining the honor of the State and the supremacy of the law.

The outcome of this strike will probably be the disappearance of the Amalgamated Association of Iron Workers, and this is not to be regretted, for it has demonstrated again that the worst of tyrants are the ignorant and brutal, and the control of the Amalgamated Association has fallen into the hands of those whose tyranny and oppression is only limited by their lack of power.

We are not at all opposed to organization among workmen; we believe it a good thing for them and a desirable thing for the general interests of our people. We are also firm believers in arbitration for the settlement of disputes between workmen and their employers, and organized labor can better secure its rights, even by arbitration, than can the defenseless individual workmen. There are, however, certain questions which cannot be arbitrated, such, for example, as the right of every man to work for whom and on what terms he pleases, and his liberty to stop work when either his remuneration or conditions of labor are unsatisfactory to him. The right of every employer to operate or stop his works, and to employ whom he pleases, and to discharge unsatisfactory workmen are inherent rights which do not admit of question. It is, however, to the interests of both employer and employed to arbitrate, where they cannot agree upon, the rates of wages and questions of claimed injustice.

BOOKS RECEIVED.

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

Arkansas Geological Survey, Annual Report 1890, Vol. III. Whetstones and the Novaculites of Arkansas, by L. S. Griswold—John C. Branner, Ph. D., State Geologist. Published by Geological Survey of Arkansas, May, 1892. Pages 443. Illustrated.

Dynamometers and the Measurement of Power. A treatise on the construction and application of dynamometers. By John J. Flather, Ph. B., M. M. E. Wiley & Sons, New York, 1892. Pages 215. Price \$2.00. Illustrated.

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.

The Engineering and Mining Journal and the Pribram Mine Fire.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I cannot forbear to express my astonishment at the unsurpassed achievement of the ENGINEERING AND MINING JOURNAL, which you so admirably conduct. By the publication of the United States Statistics of production in the first numbers of the succeeding year your journal has indeed long shown us how speedily it can prepare important communications. But that you in your issue of June 4th should already present a detailed account of the great mining disaster at Pribram, and even in addition a dispatch of June 3d from Prague, fills us with justifiable astonishment. Our journal, the *Oesterreichische Zeitschrift für Berg und Hüttenwesen*, was only able in its issue of June 11th to speak of the fire in the Mariaschacht; but in New York it had been described to our colleagues a week earlier!

There is still obscurity concerning the course of the catastrophe. It has been said that it was caused by the introduction of water into the shaft which was burning far down below. This is conceivable, for the Maria shaft, the collar of which had the higher situation, was an upcast, and its

draught, hindering the entrance of the gases into crosscuts and headings, favored the fire. By putting water down a reversal of the ventilation was, of course, caused; the Maria shaft became a downcast and other communicating shafts took the up draught, as could easily be seen from the smoke which issued from them. The consequence of this change was the filling of all the deep workings with carbonic acid and carbonic oxide, which necessarily destroyed all life. The newspapers have published official contradictions as to this introduction of water. But the Minister of Agriculture, etc., has confessed in Parliament that water was put down the shaft to extinguish the fire; only, he said, this was not done until after all the workmen below had undoubtedly been already suffocated.

We can only accept as certain the sad fact that in this disaster at Pribram 319 brave miners lost their lives, and 286 widows and 742 orphaned children were deprived of their natural supporters. The *Oesterreichische Zeitschrift für Berg und Hüttenwesen* has opened a subscription for their relief, and has invited contributions from colleagues in all countries. If any of our readers should wish to give a helping hand their subscriptions will be gladly received by the Austrian journal.

VIENNA, June 17th, 1892.

AN AUSTRIAN MINING ENGINEER.

[So far we have not received any further positive facts of this disaster and its cause than are to be found in our issues of June 4th and June 18th, pages 603 and 651, respectively. One of the last dispatches states that one of the miners had first confessed that he poured petroleum over the timbers and ignited them purposely, and afterward he modified his confession by stating that he had accidentally dropped a lighted match upon some combustibles and had been unable to quench the resulting fire. The deaths resulted entirely from suffocation caused by the smoke from the burning timbers. The volume of noxious gases was considerably increased by the steam and carbonic oxide given off by the contact of the water with the burning timbers. Our correspondent's information concerning the action of the stream of water in reversing the draft in the burning Maria shaft explains how it was that the noxious fumes traveled into other workings and so suffocated the miners who had fled to other cuttings and shafts for safety. This explanation comes from an engineer of very high standing in Austria, and we have no doubt that it offers a correct solution of the cause of the extensiveness of the disaster which apparently arose from so slight a beginning. We presume that the authorities at the mine had had little or no experience with subterranean fires, hence their inability to combat this one successfully. We hope that the writers appeal for aid for the widows and orphans will meet with a cordial response in this country. All communications should be addressed to Carl von Erust, editor of the *Oesterreichische Zeitschrift für Berg und Hüttenwesen*, Vienna, Austria. Ed. E. & M. J.]

The Cost of Producing Copper.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Although several communications in your journal, appearing in recent issues, have enlightened your readers concerning the cost of producing copper in different parts of this and other countries, it may not be unwelcome to hear from a locality where the copper industry, though yet in its early stages, is destined to become one of the foremost in Arizona. In what follows reference is made to the Territory of Arizona in general, but more specially to Globe district, Gila County.

The copper production at Globe dates back to 1883, at which time some few efforts were made by the owners of the Hoosier and Buffalo copper mines to smelt their ore, and, additional, the Old Dominion Mining Company had a small plant some six miles west of Globe. Want of proper management and metallurgical skill made a sudden end to these efforts, however.

The working of the Globe Ledge mine by the Old Dominion Company, and the subsequent erecting of a smelting plant in Globe, in 1883, has been the real beginning of a regular and permanent copper production to the present time.

Since then a regular and nearly uniformly profitable output has been had of the Globe mines, in the face of many formidable obstacles, of which the enormous cost of coke is the chief one, aside the unreliability of wagon transportation from Wilcox at certain seasons of the year.

Until 1890 the Old Dominion Mining Company were practically the only producers, the ore being taken from one or two mines only. Then the Buffalo mines began to produce copper under a lease, and with success, notwithstanding the very low copper market. Upon the lease being transferred to new parties the smelting was temporarily discontinued and work on a large number of copper mines, purchased by them, started, for their development, with the object, as is supposed, to start more extensive operations in the near future, when it is thought a railroad will connect the isolated district with the Southern Pacific Railroad.

There can be no question to the initiated that the capacity of the copper production in Globe and surroundings is immense, and needs only the energy and capital of a powerful corporation, together with a railroad, to bring it out in full, and to be ahead in clear profits when compared with many Montana and Lake Superior mines, now producing largely.

With such superior railroad facilities as are found in nearly all important mining districts outside of Arizona, it is not difficult to see that in the coming struggle for existence, caused by low prices of copper, the Globe copper mines, and indeed many in other localities in Arizona, will come out on top in spite of the enormous plants and the great production in Montana. The reason for this assertion lies chiefly in the great superiority of Arizona copper ores, their average quality and assay value is so far ahead, and the direct production of very nearly pure copper by one simple smelting so much more economical, that these natural advantages outweigh by far the immensity of production of low grade and impure ore, which has to be handled and treated repeatedly for fine copper.

The greatness of plants, which, of course, admits of many advantages and savings, is not exclusive in Montana. Money and skill can duplicate these in any other locality, and reap the corresponding results.

Taking a limited area, comprising Pinal and Gila counties, there are sufficient copper mines in the Guliera and Mescal mountains, notably in Mineral Creek, near Riverside, on the Gila River, and further north, between the Pinal and Apache mountains, in the Globe district, again in the Sierra Anche and Mazatal mountains, toward Yavapai County, as to

form a fair offset with the productive copper mines in Montana, and with ore that will produce more than double what Montana ore yields.

The Globe district ore is generally far above the average assay value of copper ore, outside of Arizona. It is a mixture of iron and copper oxides and carbonates, with a sprinkling of copper sulphurets. It occurs mostly in contact depositions between eruptive diorite and quartzite or limestone, frequently opening into large chambers of nearly pure ore. The gangue is quartzose except when found near limestone, in which case the ore is entirely or nearly self fluxing. At greater depths it is more quartzose, and requires from 20 to 30% limestone as flux.

The treatment in water jackets is simple and needs no explanation, having been described already in the columns of the ENGINEERING AND MINING JOURNAL.

In several localities between Pinal and Gila counties, the copper ore found is argentiferous. It is so in Mineral Creek; in Globe, the Buffalo ore has sufficient silver to produce bullion yielding 45 oz. per ton; in the Sierra Anche Mountains I have seen ore that would average 20 oz. silver per ton. In the Guliera Mountains, and within a few miles from Globe, ore is found that has noticeable quantities of gold.

The copper produced directly in one smelting is of the best quality; that of the Buffalo contains an average of 45 oz. of silver, and frequently the ore carries also a trace of gold. The bullion shipped from Globe has a fineness of 98% to 99% by battery assay.

The greatest drawback working against the complete financial success of Globe copper mining is its great distance from trunk lines, causing a most extraordinary cost of coke. The freight rates between Globe and Wilcox are about as low as they ever will be by wagon, and yet they reach \$40 per ton per round trip, \$30 being charged for coke and \$10 for the returning bullion, which in bulk is about 70% of the coke. Thus the cost of coke at Globe, formerly about \$50 per ton, is now about \$45.50, and several dollars additional per ton for wastage and losses, whereas, with railroad connections, the cost would be reduced nearly if not fully one-half. Now, since the cost of coke figures nearly 50% of the total expense incurred in producing copper, it follows that a saving of one-half in the cost of coke means a saving of 25% in the total cost of the metal produced, without considering the further reduction of expense for sundry supplies.

The actual output, taken as an average, of the ores about Globe is now between 11 and 12%. Some years ago the average was higher (from 14 to 18%). Under existing circumstances it is found necessary to mine high grade ores, but with cheaper coke it becomes a certainty that 8% ores can be profitably treated even at the present copper prices.

In 1885, during a period of 11 months, with an output of 16%, the cost per ton of copper was \$108.28, including all expenses. The former Buffalo lessees, with an output of 11%, produced the metal at a cost of \$142 per ton, the outlay being in the following proportions: Coke, 45.21%; labor (mine and smelter), 28.14%; supplies, 9.54%; transportation and teaming, 3.72%; development work, 7.50%; construction, 2.11%; general expenses and salaries, 3.78%.

The cost of transportation of the copper to market, from smelter's dump at Globe, can be laid down at \$27.50, or nearly 1½c. per pound, refining excluded. It will, therefore, be seen, that with the opening of new mines here at Globe, and their rich ore, and the event of a railroad to connect with S. P. R. E., the copper industry in Globe is well secured when compared with many other large producers, and what holds good for this place is equally applicable to the now existing steady producers of copper in Arizona, and yet more so to the many rich but unworked copper mines between Globe and the railroad. A. TRIPPEL, M. E.

GLOBE, July 25, 1892.

Russian Petroleum Trust.—The continued low price of Russian oil, says the *Petersburger Zeitung*, is the result of the insensate rivalry of the producers. No one makes a profit—neither the producer nor the government—for the latter taxes only the amount used in the country. The prices of petroleum and its derivations are very low. Lubricating oils which formerly sold for \$1.551 to \$2.595 per 36 lbs. are now worth 20 to 25 cents, so that it can only be shipped in bulk instead of in casks, as formerly. This condition of affairs has led the producers to propose forming a trust similar to that of the Standard Oil Company for the purpose of restricting production and keeping up prices. Lately, arrangements have been made for the sale of lubricating oils, of which the production has been 4,000,000 poods, divided as follows: Nobel Bros. & Shibareff, 2,500,000 poods; Martirosoff, 1,000,000, and the smaller producers, 500,000 poods, but which will now be limited to a total of 1,000,000 poods.

Negrier's Method of Concentrating Sulphuric Acid.—The high price of platinum has caused a good deal of trouble among the firms in Europe who manufacture highly concentrated sulphuric acid of 66° Beaume. Up to the present time platinum vessels were used for containing the acid during concentration, as this metal is capable of resisting the attacks of the acid better than any other material. During the last year or two the continuously advancing price of platinum has made it necessary to find some substitute. The most practicable of the new processes is that of M. Negrier, who employs a series of specially-made porcelain dishes. These dishes are placed in a row, each a little lower than the other, and they are arranged inside an oven, the interior of which is kept steadily at a temperature of 145°–149° C. The acid at 58°–60° B. coming from the chambers enters the first dish in the oven, and passes gradually down the series of dishes, and finally leaves the oven at a concentration of 66° B. In a plant already erected by M. Negrier there are four ovens, each containing two sets of eight dishes. Each oven produces 1,250 kilogrammes of concentrated acid a day, with a consumption of 24 kilogrammes of fuel per 100 kilogrammes of concentrated acid. Only five porcelain dishes out of sixty-four were broken in a month, and as each one cost about a dollar, the item of repairs and renewals is small enough compared with the interest on capital represented by the use of platinum retorts. The ability of the workman to avoid breakages of dishes and damages to the ovens are the chief points that affect the practicability of this process, but with a little practice economical results are obtained. On an average one workman is able to turn out 10 tons a day. The porcelain dishes are manufactured in Limoges, France.

METHODS FOR THE PREVENTION OF SMOKE.

A committee of the Engineers' Club of St. Louis have prepared a report on the prevention of smoke. Their chief object was to find a cure for the nuisance from which that and many other cities suffer, and the part of the report dealing with mechanical devices for the prevention of smoke in boiler furnaces is of great general interest.

The committee made inquiries of 78 manufacturers who used local bituminous coal, and only seven were found to be using smoke-preventing apparatus. Of these only one seemed to be quite satisfied with his apparatus, and he was his own inventor. Nineteen others reported that they had tried preventers in former days, but had thrown them out for various reasons.

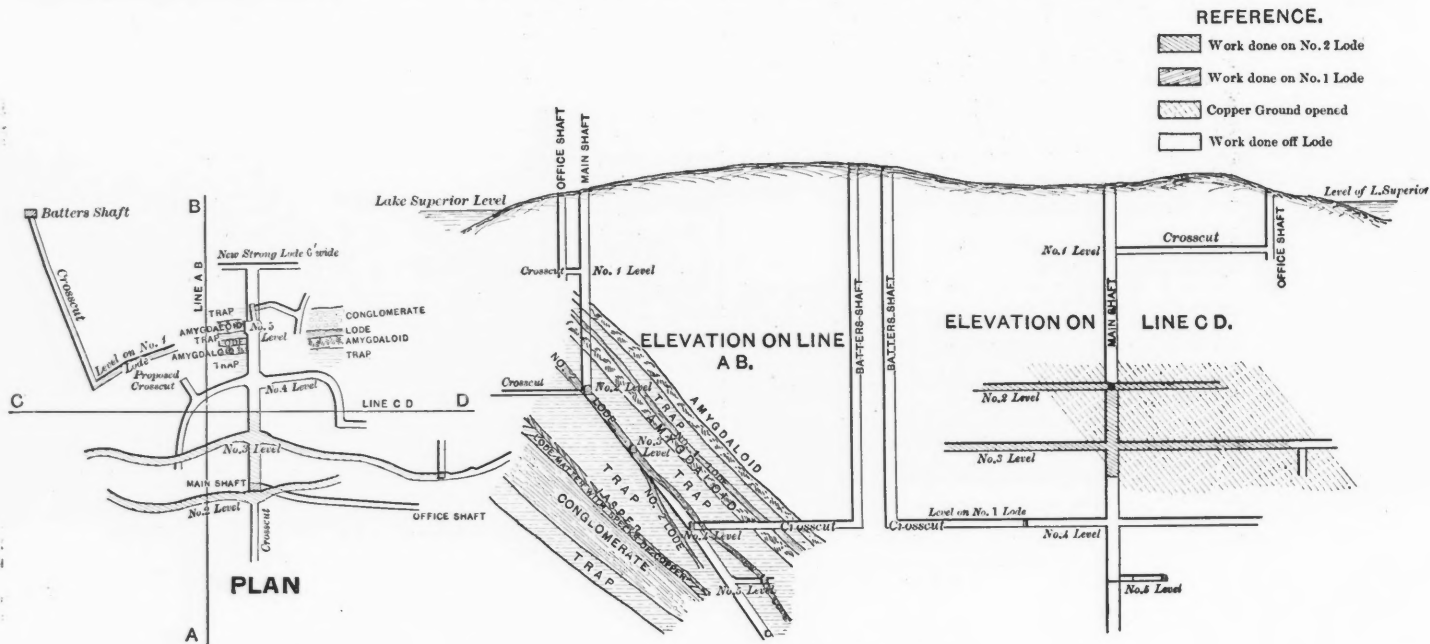
A smoke preventer, in order to be popular, must prevent the separation of the unconsumed carbon particles; it must be cheap and easily applied to any existing furnace; it must not increase the consumption of fuel; it must keep right automatically in spite of great variations in the amount of work it has to do and in spite of inattention on the part of the fireman; it must not occupy too much space; it must not be liable to derangement, nor must it want repairing often; and it should not stop the natural draught. There are numberless inventions, all claiming to attain these desired ends. They can be classed under seven different heads, as follows: Steam jets, firebrick arches, hollow walls for preheating air, coking arches or chambers, double combustion, downward draught furnaces, automatic stokers. All these methods are efficient in a way, but the perfect application and combination of them has not been discovered as yet.

Steam Jets.—This class of apparatus is intended for injecting an induced current of air into the fireplace over the fire. The steam heats the air and aids the combustion of the coal, and when the heat of the coal is great the steam is decomposed by contact with it into hydrogen and carbonic oxide, both of which afterward burn and aid the combustion of the coal. These jets can be made to work satisfactorily where the demand upon the boiler is comparatively light and does not vary much, but it is

of coal to be burned in a given time is limited. Such constructions are necessarily short-lived, as they are exposed to high heats, changing temperature and fluxing ashes.

Double Combustion.—Applications of this system have been attempted in many ways. Some have taken the form of duplicate fireplaces, which are charged with fresh coal alternately. Suitable dampers or valves cause the smoke and gases from the freshly charged grate to pass beneath and thence through the other fire bed, which consists in the main of glowing coke. The double furnace requires extra room and also requires more skill and attention than can be expected from an ordinary fireman. None have proved successful.

Downward Draught-Furnaces.—These consist essentially of a fireplace with the back closed so that there is no direct communication for the smoke and gases to pass away under the boiler except downward through the fire bed. The closed back is formed either of a water leg from the boiler which passes below the level of the grate, or a drum set below the level of the grate and connected at either end with the boiler by tubes, the space between the drum and the bottom of the boiler shell being bricked in solid. Owing to the intense heat upon the grate, it is necessary to substitute a water tube grate for the ordinary bars, and these water tubes are connected at the back with the water leg or drum and at the front, by means of headers and connecting tubes, with the boiler shell. All these parts, therefore, belong to the water circulating system of the boiler and supply so much additional heating surface. The combustion of the fuel is effected, by such a device, in a far more rational way than on the ordinary fire bed. The fresh coal is as usual charged on the top of the bed, but the air enters from the top, and therefore cooler part, quickly gaining heat from contact with the heated coal, and passing with the smoke and distilled volatile matter through the bed of incandescent coke below. In order to get the requisite amount of opening for draught the water tubes forming the grate must be spaced at a greater distance apart than is the case with ordinary grate bars. Some of the fuel will, therefore, drop through, impelled by the force of the draught added to that of gravity



MICHIPICOTEN ISLAND—PLAN AND VEIN SECTIONS.

necessary to supplement their action with careful and regular firing. If too much coal is charged in the fire-place at a time, the temperature is likely to be so much reduced that the action of the jets tends to retard rather than promote combustion. Such a system is, therefore, largely dependent for its successful operation upon the skill and faithfulness of the fireman. It often happens also that with careless handling the amount of steam used in the jets more than offsets any gain in efficiency due to improved combustion. Another very important consideration is the setting and adjustment of the nozzles, which, if not very carefully attended to, may be the cause of a blow pipe action upon the boiler shell or grate bars resulting in a rapid burning of the metal, especially from the strong oxidizing action of the decomposing steam.

Firebrick Arches.—These are usually fixed at the back of the furnace near the bridge, and serve to store heat. As the gases pass under them their heat raises the temperature of the gases, and thus makes the combustion more complete. There is also a modification of this system sometimes used, and that is to subdivide the passage through the arch into a number of smaller passages, and so increase the heating surface. The firebrick arch and its modification are efficient with careful firing, but they require too many repairs and renewals; also they stop the natural draught considerably.

Hollow Walls for Preheating Air.—A great many patents have been brought out in this line, but none of them work. By this means heated air is introduced at the bridge and round the furnace, but the openings are readily clogged and injured.

Coking Arches or Chambers.—This system consists in constructing a chamber in front of, or in an arch over, the forward part of the fireplace; the fresh coal is charged under this arch and retained there until the greater part of the volatile matter is driven off. The resulting coke is then pushed to the rear to serve as the hot bed over which the volatile matter from the fresh coal in front is made to pass. These devices are only effective when the fireman is careful in working the fire, and when the amount

With caking coals the loss from this source is not great under moderate firing. When, however, the fires are pushed and frequently worked with a bar to loosen the mass of caked coal or to clean the grate, a considerable amount of coal falls through. This has led to the adoption of an auxiliary grate of ordinary type set some distance below, and through this the air is delivered for the combustion of the gases issuing below the upper grate. As the lower grate receives only the incandescent fuel falling from above, the space between the two grates is in a favorable condition for completing the combustion, being highly heated and supplied with heated air. The downward draught system is well adapted to the prevention of smoke, even when the fire is forced or when there is a careless fireman. It is easily attached to any boiler, and it increases the heating surface of the boiler. There are many objections to all the designs hitherto made on this system. They might easily, however, be removed. The arrangement for admitting air to the lower grate through the floor plates in front of the boiler is defective, as it does not permit of the control of the air current; excessive quantities of air enter and cause an unnecessary heat and a lowering of the efficiency. The water tubes of the grate and the connecting pipes are liable to unusual strains at the joints. The water leg or drum which acts as an inverted bridge is subjected to intense heat, and the same may be said of the tubes of the water grate. Unless the circulation is very efficient indeed, the scale which might deposit at these places would cause the metal to be eaten through by the heat very soon.

Mechanical Stokers.—In this form of apparatus the coal is fed mechanically through the closed fire door regularly and gradually, and grate is constructed in such a manner that the charge is pressed slowly forward by the feed. As the coal enters, the bituminous portions are distilled off and the resulting gases pass over the incandescent fuel behind. This apparatus would be very efficient with coal that does not cake and does not form clinker, but unfortunately most of the Illinois coal has this drawback. Then, again, the mechanical stoker cannot be forced to meet an emergency.

MICHIPICOTEN ISLAND AND ITS COPPER MINES.

Written for the Engineering and Mining Journal by Herman Poole.

Michipicoten Island is situated in the northeastern portion of Lake Superior, near the entrance of Michipicoten Bay, and in latitude $47\frac{1}{4}$ N., longitude $85\frac{1}{4}$ W. The general outline is lenticular, having a length of 19 miles, and a width across the middle of 7 miles. The area is about 50,000 acres.

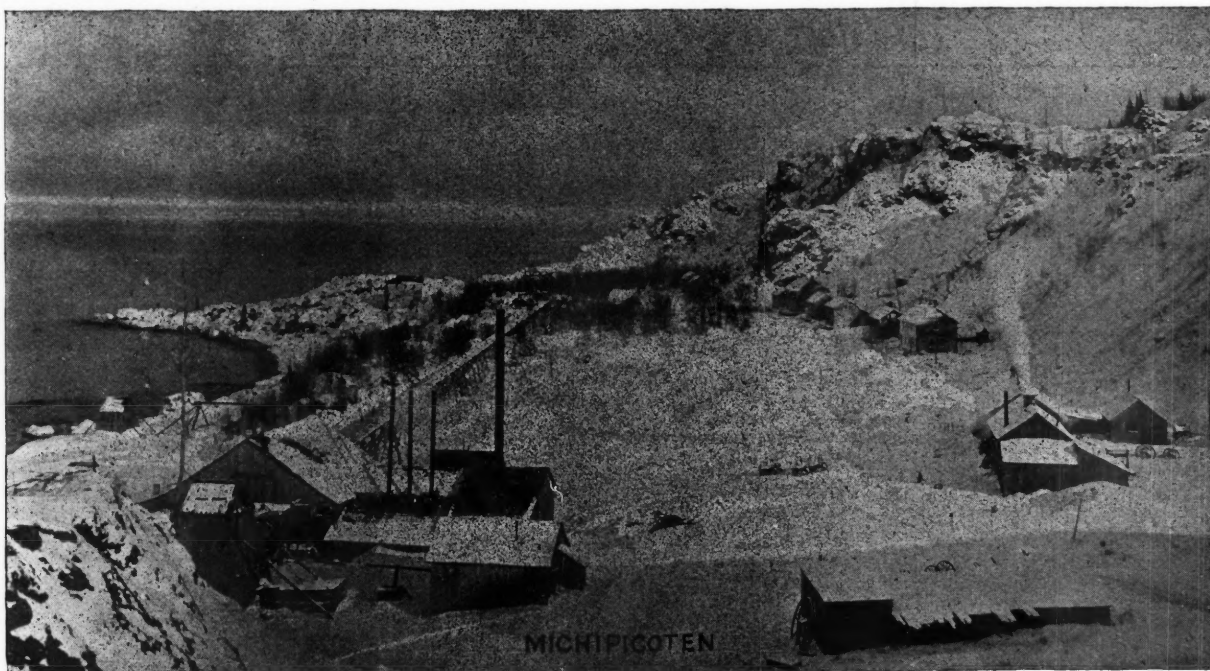
The whole western, northern and northeastern portions of the island are elevated and rocky, having many cliffs, and presenting a very rough and jagged appearance. Occasionally these cliffs recede from the shore, and then are found beaches of pebble and sand. The highest cliff reaches 937 feet above the water level, and is used as a government lake survey point. Toward the south the central table land slopes gradually and is very densely wooded, as is nearly all the island, even on the cliff tops. In the interior are many lakes of various sizes and shapes, one of them being three miles long and about half a mile wide. From these lakes small streams run through the woods to Lake Superior. One of these lakes is near the mining location, and will furnish water power with a head of 228 feet by damming an area of half a square mile. There are several good harbors around the island, one of which, on the southern side, and called Quebec Harbor, has been utilized. This harbor is nearly land-locked, being three miles long and only about half a mile wide at the entrance.

The whole physical and geological character of the island is marked. It seems to be made up entirely of rocks of the Lower Keweenaw Series, having a general dip to the southeast, with an inclination of about 30° , and a strike east and west. The direction of the dip changes toward the

Associated with the copper on the northern part of the west end is native silver in threads and on the north part of the middle of the island is found thread silver and copper, associated with nickel. How much there is of this is not known, as the property has never been thoroughly explored and no work at all has been done for over 30 years. The copper property covers a claim of 6,080 acres on the west end of the island and one of 160 acres at the harbor. These are connected by a road and telephone line. From time to time there have been several openings made, the first further north than those now open.

These shafts are now pretty well filled with water and debris, so no knowledge of them is available. No. 2 LODE.—On this the "main" shaft has been sunk, and although considerable work has been done only a little of it was on the lode itself, as will be seen from the plans. This shaft is sunk perpendicularly 200 ft. to the intersection with the lode; from this it follows the angle of the lode for 320 ft. more. At the junction with the lode tunnels were driven east and west, opening up good ground, as shown in these sections. Ninety feet below No. 2, No. 3 was driven the same way and with the same results, in some portions better. Three hundred and twenty feet west of the shaft a winze was sunk, passing through good rock 50 ft. In both this and the upper level large masses were frequently found. A short distance below level 3 the shaft went off the lode, but was continued to the 320 ft. level, at which depth a short crosscut was made, striking the lode again. No. 4 level was only driven a short distance and does not strike the lode. It is used as a sump. No. 5 level is where the crosscut mentioned above was made. In this shaft 100 ft. is in the lode and nearly all of it in copper ground.

The "Batters" shaft is also on this lode, and has been sunk for 360 ft. with the intention of striking the lode at about 600 ft. deep. A level has been run from the bottom to connect with the "office" shaft, and serves



MICHIPICOTEN ISLAND—SURFACE VIEW.

south, flattening to less than 20° , and the strike grows northerly as the eastern part of the island is approached.

The rock of the country is a compact measure trap or greenstone, occasionally basaltic in nature, and alternating with beds of amygdaloid sandstone, conglomerate and volcanic ash. Some of these latter beds are highly metalliferous, though the distribution is irregular. The lower strata toward the north side of the island are chiefly amygdaloid trap, with an occasional trap conglomerate, red sandstone or shale. Toward the south a large amount of compact subresinous red trap is found, occasionally porphyritic, and lying over the amygdaloid. In some places the trap has the character of pitchstone, and is closely allied to the ashbed trap of Keweenaw Point. Agate veins occur in this generally, but not always in the line of the strike. Toward the west end, on the north side, is a gradual slope of some 500 ft., followed by an abrupt rise of greenstone, analcime and quartz to a height of 300 ft., and a little further back the highest point of the island is found, this being 937 ft. The two accompanying sections made by Prof. Herrick will help to explain this arrangement. On the rest of the island so little has been done that nothing can be said.

At the old opening, the copper bearing vein is the usual altered cupriferos amygdaloid identical with the amygdaloid of Keweenaw Point and is some 18 in. thick. It has an overlying sandstone of 24 in. thickness, and of a pinkish tint. These two layers contain on an average $2\frac{1}{4}\%$ of copper (Logan). The copper occurs in large grains interspersed with calc spar in the amygdaloid,—the sandstone it is mostly filamentous, occasional large nuggets having being found. Beneath this is a soft argillaceous rock (ash bed) some 6 ft. thick and carrying $3\frac{1}{2}\%$ copper. Under this a massive greenstone. Over the amygdaloid is a compact greenstone, followed by another amygdaloid and conglomerate. Another band of amygdaloid has been found further south but not developed. Along the shore for some miles a soft amygdaloid runs carrying copper and calcite, which are plainly visible under the water in quiet weather.

for ventilation. Lode No. 3 has not been worked at all. All that is known has been gathered from boulders, etc., picked up along shore.

LODE No. 4.—On this lode a shaft has been sunk to a depth of about 50 ft., and on the surface several cuts have been made. The outcrop shows copper in the Amygdaloid hanging wall, but on sinking the shaft it was found in the conglomerate which increased in width and richness with the depth. At about 30 ft. down a rich streak 2 ft. wide was found. Indications point to this as the richest of all and the one which will best pay for exploration.

It will be seen that first to last considerable work has been done and some ore raised. Yet it has been done in such a way and at such intervals that no satisfactory estimate as to the amount produced can be had. At the time I examined the property last September there were several hundred tons of rock on the dumps, yet from them all that was worth culling had been taken. The policy of the proprietors seems to have been to pick out all visible pieces, barrel them up and take them across the ocean, and probably some 25 tons of very rich ore has thus been shipped. The first discovery of copper on the island is not recorded. No regular systematic work was undertaken till the Quebec company took hold of it and sunk the Bevan and Office shafts. After a short time of work this company stopped, and after a while the Michipicoten Copper Company commenced working out. The history fails to show that any one ever made a profit.

Discovery of a Serpent Mound in Ohio.—An important archaeological discovery, or rather identification, has just been made by Professors Metz and Putnam, of the Peabody Museum, seven miles from Fort Ancient, on the Little Miami River, Ohio. What has hitherto been regarded as separate works is now shown to be another separate mound, similar to the famous one in Adams County. The total length is 1,900 ft. Accurate surveys and drawings are being made for the archaeological section of the World's Fair.

PRACTICAL NOTES ON THE ELECTROLYTIC REFINING OF COPPER.*

By F. B. Badt.

In this paper the author gives a partially complete list of the refineries in the United States where copper is treated electrolytically, and he also gives information as to the cost and the various processes and methods adopted at these refineries. The accompanying table is not complete, but it serves to show the extent to which this method of refining has been adopted.

According to the Census Report, the product of copper throughout the States was 79,847 tons of 2,000 lbs. in 1889, but unfortunately it does not give the proportion of refined copper prepared electrolytically. From the table given above, however, it appears that about 25,000 tons will be near the mark. As will be seen in the fourth column of the table, there are four different processes in vogue, viz.: the Multiple, Smith's, Hayden's, and Stalman's. In all these processes the black copper is used as the anode and the electrolyte is a solution of sulphate of copper.

In the "multiple" process the anodes of black copper and cathodes of pure copper of each cell are arranged in a row alternately, but connected in multiple, and there is generally one more cathode than anode. The electrodes are suspended in a vertical position in wooden vats lined with lead, and the vats are either in series, multiple, or multiple series, the best arrangement, however, being single series.

In Smith's process there are no cathodes at all. The anodes of black copper are arranged horizontally, and the current causes the solution of copper from the under sides of each plate and a deposition of it on the upper side of the plate next below. A cotton cloth screen is placed between each plate to intercept impurities, or foreign matter, such as gold and silver. The anodes and the vats are all in series.

Hayden's process differs from Smith's only in the fact that his plates of

again. In Smith's process it is claimed that no circulation of the electrolyte is needed.

The majority of these plants are by no means models of electrical engineering. There are many faults and defects in their design which shows that the advances made during the last 10 years in electrical discovery have not been taken advantage of in the plants for electro deposition. In most of them there is no measuring of the voltage done and in the exceptional cases it is done in a very clumsy manner. The writer in designing a new plant introduced a great improvement by placing a potential board in the manager's office, which indicated the pressure of any vat immediately by the turning of a switch handle. It is very necessary also to guard against the short circuiting of anodes and cathodes, which in the multiple system means the short circuiting of a whole vat. If such an occurrence is not detected immediately the whole contents of the vat are spoiled. Until recently, however, no automatic indicator was used in any of the plants.

Some of the electrolytic refineries in the United States buy copper matte of from 45 to 54% of copper from the mining companies; they resmelt the copper matte and produce black copper of from 97 to 98% of copper. This black copper is then cast into anodes and subjected to the electrolytic process. Other refineries buy the black copper from the smelters owned by the mining companies. For instance, the Bridgeport Copper Company, of Bridgeport, Conn., buys the entire product of the Parrott Silver and Copper Company, of Butte, Mont., as black copper.

There are quite a number of points which need the attention of electrolytic copper refiners. There are, for instance, only a few of the refineries which manufacture their own sulphate of copper, but buy it at high rates in the market. Sometimes the cost of freight and haulage doubles its cost. Each copper refinery should have an installation of its own for the manufacture of the necessary sulphate of copper, which it can do at a small fraction of what it has to pay for it. The same holds good in relation to

PARTIAL LIST OF ELECTROLYTIC COPPER REFINERIES IN THE UNITED STATES.

Name of Company.	Generators.	Number of vats.	Process (arrangement of vats).	Estimated capacity in electrolytic copper per m ² n th -tons.	Remarks.
1. Anaconda Mining Company, Anaconda, Mont.	5 Edison—60 volts, 1,100 amperes.	320	Partly multiple, partly Stalman.	350	Plant being extended for ultimate capacity of 900 tons per month.
2. American Nickel Works (Jos. Wharton), Camden, N. J.	1 Excelsior—6 volts, 1,000 ampères	48 in series.	Multiple.....	30	By-product.
3. Balbach Smelting and Refining Company, Newark, N. J.	7 Excelsior—15 volts, 2,000 amperes. 1 Excelsior—30 volts, 3,000 amperes.	7 series of 48, 1 series of 96.	Multiple (18 anodes, 81 cathodes).....	650	They refine the product of the Oxford Copper Co., whose smelters are in New Jersey, and who are general purchasers of copper ores, matte and bullion.
4. Baltimore Copper Smelting and Rolling Company, Baltimore, Md.	6 Edison—150 volts, 400 amperes..	.....	Hayden.....	800	Generators have sectional fields which can be plugged for different voltages.
5. Baltimore Refining Company, Baltimore, Md.	2 Edison—80 volts, 700 amperes.....	.....	Hayden.....	300	
6. Boston & Montana Consolidated Copper and Silver Mining Company, Great Falls, Mont.	3 Thomson-Houston, multipolar separately excited, 165 volts, 1,000 amperes.	288	Multiple (19 anodes, 19 cathodes).	550	Plant in construction. Dynamo capacity in excess of present requirements.
7. Bridgeport Copper Company, Bridgeport, Conn.	1 Thomson-Houston, 1 Mather, 1 Edison—150 volts, 400 amperes ...	3 series of 10.	Hayden (100 electrodes in each vat).	400	They refine the entire product (black copper) of the Parrott Silver and Copper Company, Butte, Mont.
8. Chicago Copper Refining Company, Blue Island, Ill.	2 Edison—80 volts, 800 amperes.....	165	Multiple.....	150	
9. Electrolytic Copper Company, Ansonia, Conn.	3 Mather—100 volts, 300 amperes....	75	Smith.....	100	
10. Lewisohn Bros., Pawtucket, R. I.	1 Excelsior—15 volts, 2,200 amperes.	60 in series.	Multiple (19 anodes, 19 cathodes).	110	
11. Omaha & Grant Smelting Works, Omaha, Neb.	1 Excelsior—6 volts, 1,000 amperes..	48 in series.	Multiple.....	30	
12. Pennsylvania Salt Manufacturing Company, Philadelphia, Pa.	.....	.....	Smith.....	30	By-product.
13. St. Louis Smelting and Refining Company, Cheltenham, St. Louis, Mo.	1 Excelsior—16 volts, 2,400 ampères.	48 in series.	Multiple.....	60	This plant is operated in connection with an electrolytic silver refinery, using the Mochus process.
14. Washburn, Moen & Co., Worcester, Mass.	.....	.....	.....	90	Plant burned, being erected.

black copper are arranged vertically instead of horizontally and that there are no screens between.

In Stalman's process, the anodes of black copper and cathodes of refined copper are arranged in ordinary series, but each pair of anodes and cathodes, except the initial and terminal ones, is riveted together to form a solid block without any electrolyte between.

Theoretically it is possible to refine any quantity of copper per horse power by increasing the size and number of the vats and the amount of copper under treatment indefinitely. Such an arrangement would of course be uneconomical, and a medium has to be found where both the vats and the power are the smallest consistently with each other. The density of the current is also an important point to be considered in producing absolutely pure copper. It is usual in the States to use a current of 10 ampères per square foot of active cathode surface as a maximum. Though in some cases in the series processes the figure is as high as 15 ampères; by this arrangement the output per vat is higher, though the quality of the copper is not so good. Theoretically one pound of copper will be deposited per hour by a current of 386 amperes out of a solution of sulphate of copper.

It is necessary to keep up a constant circulation in the electrolyte in order that its resistance shall be constant. Sometimes this is effected by arranging each vat a little lower than the other and by allowing the liquid to pass down the row in series. Another and better way is to supply all the vats from a common trough and to collect the overflow in a common reservoir and pump it back to the trough by means of lead pumps or injectors. However, the lead pumps are always getting out of order and the injectors add too much moisture to the electrolyte. The writer proposes as an improvement the adoption of two collecting tanks, which can be used alternately; as soon as one is full it will be made airtight and a small air compressor will force the solution up to the tank

the refining of the slime or mud which collects at the bottom of the vats, and contains the precious metals. Each copper refinery should have its own plant for the refining of this mud. These installations can be run at a small expense in connection with copper refineries, and it is almost nonsensical to have other concerns make large sums of money which could be saved by the refiner himself.

The approximate cost of a refinery with a capacity of 1,000,000 lbs. of electrolytic copper per month is as follows:

Building.....	\$30,000
Pavement (asphalt).....	2,000
Pipes for steam heating.....	4,000
Vats.....	6,000
Lead for lining vats, collecting tanks or troughs.....	28,000
Lead burning.....	1,500
Copper conductors.....	11,000
Rails for overhead blocks for handling plates.....	2,000
Sulphate of copper.....	3,500
Sulphuric acid.....	1,000
Steam injectors, or pumps, or air compressors.....	1,000
Electric generators, switchboard and instruments.....	30,000
Shafting and belting.....	3,000
Total.....	\$123,000

To this sum must be added the copper under treatment which will amount at least \$80,000; and if a steam plant is required another \$20,000 must be added, so that \$223,000 is the total cost of the plant. In the items in the table, the cost of labor is included but not that of freights. As will be seen, a plant for the electrolytic treatment of black copper is a costly affair and the erection of one should not be commenced until the very best metallurgical and electrical advice has been obtained.

A few words may be said on the subject of electric generators. The writer prefers to use separately excited machines, for the reason that they cannot be reversed, and also because it is easier to regulate the current when the load varies. It is fairly easy to regulate a high-class steam engine, but with a turbine it is well nigh impossible. By running

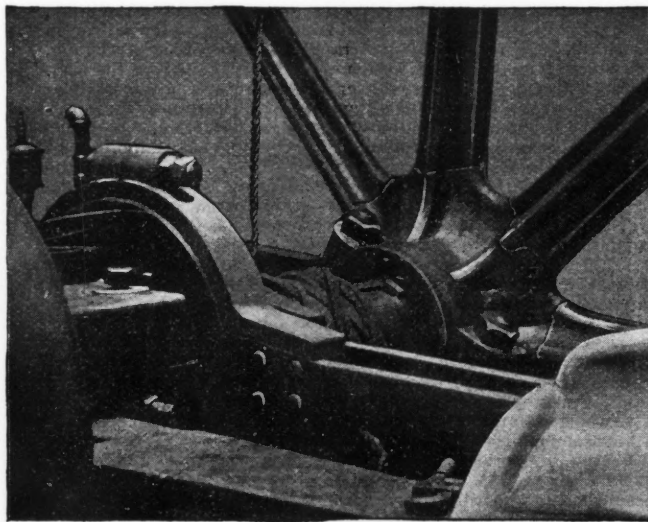
*Abstract of a paper read at the Chicago meeting of the American Institute of Electrical Engineers.

the exciters from a separate source the strength of the field can be kept uniform through all variations in the working circuit.

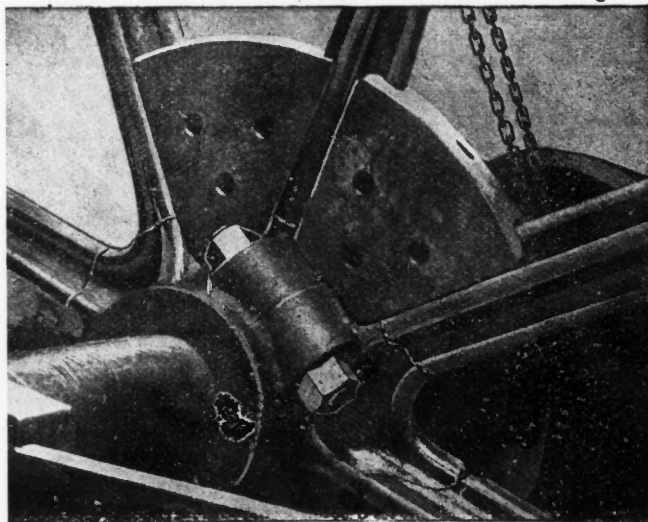
There is a very substantial reason for employing the "multiple" process to the exclusion of the "series" processes, and that is, that the latter are all patent processes and the inventor charges a royalty of $\frac{1}{2}$ cent per pound of copper produced, whereas there is no such embargo on the productions by the multiple process. Besides the processes mentioned there are two others which are coming into note, viz., Siemens' and Hoepfner's, which have been described in the ENGINEERING AND MINING JOURNAL. The former has not yet got beyond the experimental stage, and is only used by the Siemens firm; but Hoepfner's is in operation at Schwarzenberg and at two other places. Hoepfner uses a cuprous chloride solution, out of which a current of one ampere will deposit 2.35 grammes of copper per hour, an amount nearly double that produced from cupric sulphate.

REPAIRING A BROKEN FLYWHEEL.

The flywheel of the engine at the T. New Manufacturing Company's factory on East Twentieth street, this city, suddenly broke on the 31st of May



REPAIRING A BROKEN FLY WHEEL—FIG. 1.

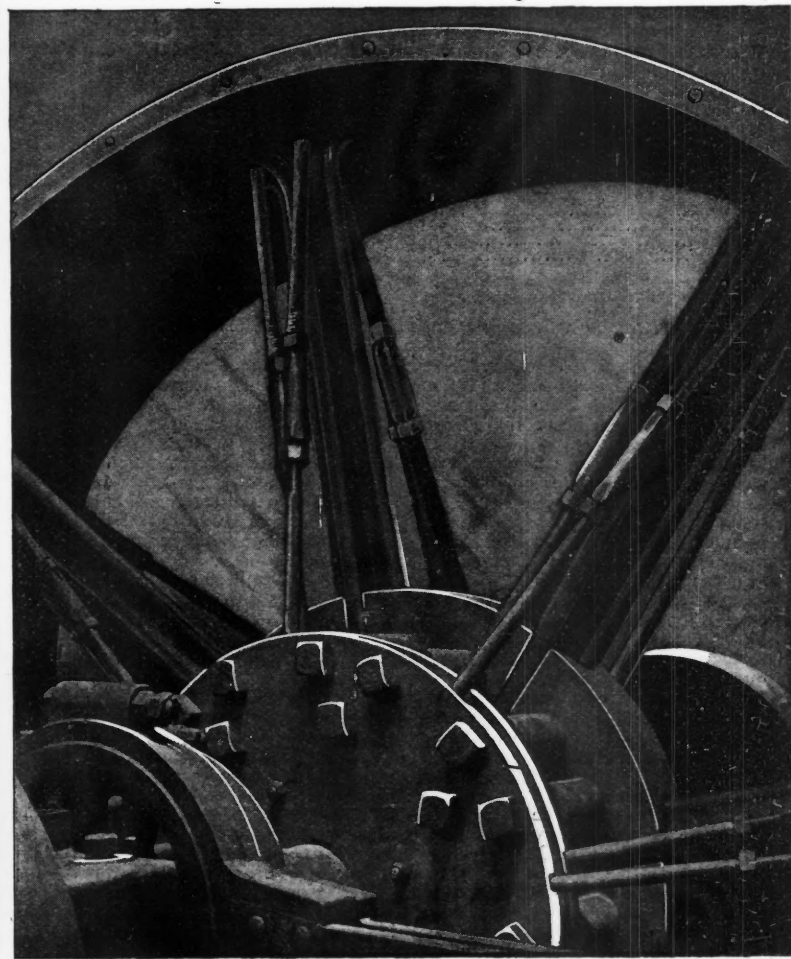


REPAIRING A BROKEN FLY WHEEL—FIG. 2.

between the arms as shown in Fig. 2. Each block had holes drilled for three 2-in. bolts of the best Burden wrought iron. Upon the shaft at each side of the hub were mounted disks bolted to each other through the blocks and through distance pieces on each side, as shown in Fig. 3; these distance pieces afforded points for the attachment of steel rods connecting the rim of the disks with the rim of the wheel, and capable of being put under stress by turn buckles. Four of these rods were used at each arm, two upon each side of the wheel, or 32 tie rods in all. Some eight or nine tons weight were thus added to the wheel. Experts say that the wheel is stronger than when it was new, and the owner claims that it runs "better than ever." For the description and illustrations we are indebted to our contemporary, *Power*.

Electric Tempering of Gun Springs.—At the gun factory of St. Etienne, France, electricity is used in tempering the springs of guns. The springs consist of steel wire spirally wound, a current of 23 ampères at 45 volts being passed through them. Rapid heating results, and when the necessary temperature has been obtained, the current is broken and the spring falls into a trough of water. It is said that one workman can temper 2,400 springs per day in this manner.

Prince Edward Island Tunnel.—It has long been proposed to construct a tunnel under the straits of Northumberland to Prince Edward Island with the main land of New Brunswick. The distance between capes Traverse and Tormentine, the two proposed outlets, is eight miles, and the water varies from 60 to 160 ft. deep. The work of testing the rock is being carried on by the Electric Mining Company, of Ottawa. In order to accomplish the diamond drilling under the water a tripod of



REPAIRING A BROKEN FLY WHEEL—FIG. 3.

last. There was a heavy load on the engine at the time, and the accident had disastrous results. The binding pulley over which the belt passed from the under side of the main wheel was stripped to the hub, the belt torn to shreds, one side of the engine bed torn from the foundation, and the eighth arms of the flywheel cracked across near the hub. No evidence such as an abnormal acceleration of the speed of the machinery to which the engine was connected is obtainable to characterize the accident as due to over speed, and appearances point to the idler as the starting point of the damage, although the cause for its failure is not apparent.

The engine was a compound, with cylinders 22 and 40 in. in diameter and 36 in. stroke, built by Wm. Wright, of Newburgh, N. Y., and had been in operation since 1885. The fly-wheel is 14 ft. in diameter, and was originally 42 in. across the face. This latter dimension was increased some five years since by the addition of wrought iron bands 3 by 3 in. of the same diameter as the wheel, bolted on at the edges of the rim. These rings had doubtless much to do with preventing the total destruction of the wheel by the accident.

The nature of the injury sustained by the wheel is shown in Fig. 1, and the method resorted to for its preservation in Figs. 2 and 3 of the accompanying engravings. The cracks are seen in Fig. 1 to extend across the base of the arms. In repairing the wheel, blocks of cast iron were fitted

iron tubing is driven into the bottom, this giving a stationary surface, on which a platform is built beyond reach of the waves. The drilling is done through an iron casing sunk to the bottom. The test holes are a third of a mile apart, and are carried 110 ft. deep.

Petroleum Industry in Canada.—From a Canadian Census Bulletin for 1890-91, relating to manufactures, it would seem that the petroleum industry of the Dominion has been conducted during 1891 without profit. The industry is centered at Petrolia, Ontario, and it is for that place the figures are given. In 1881 there were 45 petroleum refining establishments, having an invested capital of \$741,765, using raw materials costing \$937,905, and producing articles valued at \$1,719,637; at the place of production 308 hands were employed, receiving wages of \$117,764, an average of \$382 a year. The difference between the total output and cost of raw material and labor was \$663,966, or about 90% of the capital invested. In 1891 the invested capital was \$1,682,212; the cost of raw materials \$1,293,708; of the manufactured products, \$1,983,100. The number of employes was 632, receiving in wages \$225,787, an average of \$405 a year. The difference between the total output and the cost of raw materials and labor is only \$436,605, which is less than 25% of the capital invested. After taking from this sum the cost of management, rent, insurance, depreciation of plant, repairs, losses, etc., the net profit remaining must be very small.

THE ASHIO COPPER MINES AND SMELTING WORKS, ASHIO, JAPAN.

Written for the Engineering and Mining Journal By W. J. Menzies.

The Ashio mines and copper works are situated in the Watarase-gawa valley, about twelve miles from Nikko, over the Hosc-o pass, and are, by far, the largest and most productive copper mines in Japan.

They are worked by Mr. Furakawa, of Tokio, paying a royalty, I believe, to the government of Japan. There are two mines, one of which is an exceedingly old one, having been worked with more or less energy at different periods during the last 500 years. The mine at Kotaki has been recently opened by Mr. Furakawa, and some of the ore carries slightly more silver than that from the old Ashio mine.

Within the last twenty years, since coming into the hands of Mr. Furakawa, the mines and smelting works have been largely extended, and now produce about 600 tons monthly of black copper, which is refined at a separate establishment at Tokio. During the last five years, I understand, the output has been doubled.

The ore is a copper sulphide, and the mine is worked by adit levels driven into the side of the mountain. The vein is on an average some 3 to 4 ft. thick, but only the center 6 in. consists of ore carrying about 20% of copper, the remainder of the lode being very much poorer.

The method of treatment is as follows: The rich ore is, as far as possible, sorted out in the mine and sent in mats to the concentrating works, where it is again sorted by hand labor and crushed. The poor ore is crushed and most carefully concentrated by a system of jiggers and buddies, chiefly, I believe, of American manufacture, and also by hand labor, by simply washing and concentrating in wooden bowls, similar to the Chinese method of treating river bottoms carrying gold. For this latter method women are employed whose wages average about 10 sen (equivalent to about 7 cents U. S. currency) per day!

Mr. Kimura, the very intelligent and courteous manager of the Ashio Works, informed me that these women become very skillful, and can concentrate both cheaper and more thoroughly than the machinery used for the same purpose. In fact the machinery would be discarded if it were not that without its use it would be impossible to concentrate the very large quantity of ore that has to be treated.

By concentration the poor ore is brought up to about the same grade as the rich ore, and the following analysis was given, but admitted to be somewhat of a picked sample.

Copper.....	21.15	Lime.....	0.24
Iron.....	23.49	Magnesia.....	0.04
Sulphur.....	27.14	Silver.....	0.01
Alumina.....	0.79	Silica, etc., etc.....	27.14
Total.....		100.00	

The average of the ore, however, undoubtedly contains quite appreciable quantities of both arsenic and tin, with traces of bismuth. This is shown by a partial analysis of what was supposed to be rather a bad sample, and which assayed copper, 23.74; arsenic, 0.75; antimony and tin, 1.66.

After concentration the ore is removed to the smelting works, situated about half a mile from the concentrating establishment. It is first roasted in ordinary brick reverberatory furnaces, top heat only being used, and fired with wood. These furnaces are 108 ft. long by 9 ft. broad. The charge is six tons of crushed and concentrated ore, which is passed through the furnace and drawn in twelve hours. The chief defect of the whole working is the hurried and only partial roasting at this stage of the process, the roasted ore still containing some 10 to 12% of sulphur. This causes much trouble in subsequent operation; with the exceedingly cheap labor obtained at Ashio the ore could be thoroughly roasted at a very trifling expense. This defect seems to be admitted to a certain extent by the manager, but the smelting works are so pressed to supply copper, apparently sold for future delivery, that this roasting operation is hurried through in order to pass ore to the smelting furnaces. So much is this the case that the roasted ore is cooled for hauling to the smelter by quenching it with considerable quantities of water, a very objectionable practice and liable to cause considerable loss of copper.

The smelting plant consists of six water jacket furnaces. They are rectangular and of wrought iron, the jackets at the tuyeres being 60 by 30 inches. The first two or three furnaces were of American manufacture—Fraser & Chalmers, I believe—but they are now made in the foundry and fitting shops at Ashio, belonging to the mine. These are very complete with machine tools, drilling machines, steam hammers, etc. The Japanese are very clever in copying anything of this kind. The blast is supplied by six Root blowers, carried into one main air pipe, but they are placed somewhat too far from the furnaces. The fuel used is charcoal, mixed with a little coke, which, however, at Ashio is rather expensive, about \$16 per ton, as against charcoal costing about half that price. Limestone for flux is obtained in the neighborhood.

Labor here again is absurdly low. The water jacket hands receive about 50 sen daily (equal to 35 cents U. S. currency)!

The amount of ore and roasted matter passed through each furnace daily is about 40 tons. Black copper is obtained from the water jackets, but with a considerable amount of matte, assaying I believe about 55 per cent.

The analysis of the black copper was given as follows:

Copper.....	96.014	Bismuth.....	0.112
Arsenic.....	1.226	Silver.....	0.014
Iron.....	1.361	Cobalt.....	0.012
Tin.....	0.692	Total.....	100.196
Lead.....	0.428		
Sulphur.....	0.337		

The slag is chiefly removed direct from the water jacket furnaces by running it, while hot, with a stream of water into the river Watarase-gawa, which passes in a deep gorge in close proximity to the furnaces. This method, newly adopted, is already causing trouble with the farmers whose lands adjoin the river lower down, where the water is used to a considerable extent for irrigating purposes.

The assay of this slag was given as about 0.7 copper, which would appear to indicate somewhat defective mixing in charging the water jacket furnaces; and it is doubtless increased by the large amount of sulphur left in the ore after roasting.

The matte at present is broken up, heap roasted in the open air in a very imperfect manner, and then again put through the water jackets. This method to a certain extent is being replaced by stall roasting, open air stalls, constructed with slag blocks, being built for the purpose.

Mr. Kimura is also erecting a very complete and elaborate plant for Bessemerizing the matte coming from the water jacket furnaces, apparently a copy of a similar plant erected for the Butte & Boston Company. It is expected this construction will at once convert the whole of the matte so treated into a fine quantity of black copper, free from arsenic and other impurities. A complete analysis of the matte so to be treated was not given, but it appears to me very doubtful if this result can be obtained, and that the erection of this somewhat complicated and costly machinery could have been entirely avoided by more complete roasting at the initial stage of the process. The large quantity of sulphur present undoubtedly must diminish the quantity of black copper produced, and practically causes the copper to pass through the water jacket furnaces, in the form of matte, several times before it is finally converted into black copper.

The copper works are situated in what was once a beautiful valley, entirely covered with fine timber, but which has since been cut down for fuel, and also to a certain extent destroyed by sulphurous acid. There is still, however, an unlimited supply of timber in fairly close proximity to the works and which is obtained from the Japanese Government at a low price. Excellent charcoal is produced from it.

The river Watarase-gawa supplies water for the furnaces and concentrating purposes. An electrical power, equal to about 200 H. P., is also obtained by a flume taken from the river, several miles above the smelting works. It is utilized for lighting purposes, driving motors in the mine, etc. An extension of this is contemplated from another water power in the neighborhood. A 3-ft. gauge horse tramway, about eight miles long, has just been constructed in the direction of Nikko to the foot of the pass. This tramway will shortly be carried over the mountains, a waterfall at the foot of the pass supplying the necessary power. This line will eventually be carried to Nikko in connection with the railway there.

The total number of hands of all descriptions employed at and in connection with the Ashio mines and works is 10,000. This includes the charcoal burners, mule drivers, tramway hands, etc. This appears to be a very large number for an output of 600 tons daily of black copper. The wages paid, however, are extremely low, varying, as before stated, from equal to about seven cents to 35 cents per diem, American currency. This great advantage of cheap labor, in conjunction with a fairly good position as regards ore, limestone, and fuel, permits of the production of copper at a moderately low price, and which would be quite impossible with the conditions prevailing in the United States or other countries.

The output of copper at Ashio is being constantly extended the low price of silver having stimulated it considerably. The currency of Japan is entirely on a silver basis, therefore with low silver a considerably larger sum in Japanese money is obtained for the copper produced. I understand it is largely exported to the Chinese market, where it comes into competition with European copper.

A plant for the production of electrolytic copper has been under consideration at Ashio, from the ore carrying some silver. This, however, it appears, would be hardly remunerative, as the average of the anodes made for the purpose could apparently not be easily got to carry over 25 oz. of silver to the ton. There are also other impurities which would give trouble in working this process.

The general manager of the Ashio mines and works, Mr. C. Kimura, is a most civil, highly intelligent and courteous Japanese gentleman, but unfortunately speaks no English. He is very ably seconded by Mr. S. Fujika, M. E., and also by Mr. Otagawa, C. E., both of whom speak English fluently.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Decisions of the Secretary of the Interior.

MINING CLAIM—ADVERSE PROCEEDINGS—REGULATIONS.

1. The Department of the Interior, in the exercise of its discretion, may suspend its regulations in order to avoid the perpetration of an act of injustice.

2. The failure of an adverse claimant, who appears as a transferee, to furnish an abstract of title, will not defeat his right to be heard where he has, in good faith, complied with the regulations so far as it was possible for him to do so.

3. The omission to file an abstract should be treated as an irregularity and not as a defect that vitiates the adverse claim. Where no one is injured by the omission it would be extremely technical to treat it as a good cause for rejecting the claim.

4. The non-compliance in this case was with the requirement of a rule and not a statute, and the rule should not be so strict as to require an impossibility or to work an injustice.

5. A court may, under certain circumstances, avoid an act of injustice by the suspension of its rules, when its discretion may be fairly exercised. —*Hawkeye Placer v. Gray Eagle Placer*. [Decision July 13, 1892.]

MINING CLAIM—SURVEY—OFFICIAL CIRCULAR OF DECEMBER 4TH, 1884.
1. In the survey of a mining claim the end-line must terminate at the point where the mineral lode, in its onward course or "strike" intersects an older or senior location, and the regulations of December 4th, 1884, to this effect are not in conflict with statutory provisions.

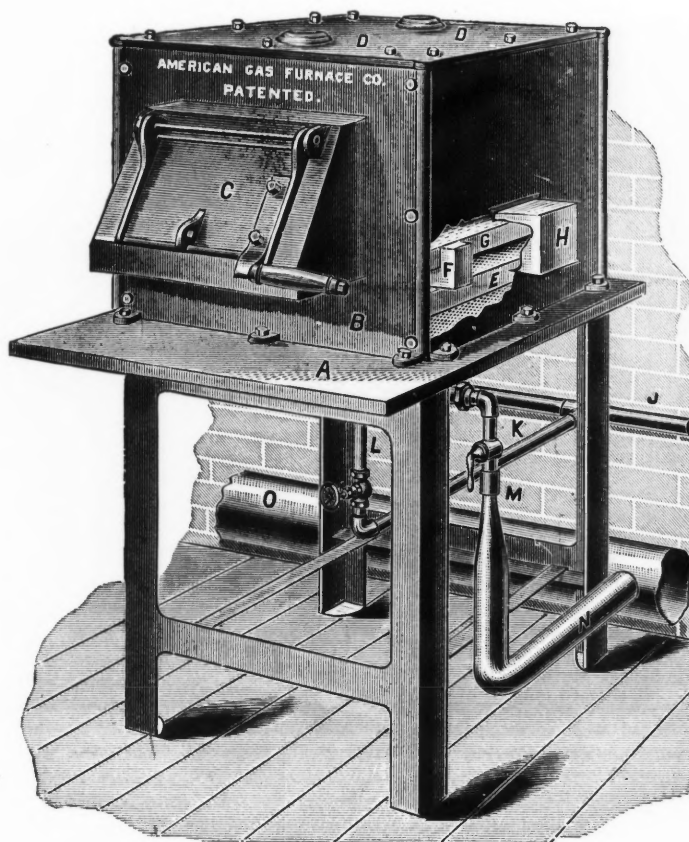
2. The right of location upon the mineral lands of the United States is a privilege granted by Congress, but it can only be exercised within the limits prescribed by the grant. A location can only be made where the law allows it to be done. Any attempt to go beyond that will avail nothing. Hence a relocation on lands actually covered at the time by another valid and subsisting location is void, and this not only as against a prior location, but against all the world, because the law allows no such thing to be done.—See *Belk v. Meagher*, 104 U. S., 279. IN RE CORRECTION LODE. [Decided July 18th, 1892.]

Interprovincial Coal Trade.—The coal trade between the Cape Breton ports of Nova Scotia and the cities of Montreal, Quebec, etc., is, according to the *Halifax Herald*, constantly increasing in volume. Since the opening of navigation 23,851 tons have been shipped, against 199,111 for the same period of 1891. Twenty steamers are engaged in this trade. It is claimed that shipments would have been larger had not the scarcity of inward freights had the effect of inducing the importation of Scotch coal, the freight on which has been as low as 70 cents per ton, while the ruling freight from Sydney, N. S., has not been less than \$1.30.

GAS OVEN FURNACE FOR ANNEALING AND TEMPERING.

The American Gas Furnace Company, of this city, is offering a device whereby the work of the old-style forge and muffle furnace may be done with great saving in time. The furnace shown has an inside space available for work 18 in. deep, 16 in. wide, and 8 in. high. The door is 12 in. wide and 6 in. high. The bottom of the furnace, *G*, extends from the front to the back and from side to side, except a small space through which the heat is driven. The slab *G*, which is supported upon the firebrick *F*, separates the oven into two chambers—the combustion chamber beneath the slab *G*, and the heating chamber above it, in which the work is placed. The combustion chamber contains the burner, which enters a funnel-shaped well hole in which combustion takes place. This burner is given a centrifugal motion by the force of the air and gas passing through it. This motion forces the flame out of the funnel and against the slab *G*, which is placed at a proper height above the burner to secure an even distribution of heat. The heat is thence forced into the upper chamber by passing around the sides of the slab *G* and upward through the narrow spaces between the slab and the walls of the furnace.

The gas is said to be perfectly consumed, and no flame enters the upper chamber when the supply is properly adjusted. The advantage of the furnace over the muffle is the more immediate and direct action of the heat upon the work, the lessened cost of running by dispensing with



AMERICAN GAS ANNEALING FURNACE.

costly and perishable muffles, and the adaptability of the furnace to larger work.

The furnace is particularly suited for use in tempering taps, dies, cutters, and all kinds of small tools that require an even temper. The heat may be maintained steadily at any desired temperature. A furnace now in use at the Garvin Machine Works, in this city, is giving excellent results. A bar of steel 12 in. in length and 6 in. square has been heated to a cherry red in one hour. The oven is arranged to run with a constant air pressure of one pound to the square inch. Fan blowers cannot be used.

Prize for Plans of a Proposed Neva Bridge.—The municipality of St. Petersburg offers three prizes for designs for a bridge over the Neva, the bridge to be 533.38 metres long and 23.46 metres wide. The plans must be on a scale of $\frac{1}{1000}$ natural size. The prizes are \$3,114, \$1,557 and \$778.50. The total cost of the bridge must not exceed 6,000,000 roubles. The plans must be submitted to the municipality between the 2d and 14th of October, 1892.

The Manganese in the Caucasus, Russia.—The manganese mines of the Caucasus are becoming of considerable importance as is shown by the exports of Poti and Batoum since 1886—tons of 2,240 lbs.

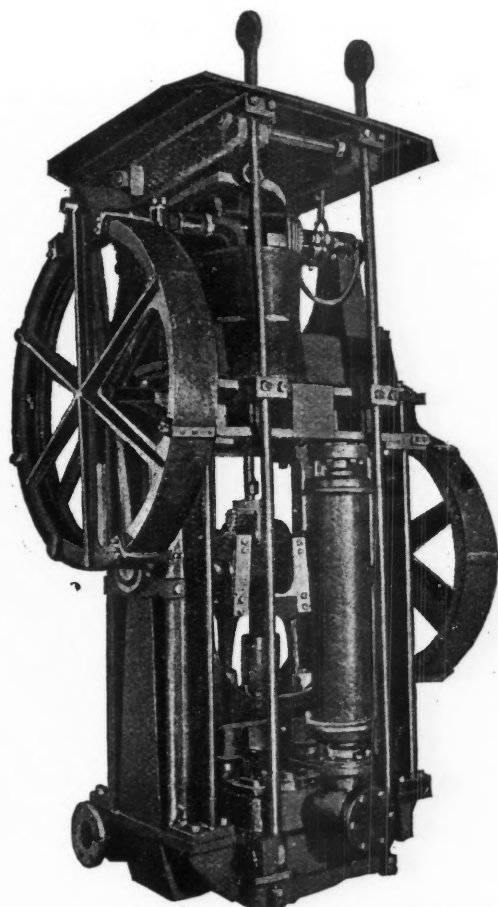
Year.	Poti, tons.	Batoum, tons.	Total tons.
1886.....	35,413	19,304	54,717
1887.....	49,360	9,977	59,337
1888.....	41,952	6,891	48,843
1889.....	40,700	11,219	51,919
1890.....	120,336	10,362	130,698
	187,761	57,753	245,514

Nearly all of this ore was exported to England.

GOULD'S TRIPLEX ELECTRIC SINKING PUMP.

We illustrate herewith an improved form of electric mine pump made by the Gould Manufacturing Company of Seneca Falls, N. Y. The particular feature of the design is its small width, which enables the pump to be used as a sinking pump in very narrow shafts. The electromotor is placed on the top of the pump, and the throw of the pump is vertical. Everything is arranged so that there shall be no projecting parts to come in contact with the sides of the shaft. All moving parts are protected by covers. The frame is supported from a windlass by means of verticle tie rods. Suction may be made either at the side or at the bottom, and the discharge is vertical. The plungers, valves and seats and main bearings are made of the best phosphor bronze, and all the working parts are made to stand extra heavy strains. The three cylinders are each $6\frac{1}{2}$ in. in diameter by 8 in. stroke; the suction and discharge are each 4 in. in diameter. The number of gallons delivered per revolution is $3\frac{1}{2}$, and the number of revolutions per minute is 35 to 250 ft., and 25 to 500 ft. The approximate weight is 9,000 lbs., and the dimensions over all are: length, 5 ft. 6 in.; width, 4 ft. 6 in. and height, 10 ft. 8 in.

New Zealand Offers a Bonus for Pig Iron Making.—According to the *Journal des Mines* the New Zealand government has published a



THE GOULD TRIPLEX ELECTRIC SINKING PUMP.

notice promising a bonus of £1 per ton for the first 500 tons of merchantable iron produced from the titaniferous sands or other iron ore of the colony. The fuel and fluxes must also be from that country and the iron must be produced before March 31, 1893.

Eruption of Mt. Etna, Sicily.—About eighty eruptions of this volcano are known to have occurred prior to the one which is at present attracting so much attention. The first eruption of which history makes mention was in the early part of the 7th century, B. C. The one that did the most damage occurred in February, A. D. 1169. During the outbreak an earthquake destroyed the town of Catania, killing over 15,000 people. One side of the crater fell in. In 1537 the village of Nicolasi was destroyed and a stream of lava ran 15 miles to the sea. Another terrible eruption occurred in 1669, which destroyed the towns of Nicolasi, Belpasso and part of Catania. A fissure nearly 12 miles long, 6 ft. wide and of unknown depth appeared in the side of the mountain; a bright light issued from it, and six months along it emitted smoke, accompanied by a roar which could be heard 30 miles away. The stream of lava was for a time stopped by the walls of Catania, but it finally rose to a height of 60 ft., poured over the walls and destroyed the greater part of the town. The lava covered an area of 40 square miles. In 1886 an eruption took place which lasted three weeks, and cinders fell at Messina, 80 miles distant. Mount Etna is 10,868 ft. high and at its base, has a circumference of 90 miles. Some of the lava thrown out by it forms headlands several hundred feet high along the Ionian Sea. Two cities and 63 villages, containing 300,000 people, are built on its slopes. In 1877 the abyss of the crater was found to be 1,000 ft. deep and nearly three miles in circumference. The lava is now flowing slowly from five craters, and it is possible to approach it closely, it being in this respect similar to that which flowed from Kilauea, in the Sandwich Islands, a distance of 60 miles to the sea. At present the lava is still three miles from Nicolasi.

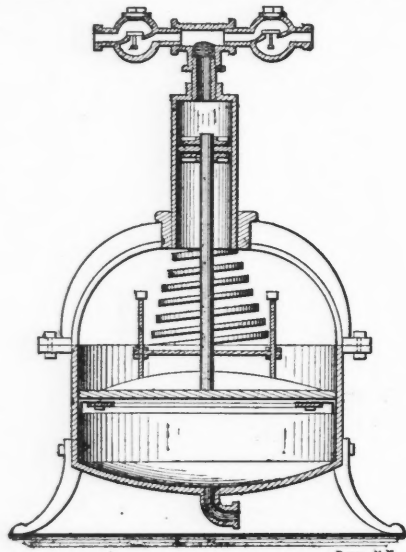
THE HENDERSON COMBINED WATER PRESSURE PUMP AND MOTOR.

This pump is constructed with a large cylinder with a spring-controlled piston in the lower part; a piston rod from this large piston is connected with a small piston which works in a cylinder of reduced size directly over the larger one. The motor is contained within the large cylinder, which is closed at the bottom, with the exception of a central inlet pipe arranged for direct connection with a water main, service pipe, or any confined body of water in which the pressure fluctuates. On the upper side of the large piston there is a spring with movable guidance by means of two bolts. The upper end of the small cylinder is connected by pipes supplied with inlet valves with any convenient source of water.

The operation of the pump is as follows: If an increase of pressure occurs the piston will rise and the water in the upper cylinder will be forced out at a pressure as much in excess of the pressure in the main as the area of the large piston is in excess of the small one. If there is a decrease in main pressure the spring on the upper side of the large piston will operate and the piston is forced down. This movement causes the piston in the smaller cylinder to draw in a supply. At another change of pressure this supply is forced out under increased pressure. The localities where this motor can be advantageously used are numerous, as, for instance on an ordinary steam pump service pipe, on the service pipe of a pump-station engine, or where the pressure is constantly varying. Its use for supplying boilers with feed water at any desired pressure is also evident. The pump is the invention of Thos. Henderson, of Dallas, Tex.

LONG DISTANCE ELECTRIC POWER TRANSMISSION.

The most important electric power transmission plant yet undertaken in this country, says the *Electrical World*, is one now in course of construction for the San Antonio Electric Light and Power Company in



THE HENDERSON PUMP AND MOTOR.

Southern California. The power plant is located in the San Antonio Canyon, where there is a minimum flow of 1,300 cu. ft. of water per minute, with a head of about 400 ft. The water is brought to the power station through 1,900 ft. of 30-in. and 600 ft. of 24-in. double riveted sheet iron pipe, which involves a loss of head by friction of 12 ft. The laying of the pipe line necessitated a rock tunnel 1,300 ft. in length as well as several heavy open cuts. The power station is provided with four double-nozzle Pelton wheels 34 in. in diameter coupled direct to the armature shafts of as many Westinghouse alternating current generators of 200 H. P. each. The wheels run at 600 revolutions per minute. Two exciters are provided which are also run by Pelton wheels coupled to the shafts in the same manner, of 20 H. P. each.

The current thus generated will be carried on two No. 7 bare copper wires seven miles down the canyon to a point where they diverge, one running to Pomona, 15 miles, and the other to San Bernardino, 28 miles. By means of transformers the potentials will be raised at the generating station to 10,000 volts and the current carried at this pressure to sub-stations located just outside the cities named, where by means of step-down transformers it will be reduced to about 1,000 volts and then distributed for both light and power purposes.

The motors used for power purposes will be of the Westinghouse synchronous type. The sub-stations will be provided with regulators by means of which the attendants can regulate the voltage of the distributing circuit independently of the generating plant. This installation is attracting much attention, as it is by far the highest tension distributing system ever attempted in this country on so extensive a scale for commercial purposes.

A New Slide Rule.—The English firm of scientific instrument makers, Elliott Brothers, St. Martins-lane, London, are placing on the market a useful slide rule, by means of which the diameter, head, length and discharge of any pipe can be calculated immediately. The rule is divided so as to give the results in accordance with Box's formula

$$G = \frac{(3d)^2 \times H}{L}$$

in which d is the diameter of the pipe in inches, H the head in feet, L the length in yards and G the discharge in gallons. The use of the rule is easily learned. It is the invention of Mr. C. T. Pollit, of Adelaide, South Australia.

THE PADDOCK PNEUMATIC ORE SEPARATOR.

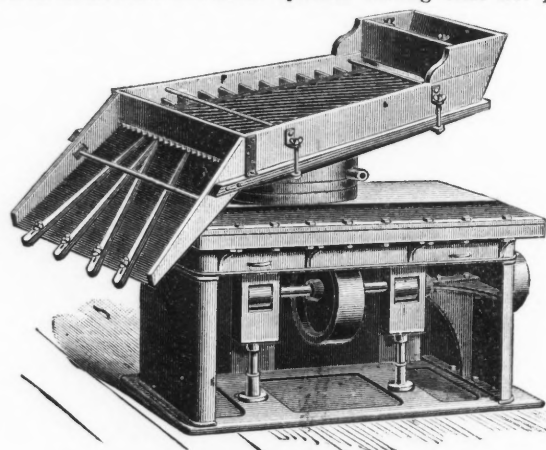
The separation of ores by means of specific gravity machines without the use of water has been the study of many minds for some years past.

It is obvious that there are localities where this type of machine would be particularly adapted. The scarcity of water, and at times the absolute lack of it in many sections of the mining country, makes the demand for such a machine. Where water can be had it is generally better to use a wet concentrator. Dry separation, however, is perfectly feasible. In dry separating the ore has to be crushed, dried and sized before being passed to the machine. The separator shown in the accompanying engraving is manufactured by the Ticonderoga Machine Company, of New York. Its operation and construction are explained as follows:

The support for the machine is formed by the hollow base; this base accommodates a shaft and driving pulley. To the shaft is attached two adjustable Hooper eccentrics, which allow the adjustment of a bellows. Two boxes are arranged on this shaft, which transfer its motion to the bellows operated by the revolution of the shaft. The bellows forces puffs of air upward through the bed of the machine. The shaft is run at 450 revolutions per minute.

Air is delivered through the circular neck of the machine, which connects the base and bed, as shown, and from thence to the bed of the machine. The bed is simple in its construction. It consists of an iron grating, made up of thin diagonal bars. Over this grating a piece of broadcloth is tightly stretched. This cloth is held in place by the wooden frame of the bed, containing a brass grating which lies parallel to and directly over the diagonal gratings underneath the cloth.

The strips of brass extend upward from the cloth about three-eighths of an inch. Above this brass grating is another grating in which the strips are much higher, being about two inches in height. The latter grating runs diagonally across the bed, but almost at right angles to the grating nearest the cloth. Upon one end of the bed a hopper is arranged, while at the other end an apron is provided which has adjustable partitions which separate the product. The circular pipe or neck which supports the bed is composed of a series of rings, which are air tight. These rings are made so that when put together they appear wedge shape. They are each of them in the form of a short cylinder having ends not parallel.



THE PADDOCK PNEUMATIC ORE SEPARATOR.

By turning these rings, by means of a handle provided for this purpose, the bed may be made to assume any desired angle. This is a most important feature of the device.

The machine, as shown in the cut, is set with the bed slanting toward the apron and slightly away from the observer. When the bed has been adjusted the shaft is started and the air is forced through the cloth. The ore is now fed into the hopper, and as it meets the air it is arranged according to its specific gravity, the heavier matter working toward the bottom and the lighter matter toward the top. The slant of the machine and the action of the air has the effect of carrying the different products slowly toward the end of the machine. The ore in passing over the cloth is met by the diagonal strips. These strips tend to carry the heavy particles to one side. The lighter matter meets the second row of grating, which has a different direction, and this matter is carried or skimmed toward the higher side of the bed. This action is constantly going on until the product reaches the apron. At this point the partitions are set to divide each class.

Good results have been attained by using this machine for the separation of ores containing lead, zinc, iron pyrites, quartz, mica, etc. The company claims to separate such ores in one operation into merchantable products, waste and middlings. The middlings consist of unseparated particles, which are not separated in crushing, and in which the specific gravity is mixed. The middlings are recrushed and run through the machine again. The company claims that the quality of the work is unsurpassed, and that the machine will handle one ton per hour.

Machines which have given entire satisfaction in several mines are located at Frisco, Utah; Pioche, Nev., and Graphite, N. Y.

Magnesium Light Signals.—The new magnesium flash light devised by Prof. Schrim, of Berlin, Germany, has been tested, and for signaling purposes it is said to be superior to electric light. In order to produce a flash of 400,000 candle power a small quantity of magnesium powder is blown into a benzine gas flame by a draught of air which has passed through pumice stone saturated with benzine. The light, which shows in red and yellow, can be seen at the distance of six miles, even when the sun is brightly shining. An experimental apparatus is being used at the lighthouse on Staten Island, N. Y., and it is thought that the new light will become well known during the Chicago fair.

OFFICIAL REPORTS.

Tombstone Mill and Mining Co.

The report of the Tombstone Mill and Mining Company for the year ending June 30, 1892, shows that receipts from all sources during the year was \$408,753.07, of which \$406,580.61 were derived from ore sales.

The expenses were as follows:

	Per Ton.	Total.
Mine labor.....	\$18.50	\$126,853.90
Mine supplies.....	4.50	31,653.84
Ore hauling.....	2.62	18,426.61
General expenses at mines, including superintendent, cashier, bookkeeper, watchman, insurance, house, stable, water, etc.....	2.70	19,080.06
Diamond drill.....	0.66	4,681.36
Purchase of mines.....	0.47	3,350.00
Taxes.....	0.28	2,019.11
Salaries, legal printing, traveling and office expenses.....	1.38	9,760.24
Charleston work.....	1.60	11,283.15
Total.....	\$32.71	\$227,108.27

The gross profits according to this statement were \$181,544, of which \$169,307.63 were expended in paying off the principal and interest of the C class of bonds, leaving a cash balance on hand, including the balance on hand, June 30, 1891, of \$60,024.79. The indebtedness of the company now consists of the D series of bonds, \$153,400, and accrued interest, \$39,117, a total of \$192,517.

The following is the superintendent's report of shipments of ore:

Name of mine.	Dry weight, tons.	Contents.			Average grade per ton.			No. of men employed.	Tons waste hoisted.
		Oz. silver.	Oz. gold.	Lbs. lead.	Oz. silver.	Oz. gold.	% lead.		
Lucky Cuss.....	2,683	116,973	1,253	280,606	45.58	.46	5.24	44	14,185
Westside Sulphuret.....	1,490	99,026	1,689	381,912	66.47	1.13	12.82	34	10,380
Northwest.....	1,413	124,062	531	262,407	87.79	.35	9.30	22	7,501
Toughnut.....	1,102	97,455	605	248,956	88.45	.55	21.30	33	9,228
Assays office, clean up.....	17	899	9	2,476	53.00	.52	7.30	.....	.....
Clean up from dumps at Charleston.....	323	22,000	152	86,469	.....	.....	.....	.....	.....
Total.....	7,027	460,505	4,207	1,262,826	65.52	.508	8.98	.....	.....

The production of ore has exceeded that of the previous year by 2,956 tons. The average grade has increased 3.9 oz. silver and declined .26 oz. per ton in gold, making the average value of the ore very nearly the same for two years past. The increased production has come mainly from the Northwest and Tough Nut mines, but all the mines have improved in production during the previous year. A large amount of new ground has been opened by workings, aggregating 12,354 lineal ft., or 54% more than the preceding year. It is impossible to speak with confidence regarding the production of the coming year. Considering the mines as a whole, they are not looking so well as at the date of the last report, as many of the ore shoots are visibly approaching exhaustion except in localities in which it is surmised that the grade will be low and that in spite of the diligent work done so far other bodies of ore able to replace them have not yet been discovered.

Lucky Cuss Mine.—The first level has been extended south 260 ft., to a point 1,033 ft. from the shaft, where a crosscut, now in 54 ft., is being run toward the southwesterly corner of the claim, to tap the manganese shoots of the Lucky Cuss, Wedge and McCann mines. The third level has already reached one of these chutes by a crosscut run 343 ft. into the foot wall at a point 730 ft. south of the shaft, proving it to be of good size and with such fluxing qualities that it is profitable to ship, notwithstanding its low grade—not over 20 oz. silver per ton. The finding of these manganese shoots has caused considerable encouragement, and at least three others are known to exist near the surface, and they will probably be found on this level and below. Work has been resumed on a branch of the Lucky Cuss vein, starting near the shaft and running southwesterly. This work has resulted in the discovery of manganese ore of a fair grade upon the third and fourth levels south of the shaft. The fourth level has been extended 105 ft. to the south of the main vein, making the total distance of the shaft 267 ft. The vein has been found very strong, but only to be 15 oz. average grade and very silicious. In the north drift ore has been found in bunches of streaks. The gold contents are high. The sixth level is 490 ft. from the surface, and is the water level of the mine. On this level the main level was cut 70 ft. south of the shaft and 82 ft. north of it. The north drift has been run 271 ft., and the south drift 137 ft. A greater part of the vein opened has been tight and poor. There have been occasional spots of excellent grade ore. Numerous crosscuts have been run, but without results. The most important work on this level is the sinking of the No. 3 winds on a downward continuation of the largest and most ore productive vein of the mine. Known on this level is the No. 3 stoke. This shoot has been followed almost continuously from the surface, and has continued in grade down to the water. The winds have now reached a depth of 100 ft. below the water level, but the ore shoot, while a good size, has been for the most part quite low in grade, although there have been occasional spots of rich ore. The ore is as thoroughly decomposed at the deepest points as it is at the surface, suggesting that the water level has been a fluctuating one.

West Side Sulphuret Mine.—There are two principal ore shoots in the Sulphuret mine; one is entirely in the blue limestone belt and is known as the fifth level shoots, and the other one, the fourth level shoot, is now dipping into the blue limestone and the overlying shale. The first of these shoots reached its maximum size and grade some months ago in abutting against a large fissure and since then it has disappeared. The fourth level shoot crossed the line of the same fissure without interruption and is still strong.

Tough Nut Mine.—Very little work has been done during the past year in the blue limestone, but the contact between the lower white limestone and quartzite has proved quite productive. One chute has been opened

at intervals but 1,200 ft. and is partially exhausted, and it seems possible that there are other similar ones, although as yet they have not been discovered. Prospecting is being actively pushed.

During the year a diamond drilling machine has been purchased and placed in the Lucky Cuss mine and will doubtless prove a very valuable adjunct in means of prospecting, although as yet it has not found any ore. Much trouble has been experienced in the peculiar nature of the country rock. It is an excessively hard quartzite with a tendency to break into triangular fragments and jam in the pit, not only making progress slow, but causing a heavy consumption of carbons. Six holes have been bored, aggregating 887 ft., at an average depth of 147.83 ft. The average speed of boring has been 11.37 ft. per day of 10 hours and the average cost \$2.71 per foot. It is proposed to use the drill on other portions of the property.

The Breakage of Winding Ropes in Mines.—Since 1884 there has been a law in Saxony that all breakages of winding ropes and chains shall be reported to the mine inspectors, and the consequence has been a diminution in the number of accidents of this nature from 28 in 1884 to 11 in 1890. In order to fully appreciate the improvement that has taken place, two other facts should also be taken into account, viz., that during these seven years the output has grown considerably and the depth to which the mines are worked has increased. Of the 133 breakages which occurred during these seven years, 1884–1890, only 18 were on the down journey and the remainder on the up journey. It was not possible to ascertain the cause of all the accidents, but 43 were found to be due to bad or worn out material, from five to seven to imperfect welding, twenty to excessive friction on the pulleys, and twenty to the jamming of the cage in the shaft. The mine managers in that country are not agreed on the question as to whether it is best to trust to the uniformly good quality of the rope and machinery or to adopt some form of safety catch. In the collieries where such a precaution has been adopted the services of the apparatus was called upon 79 times, and in 60 cases it saved the cage from falling. Though the efficiency of the safety catch is by no means as perfect as might be desired, still the results that have been obtained are so far satisfactory that its general adoption may be recommended. It would be considered a poor form of safety cage which would not act over 60 times in 79 in this country, and miners would soon protest against its use. Our Continental friends are slow to adopt our improved appliances.

DIVIDENDS PAID BY MINING COMPANIES DURING JULY AND FROM JANUARY 1ST, 1892.

NAME OF COMPANY.	Paid in July.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in July.	Paid since Jan. 1st.
Adams, Colo.....		\$7,500	Homestake, S. Dak.....	\$12,500	\$87,500
Alaska, Tr'd w'l, Alaska.....	\$75,000	225,000	Hope, Colo.....	25,000	25,000
American Coal, Md.....		45,000	Horn Silver, Utah.....		50,000
American-Nettie, Colo.....		30,000	Idaho, Cal.....	6,200	21,300
Argyle, Colo.....		20,000	Iron Mountain, Mont.....		15,000
Aspen, Colo.....	20,000	60,000	Kennedy, Cal.....		60,000
Aurora, Mich.....		100,000	Lake Superior, Mich.....		252,000
Bald Butte, Mont.....		20,000	Leadville Cons., Colo.....		12,500
Bannister, Mont.....		6,000	Lexington, Colo.....	3,000	24,000
Belden Mica, N. H.....		5,000	Maid of Erin, Colo.....		139,725
Best Friend, Colo.....		20,000	Maryland Coal, Md.....	42,000	84,000
Brotherton, Mich.....		40,000	Maxfield, Utah.....		18,000
Bull-Domingo, Colo.....		4,000	Minnesota Iron, Minn.....	210,000	630,000
Bulwer Con., Cal.....		10,000	Mollie Gibson, Colo.....	150,000	950,000
Buxton, S. Dak.....		20,000	Monitor, S. Dak.....		22,500
Calumet & Hecla, Mich.....		1,000,000	Morning Star D., Cal.....	7,200	46,800
Centennial-Eureka, Utah.....		15,000	Napa, Cal.....	20,000	50,000
Champion, Cal.....		3,400	New Guston, Colo.....	41,250	123,750
Colorado Central, Colo.....		13,750	Ontario, Cal.....		7,200
C. Consolidation Coal, Md.....		205,000	Ontario, Utah.....	75,000	525,000
Colorado Fuel.....		67,120	Oscuela, Mich.....		50,000
Cook's Peak, Colo.....	100,000	400,000	Pacific Coast Borax.....	15,000	105,000
Cortez, Nev.....		15,000	Pandora, Mont.....		3,000
Coptis.....		15,000	Parrott, Mont.....	18,000	126,000
Daly, Utah.....		37,500	Plumas, Eureka, Cal.....		25,313
Deadwood Terra, S. Dak.....		70,000	Poorman, Ltd., Colo.....		36,450
De Lamar, Idaho.....		100,000	Quincy, Mich.....		200,000
Diamond, Kyune & Castle, Utah.....		7,500	Red Cloud, Idaho.....	10,000	20,000
Elkhorn, Mont.....		175,000	Rescue, S. N., Mex.....		12,000
Enterprise, Colo.....	50,000	200,000	Rialto, Colo.....		18,000
Eureka Con., Nev.....		12,500	R'y Fork Coal, Mont.....		100,000
Farncomb Hill, Colo.....		10,000	Running Lode, Colo.....		6,000
Franklin, Mich.....	80,000	163,000	Sierra Butte, Cal.....		14,700
Golden Reward, S. Dak.....	5,000	30,000	Standard, Cal.....	10,000	30,000
Granite Mountain, Mont.....	80,000	500,000	Tamaack, Mich.....		400,000
Great Western Quick-silver, Cal.....		12,500	United Verde, Ariz.....		30,000
Hecla Con., Mont.....		15,000	W. Y. O. P., Cal.....	3,000	21,000
Helena & Frisco, Mont.....		20,000	Yosemite No. 2, Utah.....		5,000
			Total.....	1,555,800	7,563,000

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, AUGUST 2D, 1892.

- 479,780. Process of Scaling Sheet Metal. Joseph W. Britton, Cleveland, O.
- 479,872. Phosphate Rock Drier. William B. Chisolm, Charleston, S. C., Assignor, of one-half to Samuel Hughes, same place.
- 479,882. Apparatus for Removing Iron and Alumina. Samuel Hughes, Charleston, S. C., Assignor of one-half to William B. Chisolm, same place.
- 479,925. Double Salts of Fluoride of Antimony and Sulphate of Ammonia. Carl Wachendorff, Oestrich, Germany, Assignor to Rudolph Koepf & Co., same place.
- 479,953, 479,954, 479,955. Process of Separating Powdered or Finely Divided Particles. Orrin B. Peck, Chicago, Ill., Assignor to Melinda Peck, same place.
- 479,988. Method of Restoring Nitrating Acids. Hudson Maxim, New York, N. Y., Assignor to the Columbia Powder Manufacturing Company, same place.
- 480,134. Brick Kiln. William Radford, San Francisco, Cal.
- 480,193. Air Compressor. John G. Haines, Omaha, Neb.
- 480,200. Mill Appliance. William H. Maddock, Pittsburg, Pa. Assignor of one-half to the Riverside Iron Works, Wheeling, W. Va.
- 480,232. Apparatus for Melting and Casting Metals. Craft C. Carroll, New York, N. Y.
- 480,233. Alloy. Alexander I. Crocker, George W. Collyer and Clarence Maines Tarrytown, N. Y.
- 480,234. Manufacture of Asphaltum. Jesse A. Dubbs, Allegheny, Assignor of one-half to James H. White, Pittsburg, Pa.

PERSONALS.

Mr. Wm. M. Courtis, mining engineer, of Courtis & Smith, Detroit, has gone to the Black Hills to examine the Dolphin and other tin claims near Custer City for American gentlemen. His experience in different tin districts in Europe should give value to his opinion.

Mr. A. F. Baudelier, the archaeologist, whose explorations in Mexico have added so much to our knowledge of Mexican antiquities and architecture before the Conquest, is now on his way to Peru for the purpose of making an ethnographic study of the country. His starting point will, in all probability, be the ancient city of Cuzco.

Professor Ivan Dolgourovitch, of the University of Moscow, a distinguished metallurgist and mining expert, is examining the mines of California, after having visited for like purposes, Idaho, Montana, Colorado and Oregon. He is Inspector-General of the Russian Imperial mines, and is examining into American methods of mining and treating ores with a view to the adoption of certain improved forms of machinery into the government mines of Russia.

OBITUARY.

Samuel C. Wright, superintendent of the United States Mint in Carson City, Nev., died on the 1st inst.

Theodore Sturges, a prominent iron merchant of this city, died on the 3d inst. at Brooklyn, aged 64 years. Mr. Sturges was born in this city and lived in Brooklyn for 40 years. He was president of the Oxford Iron and Nail Company and treasurer of the New Jersey Zinc and Iron Company.

William Reese, the pioneer iron mill builder of Pennsylvania and the oldest-known resident of the western part of the State, died at Bolivar, Pa., on the 4th inst., aged 104 years. Some of the largest plants in the State were built under his supervision. Twenty-five years ago he retired from business.

Dr. F. B. Brewer, one of the pioneers of the petroleum industry, died at Westfield, N. Y., July 28th. He was born in Keene, N. H., Oct. 8th, 1820. His firm—that of Brewer, Watson & Co.—had the first oil lease on record, dated July 4th, 1853, and Dr. Brewer was an incorporator and director in the first oil company ever formed.

George Sydney Perceval died in this city on the 1st inst., aged 25 years. He was graduated from the Columbia School of Mines in 1888 as a civil engineer. Then he studied mechanical engineering under Prof. Hutton at Columbia, and acted as his assistant for two years. Since 1890 he had been employed as a mechanical engineer by Westinghouse, Church, Kerr & Co., of this city.

H. H. Corbin, of Telluride, Colo., died in this city on the 22d ult. He was a graduate of Lehigh University, and the oldest alumnus of that institution, being a member of the first class to be graduated. Mr. Corbin has been identified with the development of Telluride, of which town he was a popular and prominent citizen. He was well known to mining men in that section of the State, and his sudden death will be regretted by all who knew him.

Col. John A. Price, vice-president of the National Board of Trade and a member of the Pennsylvania Commission for the Equalization of Taxes, died on the 3d inst. at Seranton, Pa., aged 50 years. He was born in Covington, N. J., and held during the last 20 years many positions of trust. He was the organizer of a movement to make a permanent census as a basis of representation; also of the permanent statistical department of States for the purpose of a basis of value on which taxation may be equally distributed. He had long been interested in the utilization of the coal waste in Pennsylvania, and he was chairman of the State Commission appointed to look after it. He was recently appointed a commissioner to the International Trade Congress connected with the World's Fair. He was devoted to the mechanical arts, having taken out nearly 100 patents, and was a member of the Society of Inventors, the Irish Academy, the American Society of Mechanical Engineers, the International Geographical Society, and the American Institute of Mining Engineers.

John M. Adams, mining engineer, of San Francisco, died recently in that city. Mr. Adams was one of the first graduates of the Columbia School of Mines, finishing his course at that institution in 1867. He then proceeded to the West, and for several years was connected with various mining companies in Owyhee County, Idaho, among others being the famous Ida Elmore. During that period he became skilled in the Washoe pan amalgamation process, and contributed a paper on that subject to the Transactions of the A. I. M. E. When the success of the Frue vanner had been proved at the Silver Islet mine Mr. Adams, recognizing the adaptability of the machine for concentrating the sulphurets from California gold ores, obtained, together with the late W. A. Carter, the agency for the Pacific coast. Mr. Adams' judgment proved excellent, and the machine, as improved by his valuable suggestions, to-day is the most successful slime dressing machine used in stamp mills. Personally Mr. Adams was a most popular man, and his death will be sincerely regretted by the thousands of mining men

with whom he came in contact during his 25 years of Western experience.

SOCIETIES.

The first regular quarterly general meeting of the Mining Society of Nova Scotia was held at Halifax June 17th. At this meeting the Gold miners of Nova Scotia amalgamated with the Mining Society. Among other business, the society expressed itself as favorable to a united convention of Canadian mining societies and the American Institute of Mining Engineers at Montreal in February, 1893. Papers were read on "Nova Scotia Iron Ores," "The Introduction of New Explosives in Coal Getting," and other subjects.

The General Mining Association of Quebec held a meeting at Black Lake June 14th. Communications were received from Mr. R. W. Raymond, secretary of the A. I. M. E., and Prof. J. Wm. Dawson, of McGill University, in relation to the annual meeting of the A. I. M. E. at Montreal Feb. 21st, 1893. Papers were read by J. B. Smith, M. E., on "The Labor Question in Its Relation to Canadian Mining," by L. A. Klein on the "Canadian Asbestos Industry," and by F. A. Halsey on "Recent Practice in Air Compressors." An extraordinary meeting of the association was held at Montreal on June 20th to discuss the Quebec mineral exhibit at the World's Fair, at which a committee was appointed to co-operate with the Hon. John McIntosh, World's Fair Commissioner for Quebec.

INDUSTRIAL NOTES.

The Suez Canal authorities have definitely decided that tank oil steamers cannot pass through the canal.

President Harrison, on Aug. 1st, signed the act limiting hours of laborers and mechanics employed on public works to eight hours.

The Sheffield Land, Iron and Coal Company has sold certain properties to a syndicate of Nashville, Memphis and Pennsylvania capitalists which will relieve the company of its indebtedness.

The wire drawers' scale has been settled for the coming year, and the mills at Pittsburg, Pa., it is stated, will start up within a week. The differences between the employers and employees were adjusted amicably.

C. W. Hunt Company is building the plant of two conveyers for coal and ashes for the Reading Terminal Works in Philadelphia. The Hunt company has made also seven ore stocking cable lines for works in Pueblo, Colo.

Work on the Sault Ste. Marie Canal is rapidly progressing. The upper and lower approaches will probably be finished this season. The lock excavation is now nearly finished, and within a few weeks the masonry will be started.

Coinage was executed at United States mints during the month of July as follows: Gold, 85,000 pieces of the value of \$1,440,000; silver, 1,042,000 pieces of the value of \$559,000; minor coin, 1,900,000 pieces of the value of \$19,000.

Merchant & Co., manufacturers of roofing plates, have dropped the "Gilbertson's old method" brand of plates and have withdrawn their guarantee of the same. They are now offering their own production of heavy coated guaranteed roofing plates.

The New York Central Railroad Company has just placed an order for 300 miles of eight conductor Day's Kerite cable. The order requires over twelve and a half million feet of wire, and is probably the largest single order ever placed in this country.

The Siemens & Halske Company, of Frankfurt on the Main, Germany, manufacturers of electrical apparatus, will establish a large branch in Chicago for the manufacture of their specialties. The Lodge & Davis Machine Tool Company, Chicago, have sold this American branch a large assortment of engine lathes, radial drills and similar machinery.

It is reported from Paris that the concessions and assets of the Panama Canal Company have been acquired by a syndicate headed by M. Hielard, vice-president of the Paris Chamber of Commerce, and that a new Panama Canal Company will shortly be formed. It is, however, easier to organize Parisian companies than to make Panama Canals.

A trial run of the new Shickle, Harrison & Howard steel plant, in St. Louis, Mo., was made on Aug. 1st, and 10 tons of high grade steel were cast. The plant, which is the only one west of Pittsburg, is an open hearth steel plant, on the basic process. It turns out the same grade of steel used in making armor plates. The output is expected to be 20 tons daily.

Mr. B. F. Stewart, a representative of the Westinghouse Electric Company, has closed a contract with the South Chicago City Railway Company for 50 railway motors, or 25 double equipments of the single reduction motor type. The road between South Chicago and the World's Fair grounds will be 12 miles long, double-tracked and all girder rails and large Pullman vestibule cars. It will be in operation by Oct. 19, 1892.

The first armor plate test made on the proving grounds of the Bethlehem Iron Company took place on July 30th. The plate tested was 10½-in. harvey-

ized nickel steel, 8 ft. by 6, and weighed 18,600 lbs. In tempering the plate it was treated with the ice-water process, which rendered its surface exceedingly hard and brittle. Five shots from an 8-in. rifled gun were fired at the plate, four into the corners and the fifth into the center. The charges consisted of 81¼ lbs. of powder and a 250-lb. Holtzer projectile. The velocity of the projectile was 1,700 ft. a second. Each projectile pierced the shell about 3 in., rebounded and broke into bits the size of walnuts. Not a crack was developed in the plate.

The Thomson-Houston Electric Company has built an electric tram road for the Northwestern Terra Cotta Company, of Chicago, which is worthy of mention. The line is 1,700 ft. long, including the loop. The overhead conductors consist of two No. 2 B. & S. gauge copper wires. As the power is supplied from an incandescent lighting plant, it was deemed advisable not to use one wire and rail for return current, so a double-trolley system was installed. The line has six curves of less than 40 ft. radius. A loaded train can start from the works and unload in the storage yard, and continue to the clay sheds for a return load for the works. The track is 3 ft. gage, has 30-lb. rail on pine ties, spaced 2 ft. between centers. The greatest grade is 4%. The motor car is equipped with two 3-HP. Thomson-Houston railroad motors, hung on the axles. The motor has the standard Thomson-Houston controlling stand and switch. The motor has hauled 10 tons on a level track.

I have used handhole and manhole gaskets eight to ten times by carefully smearing the surface next to the boiler shell, taken out at periods of three to four weeks, using steam pressure as high as 100 lbs., says a writer mentioning various uses for graphite. In packing water glasses, by putting a little graphite and oil on the gasket they would become as soft as lamp wick and retain their elasticity until the glass was changed, when the old rubber could be removed without trouble, while by the old way I have spent much time in digging out the rubber, baked hard as vulcanite. Another thing I used it for was, after putting back my handhole plate or plugs in back connection I carefully brush away all the soot and ashes, then with a small brush paint a good coat of graphite over flange, stud and nuts. After running boiler from three to six months, and using coke for fuel, with forced draught, the nuts can be removed without trouble as the heat has not been great enough to burn the lead.

A petition has been presented to Judge Ewing, of Pittsburg, for the appointment of a trade tribunal to arbitrate upon the differences between the Carnegie Steel Company and the strikers. A provisional license was issued, but Secretary Lovejoy, of the Carnegie Company, replied: "As far as our company is concerned there is nothing to arbitrate. On July 6th Mr. Weihe conceded all the demands we had made with regard to the scale of wages, the minimum basis and the time of the termination of the scale. The question of recognizing the Amalgamated Association cannot be arbitrated, for we will under no conditions recognize that organization. I do not think that by October there will be any Amalgamated Association left to recognize."

On Wednesday morning there were about 1,350 men at work at the Homestead Steel Works, and before evening this number will have been increased to 1,500. About 110 of these are old men formerly employed in the works, who have deserted the Amalgamated Association. Next week it is expected that 1,800, and possibly 2,000, men will be at work. A very large number of skilled workmen from Sparrow's Point, Coatesville, Phoenixville, Reading, Pottstown, Chester and other Eastern cities have come to work at Homestead. At the Upper Union mill, on Wednesday morning, there were five departments in operation, and it is expected that a sufficient number of men will be secured to operate this plant full time within a week or ten days. As soon as the Upper Union Mill is in full operation the Lower Union Mill will be started up. The old workmen formerly employed at the Duquesne Steel Works have been given until Wednesday evening to make application for their old positions. In all probability the Beaver Falls Mills will be allowed to remain idle.

EXPORT NOTES.

Assistant Secretary Crouse has instructed customs officers to refuse to accept consular invoices in which the goods are measured in aunes instead of in metres for all shipments made on or after Sept. 1st next. It is held that the use of the aune system of measurement is illegal and tends to facilitate frauds on the revenue.

Acting Secretary Nettleton, of the Treasury, has instructed customs officers at ports other than New York to forward samples of all coal tar products to Dr. Sherer, chemist in charge of the laboratory at New York, for advice as to their character and proper classification. This action has been taken on account of the differences in classification at different ports.

Importers are talking of appealing to the courts on account of a recent decision of the Secretary of the Treasury on the value of the Austrian florin. The florin when first coined had a bullion value of 48 cts., but owing to the depreciation of silver its value has declined to 32 cts. On the other hand,

owing to the suspension of the coinage of this coin its interchangeable value is now about 40 cts., and it is at this value that the Austrian Government proposes to redeem it in gold under the finance law recently proposed. The Secretary of the Treasury, in view of this, has proclaimed that in estimating duties the value of the florin shall be 40 cts., whereas the Director of the Mint has declared it to be worth only 32 cts., and it is according to this rating that importers have been accustomed to pay duties.

The direct imports from the United States at Patras, Greece, were 52,500 cases of refined petroleum in 1891 against 50,000 cases in 1890. According to the budget now before the Greek Chambers, it is proposed to raise the price of petroleum, which is a government monopoly, from 26 drachmas to 30 drachmas per case, whereby an increase in the revenue of 360,000 drachmas is reckoned, thus giving 90,000 cases as the average consumption of the country. Some small lots of Baku petroleum have been imported, and a cargo was coming from Batoum, but it took fire, exploded, and the steamer foundered. The only other direct import was that of staves, of which 243,000 were received, as compared with 164,000 in 1890.

Mr. W. E. Curtis, in the "Iron Trade Review," gives an account of the needs of South America, financial conditions governing the trade there and with American manufacturers. The countries of South America are essentially agricultural, and their great need is of machinery, agricultural, mining and railway supplies and equipments. Mining machinery is especially needed in Chili, Bolivia, Peru and Colombia. Revolutions in Chili, Argentina and Brazil have greatly disturbed both public and private enterprise, but these countries are possessed of great natural wealth, and early recuperation is looked for. He continues: "American manufacturers must understand that South American buyers will not come to them. They must exercise the same energy and patience and enterprise that has characterized their treatment of the domestic trade, and must introduce their machinery into foreign markets by the same methods they have used at home. They must send intelligent agents to study the conditions that control the trade of the Latin American countries, and govern the requirements of the customers they desire."

Of the total imports in Canada during 1891, Great Britain contributed \$44,483,088 (about \$2,500,000 of which were goods in bond for transshipment); the United States, \$59,177,775; all other countries, \$15,176,379. The exports during the same period were: To the United States, \$37,280,572; Great Britain, \$33,357,965; all other countries, \$3,917,938. The balance of trade is more in favor of the United States than these figures indicate, for in several instances where the importations from Great Britain exceed those from the United States they include large shipments of partially manufactured goods and raw material admitted at a low rate of duty; on the contrary, where those from the United States are in excess, they are made up of heavy importations of the highest class of goods, in the completion of which the best of skilled labor is required, raw material being a very small factor. Take, for instance, imports under the heading "manufactures of iron and steel." The amount from Great Britain is swelled by heavy shipments of refuse scrap, pigs, bars, common black sheet iron, etc., while the imports from the United States are made up principally of builders' and carriage hardware, fine edged tools, locks, saws, mechanics' tools, surgical instruments, etc. What applies to this industry can be fairly said of others. The United States monopolizes the importations of agricultural implements, musical instruments, printing machinery, electrical supplies, fine papers and papereries, leather and manufactures of leather; rubber boots, shoes, and belting; watch and clock movements, field and garden seeds, binders' twine, etc. In manufactures of tin we supply ten times as much as Great Britain.

The exportation of dry iron ores and manganese ores from Cartagena, Spain, during 1891 was very small as compared with 1890, the total quantity exported amounting to 421,200 tons. This is a decrease of 402,900 tons as compared with 1890. The causes accounting for it may be found under the head of shipping and navigation." A considerable portion of the iron-ore mines were at intervals stopped from working for several months from want of ore purchasers and from lack of space at the wharfs and depots, which were all overstocked, thus throwing numerous laborers out of work and causing the price of ore to come down. On the other hand, iron-mining all through the district is steadily on the increase, some new mines having been opened during the year. The prices of iron ore f. o. b. steamer at Cartagena ranged during the last year from \$1.30 to \$1.70 per ton of 2,240 lbs. for 50% of metallic iron contained in the ore, with a sliding scale of from 6 to 8 cts. per unit in excess of that percentage. Manganiferous iron ore was sold, according to class and conditions of sale, at from \$2 to \$4 per ton, free on board at Cartagena. Iron ore was shipped as follows: To England, 198,273 tons; to the United States, 165,227 tons; to Holland, 40,400 tons; to France, 17,300 tons. The ore shipped to the United States may be classified as follows: Dry iron ore, 113,386 tons; manganiferous iron ore, 51,841 tons; with a full value, free on board, of \$320,096. Only 7,500 tons of zinc ore were shipped to Belgium during last year. The reason for the continual falling off in the exportation of this ore is accounted for by

the fact that it is getting poorer and poorer in quality.

WORLD'S FAIR NOTES.

Canada will occupy 10,000 sq. ft. for a mineral display at the World's Fair. Half of this space will be taken by the Province of Ontario.

The Durborrow World's Fair Bill, granting \$2,500,000 additional to the Columbian Exposition, passed the House of Representatives, Aug. 5th, by a vote of 131 to 83.

Carriages intended for road use and propelled by electricity will be exhibited at the Columbian Fair, in Chicago, the exhibit being under the direct supervision of Chief Willard A. Smith. He has already made arrangements with several European manufacturers to exhibit.

Mr. Wm. M. Bickford, the Commissioner for Montana, states that the plans for the State building are now complete, and the mineral exhibit will be the important feature. Among the features will be silver ores from the Benton group, Nehart County, and gold ores from the old Cable mine of Deer Lodge County. Two complete models showing the workings in a fully developed mine will also be shown.

The Manufactures Building is expected to prove a greater attraction at the World's Fair than the Eiffel tower was at the Paris Exposition. It has 44 acres of floor space in all—30½ acres on the ground and 13½ in the galleries. The dimensions of the building are 787 by 1,687 ft. The walls are 66 ft. high and the four center pavilions 122 ft. The roof will be 245 ft. above ground. The steel arches are 211 ft. high and span 380 ft. These arches are 14 ft. through at the base and 10 ft. at the apex. They weigh from 400,000 to 550,000 lbs. each. More than 15,000,000 lbs. of steel and 17,000,000 ft. of lumber were used in the building. It is the largest structure in the world. It is three times larger than the cathedral of St. Peter in Rome. The old Roman Coliseum, which seated 80,000 persons, is only one-fourth as large as this building. A new feature in its construction is the method of fastening the arches. At the base they rest upon steel pivots. At the top the nose piece of each section is slightly hollowed out and in the cavity a steel pin is driven which serves as a keystone. This arrangement allows for the necessary expansion.

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.

2,744. Cloth and paper bags large enough and strong enough to hold 50 lbs. and 100 lbs. of dry metallic paint. Cloth bags must be closely woven. Alabama.

2,745. Dolomite. Ohio.

2,746. Artesian pumping outfit and electric motor to operate same. Texas.

2,747. Light iron tubular columns for support of light roof; patent iron curtains; light iron tables, marble-tops, for meat market; fruit vendors' market tables; iron water piping 2 in. in diameter; iron skylights with glass panes; different styles of crystal roofing. These goods are to go to Mexico.

2,748. Second-hand rails in good condition for relaying, 25 to 30 lbs., with or without spikes, but with splice joints. South Carolina.

2,749. A shingle mill. Maryland.

2,750. Second-hand iron or steel rail splices to lay a track 3½ miles long, suitable for running a 10-ton locomotive with a full load of lumber; rails should have a good wide face. Virginia.

2,751. A 20-ton ice plant. Maryland.

2,752. Equipment for the manufacture of electrical specialties. Kentucky.

GENERAL MINING NEWS.

President Harrison vetoed the McGarrahan Claim Bill on July 29th. The President bases his objection to the bill on the ground that it is so framed as to give full protection to the New Idria Mining Company to the full extent of its largest claim, while

throwing upon the United States a responsibility which that company should bear if the title of Mr. McGarrahan is established.

CALIFORNIA.

It is reported that Owens Lake, Inyo County, Cal., has been sold to an English syndicate for a large sum. The lake is said to contain vast quantities of soda, and the object of the purchase is stated to be the establishment of soda works.

Mono County.

Benton Consolidated Mining Company.—At the annual meeting of this company 97,637½ shares were represented. John T. Hill, V. B. Allen, Edward Howard, E. M. Morgan and E. Hestres were elected directors, with John T. Hill president; E. M. Morgan, vice-president, and V. B. Allen secretary. The secretary reports a cash balance of \$44,811.69 on hand. No work was done in the mine during the past year.

Bulwer Consolidated Mining Company, Bodie.—The latest official weekly letter says that 170 cars of ore were extracted from the stopes on the 100 and 200 ft. levels of the mine. The mill has been kept running steadily. Average battery assay, \$27.33 per ton; tailings, \$9.11 per ton.

Nevada County.

(From our Special Correspondent.)

Lafayette Mine, Grass Valley.—A clean-up of about six tons of ore resulted this week in a yield of retorted gold of 57 oz., not including sulphurets which have yet to be worked.

COLORADO.

El Paso County.

Anacoda Gold Mining Company, Cripple Creek.—All the properties on Gold Hill, Cripple Creek, have been united under one management. Numerous meetings of the persons interested have been held within the last few days, and at last resulted in this consolidation. At the meeting at Denver on the 26th ult. there were represented 40 properties and 9 producers, all located on Gold Hill. Among them were the Anacoda, Superior, Excelsior, Rose, Maud, Corona, Lone Star, the properties of the Work Mining Company, the Rustler, and all those claims known as the Anacoda group. The capital stock of the new corporation, which is to be known as the Anacoda Gold Mining Company, was placed at \$5,000,000, divided into 1,000,000 shares. Officers were chosen as follows: D. H. Maffat, president; L. L. Rodebush, C. F. Harkinson, Arthur Gorman, and Irwin Hawley, directors, and Eban Smith, manager. This consolidation necessarily settles all the numerous disputes likely to arise because of conflicting claims, and places the new company in a position to greatly increase the work on the Gold Hill property. The mines have already taken out and shipped thus far \$150,000 worth of ore, and are sending out 2½ carloads per day. Two hundred men will now be put to work, and 100 tons of ore, or five cars per day, will be taken out.

Gunnison County.

Forest Queen Mining Company, Irwin.—The Forest Queen mine has continued operations steadily. Superintendent Fuller says that he is employing a force of about 25 men, and expects to continue work as usual. Chiefly development work is being done at present. There are large ore reserves in the mine in excellent shape for stoping, but not much ore will be taken out at present on account of the low price of silver.

Lake County.

According to the Denver "Times" the work in Leadville for the past month shows great improvement in the mining outlook. There is a greater force of men at work, while it is the intention to start up a number of old properties that have long lain idle. A good plant of machinery is being placed in the Gertrude property, that mine having been leased for three years to well known mining men in Leadville. S. N. Dwight has secured a lease on the Bartlett, and is preparing for active development work. Work is to be resumed at once on the Gunnison property, and the shaft is now being cleared of water. The reports from Robinson district are very encouraging. The Wilfley has increased shipments to an average of 50 tons daily of \$25 ore, with a large amount of this mineral in sight. The management of the Kimberly is nearly ready to begin shipments.

Saguache County.

Judge Holbrook, at Del Norte, has decided in favor of the plaintiffs in the matter of the application for an injunction restraining the owners of the Hillside mine at Creede from sinking further on two shafts to the west of the Amethyst claim. Plaintiffs are D. H. Moffat, L. E. Campbell and others. Defendants are A. T. Morgan and A. F. Maister. Upon motion to dissolve the injunction the court ruled that the injunction must stand, but modified the same a trifle as to territory covered, a virtual victory for the Amethyst people.

We extract the following items of Creede news from our local exchanges: The Amethyst has more than 300 ft. of shaft work. The drift on the third level is in but 10 ft. and in pay ore. The management is saving all the mill dirt, which will be utilized as soon as the mill is put up, foundations for which have been contracted for. The Ethel has resumed shipping, the product this week being 4 cars. The ore runs 54% galena, 15 oz. silver, and \$5 in gold. The Last Chance is taking out ore from both shafts, the shipments being heavier than their nearest neighbor. The Nelson tunnel has cleared out 160 ft., and

the breast is now in pretty solid formation. The contract has been let and work begun on the foundation for the compressor, part of which has arrived, as also the pipe to convey the water from that torrent up the gulch, West Willow Creek, which will fall over a Pelton wheel and give 150 H.P. This power will run the electric lights, drills and cars, and anything else it may be put to.

IDAHO.

The production of the placers of Idaho was for a number of years very large, but it has been gradually diminishing, and the surface placers are nearly worked out. Denver capitalists, however, working on the history of the Australian gold fields, where the richest diggings were found beneath a false bed-rock, have sunk a number of shafts at the old placer diggings here with the result that the bed-rock turned out, it is claimed, to be a capping for richer deposits below. The bed is 16 ft. thick and the gold quite coarse. Nearly 50 men are now employed sinking shafts.

Ada County.

Boise City.—The trial of the miners of the Coeur d'Alene commenced on Aug. 2. The attorneys for the miners filed a demurrer and a plea in abatement, which set up that the court had no jurisdiction. It is said further that the Miners' Union was composed of citizens of different States, Territories and foreign nations.

Alturas County.

Red Cloud Mining Company.—The company has a width of 12 ft. of ore in sight, of which 3 ft. is first-class shipping, the remainder being concentrating ore. From present appearances dividends will therefore be earned for a long time, says the Hailey "Times." The ore averages 75 oz. of silver and 75% of lead to the ton. It therefore is worth about \$165 gross.

Boise County.

Milwaukee & Idaho Mining Company.—This company has recently secured bonds on a number of quartz claims near Centerville. One is a ledge, said to be 60 ft. wide and carrying free gold ore, galena, and silver carbonates, the latter assaying over \$100 in gold and silver. This company has a working bond on two other mines carrying free gold—the Golden Star and Golden Fleece, both near Centerville.

Elmore County.

Buffalo.—This mine, which has been lying idle for many years, was taken hold of several months ago by a new company. A short time ago the mill was destroyed by fire, but notwithstanding this loss the superintendent says work will be pushed. The Buffalo was for several years a large silver producer.

Kootenai.

It is reported by the Helena "Independent" that the Silver King mine has been sold to a Scotch syndicate for \$2,000,000. A concentrator will be erected with a capacity large enough to handle the total output of the mine, and if necessary arrangements will be made to handle the output of the neighboring mines at the start. The ore has an average value of 300 oz. to the ton, it is claimed.

Lemhi County.

Salmon City.—During the past six months over 600 mining locations have been filed for record at this place for placer and lode claims. A number of sales of quartz claims have been made, among them the Hades, sold by George L. Schoup & Co. to purchasers from Utah for \$75,000; the Yellow Jacket group, owned by Steen Bros., for \$100,000. The C. J. Barelay group at Gibbonsville has been sold to an English syndicate. The price is not known. The Helena Gold Mining Company have sold their extensive properties at Gibbonsville to a Montana company.

Shoshone County.

Late advices from Wardner are to the effect that the troops will remain there for an indefinite period, as the United States Commissioner has warrants for the arrest of 200 more of the union miners alleged to have been concerned in the recent riots. It has been represented in the petitions to the Governor and the President that troops are still needed, as certain non-union men have been designated for the assassin's knife or bullet. Fifty out of 108 prisoners were given an opportunity to sign a parole on the 2d inst. Only six signed. The others declared they would not sign, as they were innocent of crime. At Wallace three of Sheriff Cunningham's bondsmen having withdrawn from his bond, probably on account of his partisanship for the striking miners and his failure to prevent bloodshed, the County Commissioners declared the office vacated and appointed Coroner W. B. Sims, sheriff. The act of the commissioners has created somewhat of a sensation. The process of the ensuing term of the District Court is extremely important, as it is openly stated that the charge of murder will be brought against many of the miners now under arrest.

Coeur d'Alenes.—The Spokane "Miner" says "the daily press is to a large extent responsible for the recent labor troubles in the Coeur d'Alene. Instead of showing to the miners that their demands were exorbitant and had no foundation of right, the newspapers catered to the good will of the labor organizations and impressed the members of these bodies that the fight was for a just cause."

KANSAS.

Cherokee County.

During the week ending July 30th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,750,950; rough ore, pounds sold, 2,433,580; zinc ore, pounds sold, 923,720; lead ore, pounds sold, 112,460. Sales aggregated a total value of \$12,861.

MICHIGAN.

Gold.

Michigan Gold Mining Company.—Another bunch of rich ore has been found east of shaft No. 3, at a depth of 25 ft., says the Ishpeming "Iron Ore." It is reported that these bunches are being found more frequently of late, and it is believed that they will lead to a more permanent deposit. The vein continues well defined, but hitherto nothing has been found outside of the rich bunches from which a total of \$25,000 has been taken.

Copper.

Centennial Mining Company.—The No. 3 shaft is down about 3,000 ft., says the Calumet "Conglomerate," and as yet there are no indications of profitable working ground. At present there is no copper in the bottom of the shaft, while some time ago there were streaks of ore.

Tamarack, Jr., Mining Company.—The Boston "Transcript," in answer to a correspondent inquiring as to the causes of the drop from \$45 to \$19 that occurred in the stock during July, says: "The company owns three sections north of the Calumet & Hecla. The lode runs from the latter into the first 40-acre section, and has been developed by No. 1 shaft, where good paying copper rock has been found. Word was received Aug. 2d that the lode in the fourth or bottom level in this shaft, running south, is rich. There appears to be no doubt that the No. 1 shaft has developed a good mine in one-third of the property. The question now comes as to how much of the other two-thirds is productive. The answer depends upon how the copper ground, running from the Calumet into the first 40 acres, dips in its course through the other two 40-acre sections. This has not been ascertained as yet. Thus the case comes to this: The Tamarack Junior has proved 40 acres of its property to be productive of copper; it has expectations of proving the remainder so, in part at least. But it should be remembered that the possibilities of 40 acres of productive copper-bearing ground are great. While the Tamarack Junior's case is as indicated, the combination of long depression in the market for copper and of the usual stock market tactics has resulted in driving down the price of the shares. The latter were advanced unduly on the developments in the No. 1 shaft; there was a small-sized 'boom' in the prospects of a great mine. Now that it is found that it must take some time to place the Tamarack Junior in this position, a certain amount of reaction is not strange, particularly when the copper market situation is not over encouraging, and when the trader has found profit in selling."

Wolverine Mining Company.—At this mine advantage of the stoppage of shipments is taken to open up the mine. Some 3,000 ft. of openings have been made, which allows of more extended stoping.

Iron—Marquette Range.

American Iron Company.—This company has suspended, and 100 men are thrown out of employment. These, with the 600 of the Champion, make a large force of idle men. It is said that more mines will shortly close down, as the companies cannot sell ore at the present cost of mining.

Blue Iron Company.—The shaft has reached a depth of 270 ft., and the bottom is now in mixed slate, quartz and lean ore, which it is hoped forms the capping of ore in that vicinity. The diamond drill found ore at a depth of 350 ft. The sinking is slow on account of the position of the rock, it standing on edge and cannot be drilled easily.

Lake Angeline.—The lake has been lowered 91½ in., says "Iron Ore," and the work has been stopped to allow of an addition to the flume. It is estimated that the work will be completed in 30 days.

Lee Peck Mine.—All development work at this property has been stopped and the miners discharged. The mine, however, is kept dry pending further orders.

Pioneer Furnace.—This furnace, the oldest on the Range, stopped working July 28th. Some time ago one of the stacks was blown out, but the other was kept going until the 28th ult. The furnace has been in operation ever since 1857 and employed about 75 men.

Iron—Menominee Range.

Aragon Iron Company.—This company has shipped 100,000 tons of ore this year, and still has a small quantity in stock.

Lincoln Iron Company.—This company is now shipping ore, the mine producing daily about 400 tons. It is said that there is a lack of transportation facilities.

Pewabic Iron Company.—This company has shipped about 56,000 tons of ore this year and has about 7,000 tons still in stock. It is now producing about 4,500 tons per week. The workings east from the shaft, which are now in nearly 1,200 ft., and upon which the future of the mine depends, are, according to the Norway "Current," opening up very satisfactorily.

MINNESOTA.

Iron—Cook County.

Gunflint Lake Mining Company.—This company will commence work at once. The lease calls for 30,000 tons per annum. The ore will be shipped in bond through Canada via Port Arthur.

Iron—Mesaba Range.

Pioneer.—It is said that this mine has passed into the hands of Capt. Wilson and the Ogelhay Iron Company, of Cleveland, O. Operations will now be conducted on an increased scale. Capt. Wilson is largely interested in the American Steel Barge Company, ore carriers on the lakes. Only 2,700 tons of ore have been shipped this season.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, August 1.

The mines were operated under the most favorable conditions last week, and there was a large output of ore, with the sales fully up to the average. There was a slight decline in the zinc ore market, and prices ranged from \$24.56 to \$25 per ton. Lead remained firm at \$23.25 per thousand. Following are the sales from the different camps: Joplin mines, 1,701,590 lbs. zinc ore and 300,490 lead, value \$28,040.15; Webb City mines, 551,800 lbs. zinc ore and 98,770 lead, value \$9,006.55; Carterville mines, 2,044,370 lbs. zinc ore and 89,020 lead, value \$27,579.85; Zincite mines, 130,660 lbs. zinc ore and 4,380 lead, value \$3,846.50; Oronogo mines, 48,680 lbs. zinc ore and 20,490 lead, value \$1,211; Carthage mines, 295,900 lbs. zinc ore, value \$1,735; Burch Center mines, 11,920 lbs. zinc ore, value \$143; Galena, Kan., mines, 923,720 lbs. zinc ore and 112,460 lead, value \$12,861; district's total value, \$84,423.05. The Jersey Lily Mining Company is a new company organized by E. O. Bartlet, W. H. Picher, E. Zelken and Henry Weymann. The company have taken a lease on 40 acres of the Rex, M. & S. Co. land, and have had the tract platted into mining lots, and are now prospecting by drilling. Capt. Hemingway is pushing development as rapidly as possible with his development shaft just north of the Jersey Lily, now 75 ft. deep. The Victor mine, of Carterville, had their hoisting plant and boiler-house burned down at No. 4 shaft last week. The origin of the fire is unknown. The Daisy mine, on the Empire land, last week sold 174,410 lbs. zinc ore and 30,560 lead for a total amount of \$2,883.97. This property is operated by the Electric Lead and Zinc Company, and has proved a very productive property.

MONTANA.

Choteau County.

Black Coulee Coal Fields.—These fields will now be worked, says the Chinook "Opinion," the syndicate owning them having made arrangements with the Anaconda, Butte & Boston and Montana companies, who have virtually agreed to take the total output.

Deer Lodge County.

Alps Mining Company.—Sufficient ore from one of the company's claims is being taken to supply the mill. The Alps shaft is filled with water, and working there has been discontinued.

Bland Mining Company.—A 3½-ft. vein has been struck at a depth of 160 ft., says the Phillipsburg "Mail." The ore will average about 35 oz. silver, and carries \$7 in gold to the ton. At present the tunnel will be continued until the east vein is reached.

Cyanide Process.—The Phillipsburg "Mail" says: "Guy X. Platt, general manager of the Southern Cross mine, reports that the cyanide process proved successful in treating the ore from the mine. Heretofore a large percentage of the gold floated off with the tailings and was not saved by amalgamation. With the cyanide process 80% of the assay value of the mill tailings was saved, while the ore gave even better returns, going 90% of the assay value."

Mount Powell.—This mine, formerly known as the Bradley & Sullivan, was recently purchased for about \$90,000 by a St. Louis company, says the Montana "Mining Journal." The company has 800 ft. of tunnel, and cross-cuts have been made through three veins that are said to be 100 ft. wide, of free milling gold and silver ore.

Royal Gold Mining Company.—The capacity of the stamp mill is being doubled, says the Butte "Miner." The ore averages \$30 per ton, and enough is being worked to pay for needed improvements.

Jefferson County.

Comet Concentrator.—According to the Anaconda "Standard" the concentrator is not financially a success. The tailings treated are reported to be rich, but the gold and silver is so fine that it is impossible to save them.

Crystal.—This mine has a shaft 110 ft. deep, with 250 ft. of levels, and there is about 9 ft. of ore in the bottom of the shaft. A tunnel has been driven in on the lead, which uncovered 5 ft. of galena. The tunnel is 440 ft. long. The lead is large and wherever the cross-cut it has shown ore, says the Helena "Journal."

Elkhorn Mining Company, Limited.—1,011 tons were mined during the month of June at an average assay value of 4,332 oz. 93.9% was extracted, the tailings averaging 3.03 oz. per ton. Forty-seven bars of bullion containing 41,061.73 oz. silver and 46,544 oz. gold were produced. The estimated value of this

bullion was \$36,195, and without the returns from 401,959 tons of ore shipped was \$24,899.81, an estimated total of \$61,094.88. The expenses amounted to \$25,547.69, an estimated profit of \$35,547.19. The lower levels of the mine are in excellent shape. On the 1,150 ft. level, south of the shaft, the vein is 7 ft. wide of milling ore, assaying on an average 38 oz., and 4 ft. of smelting ore, carrying 50 to 70 oz. and 8% lead. On the 1,250 ft. level the north end of the vein is 3 ft. wide and carries 90 oz. silver, with 12% lead. In the center the quartz is dry. The width is over 12 ft. and the value is 60 oz. At the south end there is 8 ft. of dry ore, assaying 50 oz. Lying on this and against the hanging wall a bunch of streaks of high grade lead ore is assorted for shipment. On the 1,350-ft. level south the vein is 12 ft. in width, assaying 120 oz. and 9% lead. The shaft has been sunk 72 ft. in June, making a total of 1,420 ft. up to the 1st July. A station will soon be cut on the 1,420-ft. level. The character of the ground is unchanged and the levels will be run at the same favorable outlook as on the 1,250 or 1,350-ft. levels.

Garfield & Blaine.—The development consists of one shaft 53 ft. deep, one level driven from the shaft 100 ft., from which five cars of ore was shipped; one cross-cut tunnel run across the formation to strike the lead, 242 ft. long. In driving this tunnel 90 ft. a lead of galena was struck. At the face of the tunnel where the Garfield lead was found a level was run 80 ft. east on the lead from it; 8 tons of ore have been taken out.

McArthur Iron Mine.—This property, also known as the Timberline lode, is supposed to be on the same lead as the Bluebird, says the Helena "Journal." There has been 400 tons of ore shipped, taken out in running a small tunnel and cross-cutting within 20 ft. of the surface. There is no sign of any hanging wall. The main body of ore is pyrites, but there is considerable bismuth ore which is of very high grade. There is also a shaft 45 ft. deep, and the ore gets richer with depth.

Monarch.—Foster & Company are now preparing to work this iron mine near Elkhorn with a day and night shift. The Anaconda "Standard" reports them as having a contract with the East Helena smelter to furnish 1,000 tons of iron ore per month for fluxing.

Lewis and Clarke County.

Buckeye.—This mine has been leased and bonded to New York and Butte parties, says the Butte "Miner." A new steam hoist will be erected, and, if the outlook warrants, a concentrator will be constructed.

Ontario Mining Company.—It is reported that the mine is now shipping ore. A hoist of considerable capacity has been erected and the shaft has been run down 100 ft. deeper. The ore maintains its character both in quantity and quality.

Madison County.

Prospect.—It is reported that Pat Largey is completing arrangements for a mill on this property. He is also putting up a cyanide mill at the Iron Rod mine. It is intended to test the ore from the Prospect mine by this process.

Meagher County.

Montana Mining and Investment Company.—This company has acquired control of the Blue Dick and Azurite gold and copper properties of Yogo.

Missoula County.

Iron Mountain Concentrator.—The works are treating 100 tons of ore per day. A dividend of 3 cts. per share was paid in July of \$15,000.

Park County.

Asphaltum.—Some time ago it was mentioned in these columns that asphaltum had been discovered on Butcher Creek. From the Helena "Journal" we learn that samples were sent to the Asphalt Slag & Paving Company, of New York City, who replied offering for an option of 60 days on the claims owned by White Bros. & Moore to pay \$200 in cash, and if suited with the property at the expiration of that time to purchase the claims for \$20,000.

Cooke City.—Papers have been filed leasing to W. E. Nichols et al. the properties owned by the Alice E. Mining Company for 3½ years. The lease states that Nichols shall annually mine 5,000 tons of ore on which he is to pay a royalty of a certain percentage, and that he shall have ready on or before Jan. 1st, 1893, a mill or reduction works for treating 20 tons per day. The lease is renewable for 20 years.

Silver Bow County.

Boston & Montana Mining Company.—This company's contract for treating matte by the electrolytic process was with an Eastern company and for 200 tons only per month. On matte sold for export the company is allowed no silver except when it runs above 30 oz. The silver up to about 30 oz. will about pay for treating the matte and is estimated to yield the company about \$2,500 per month, say \$30,000 per year. When the company's electrolytic plant at Great Falls is finished it will treat its own matte.

Boston & Montana Consolidated Copper and Silver Mining Company.—At the Leonard shaft, which is now 600 ft. deep, 150 men are employed. The new Allis engine, 500 H. P., is giving great satisfaction. When the pumping plant is placed in position, the East Colusa will be abandoned. At this mine a new engine was recently put in place, but the volume of water is so large, 500 gallons per minute, and was so strongly acidulated that new water columns were

constantly needed; in consequence it will be abandoned. At the West Colusa work has been resumed, and shipments to the Great Falls smelter will shortly take place.

Butte.—Among the mining companies of this county the Butte & Boston is assessed for the largest sum, viz., \$289,135; then comes Anaconda, \$225,035; Boston & Montana, \$163,200; Alice, \$127,390; Blue Bird, \$100,970; Moulton, \$99,360, and Parrot \$94,200. These values are not assessed on the mines, but upon the surface improvements.

Virginus.—This mine, which belongs to the Parrot Company, is being worked under lease by D. G. Bricker. The ore mined is sent to the Parrot smelter. The shaft is now 300 ft. deep.

NEVADA.

Elko County.

Nevada Queen Mining Company.—The latest official weekly letter from this mine says: "There have been worked at the Union mill 72.2 tons of first-class ore. Pulp assay \$262 per ton, and 598 cars second-class ore were sent to the concentrator, where 266.7 tons were concentrated. The average assay from battery was \$24.62 per ton. Received from Union Mill Company \$35,000 on account of ore and concentrates."

Esmeralda County.

(From our Special Correspondent.)

Mount Diablo Mining Company, Candelaria.—A shipment of 7,907 oz. of bullion, being the first shipment since the mill started up, has been received at the San Francisco office.

Storey County—Comstock Lode.

The extraction of ore in the Imperial Yellow Jacket, Crown Point, Belcher, and Confidence-Challenge mines, says the Virginia City "Chronicle," has been entirely suspended, owing to the low stage of water in the Carson River. It is thought the suspension of ore extraction will not last longer than is necessary to reduce the amount of ore now on hand, and operations in the mines will be resumed as soon as the water increases to such an extent as to allow the mills to resume work. All the ore on hand at the Gold Hill mines which have suspended extraction has been shipped to the river mills. That being produced at the Overman is worked at the Vivian, which mill can be better worked during the present low stage of water than any other time. A later issue of the paper says: "This suspension of the ore product in the Yellow Jacket, Crown Point and Belcher mines does not constitute a complete shut-down of those mines as many are inclined to consider. Official sources state it to be a temporary lay-off of the men employed in ore extraction for milling. About a dozen men are still employed underground in the Yellow Jacket, twice as many in the Crown Point, and 20 in the Belcher, all engaged in prospecting and regular development work, and advantage is being taken of the situation to overhaul the machinery of the surface works and put things in proper shape after the incessant run of the last year or two. The present low stage of water in the Carson River gives the opportunity, therefore the mills also are similarly shut down and undergoing necessary repairs."

Confidence & Challenge Consolidated.—The joint Confidence & Challenge north drift on the 200-ft. level is in 1,236 ft. from the Yellow Jacket shaft. The face is in quartz showing no value. The joint Confidence & Challenge west cross-cut from the north drift on the same level is out 92 ft. The face shows quartz having no value. The joint Confidence & Challenge northwest drift on the surface level is in 908 ft. from the top of the Yellow Jacket shaft, or 50 ft. from the north line of the Yellow Jacket. The face shows quartz having no value. We have been obliged to stop the shipping of ore to the mill on account of the scarcity of the water in the river; consequently no ore is being taken out of the mine. All other operations are suspended until the water in the river increases, so as to enable the mill to resume the reduction of ore, when the mine will be again started up.

Justice Mining Company.—At a meeting of the directors of this company Secretary R. E. Kelly was instructed to notify the Comstock Pumping Association, composed of Gold Hill mining companies, who are sharing the expense of draining the Gold Hill mines, that the Justice Mining Company will withdraw from the agreement in the way prescribed in the articles. The step is taken for economical reasons. The Justice mine is deriving no present benefit from the pumping, and by withdrawing it can save from \$700 to \$800 per month.

Lady Washington Consolidated Mining Company.—At the annual meeting of this company in San Francisco on the 27th ult. 88,690 shares were represented. The following directors were elected: Monroe Thompson, R. N. Graves, S. G. Whitney, J. E. Jacobus and W. B. English. Monroe Thompson was elected president, L. Osborn secretary and E. D. Boyle superintendent. The company has \$6,600 cash in the treasury. A resolution was passed instructing the directors to confer with the Consolidated New York Mining Company and arrange for working the Lady Washington through the Con. New York shaft.

Occidental Consolidated Mining Company.—The latest official weekly letter from this mine says that from the stopes on the 350, 400 and 450 levels there have been extracted and milled 175 tons of ore of the average assay value of \$21 per ton as per bat-

tery samples. West cross-cut No. 4, 750 level, has been extended 7-ft.; face in hard porphyry. East cross-cut from the Zadig drift, Sntro tunnel level, has been extended 21 ft. in vein porphyry. The mine shipped on July 20th 20,000 lbs. of ore concentrates to the Selby Smelting Works at Port Costa.

(From our Special Correspondent.)

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

Mine.	Tons extracted	Car sample assay.	Tons milled	Average bat. assay.	Bullion product for week.	Bullion shipped.	Bullion retained.
Belcher.....	295	27.19	295	27.19	\$112,715.37		
Con., Cal. & Va.	1001	29.30	980	25.22	\$15,194.98	15,200	
Crown Point..	154	20.08	154	20.08			
Occidental....	175	21.00	175	21.00	\$10,000.		
Overman.....	278	25.02	393	16.80			
Potosi.....	509	29.77	509	25.08	\$365b		
Savage.....							
Yellow Jacket	No r	epo	rt.				

¹ To Carson mint, being result of first run at the Brunswick mill.
² Making a total for the current month of \$44,023.16.
³ Concentrates of that value.
⁴ Crude bullion.

Benton Consolidated Mining Company.—The annual meeting of this company was held this week, there being 96,637½ shares represented. The following directors were elected: J. T. Hill, president; E. M. Morgan, vice-president; and E. Howard, E. Hestus and V. B. Allen, directors. The last named was re-elected secretary, and his financial statement showed a balance on hand of \$44,811.69. The company is doing nothing.

Hale & Norcross Silver Mining Company.—On Aug. 1st Judge Hebbard will hear motion to retax plaintiffs' costs. Meantime plaintiffs' counsel are preparing amendments to the proposed statement of defendants.

Lady Washington Mining Company.—At the annual meeting, held last week, there were 88,069 shares represented, when the following officers were elected: M. Thompson, president; R. N. Graves, vice-president, and J. E. Jacobus, S. G. Whitney and W. B. English, directors. L. Osborn was re-elected secretary, and his financial statement showed a credit of about \$6,000. A resolution to make arrangements for the working of the company's ground through the New York Company's shaft was unanimously adopted.

Savage Mining Company.—A meeting of the directors has been held for the purpose of acting upon the resolution, adopted at the annual meeting, with regard to the buying or leasing of a mill to crush the company's ore. Directors W. S. Wood (one of the defendants' attorneys in the Hale & Norcross case) and Mills (representing the Brokers' Combine) were appointed a committee to take the matter in hand. On Wednesday, at an adjourned meeting, Director Wood presented for the consideration of the board a contract under which bids should be received for crushing Savage ore pending any more definite arrangements with regard to leasing or buying a mill. The contract stipulated that: "The milling company shall make returns of bullion to the best percentage of the value of the ore, which, considering its character, can be obtained therefrom or is obtained by other mills working a like character of ore by the process employed in the reduction thereof, and, further, that if the milling company shall make a return not satisfactory to the mining company either by ore or pulp sample assay, then the mining company shall be entitled to call on the milling company for reclamation; and if the amount of such reclamation cannot be adjusted by agreement then it is to be left to arbitration." Mr. Mills objected very vigorously to any such contract, and plainly intimated that the board were working in favor of the Nevada Milling Company. Then the righteous indignation of the Flood and Jones delegates broke loose, and with a scorn born of conscious innocence they repudiated any such intention. None the less did Mr. Mills press for a more stringent contract, and, viewed without bias, his proposition was eminently fair. He contended that the mill company ought to be compelled to return a specified percentage of the car assay, and to support his view quoted the contract made in 1885 (this was anterior to the time of the consolidation of the interests of the Comstock luters) by Mackay, on behalf of the Consolidated Virginia Mining Company, with (Senator) J. P. Jones, representing the mill-owners. The weekly report of May 30th, 1885, showing the working of 2,009 tons of ore under the contract cited, was as follows:

	Gold.	Silver.	Total.
Per Car Sample.....	8.402	20.443	28.845
Railroad Car Sample.....	9.106	20.287	29.393
Battery Sample.....	8.169	15.536	23.705
Yield in Bullion per Ton.....	9.674	12.336	22.010

The above shows 92 86-100 of the battery assay, 76 37-100 of the mine car sample, and 75 60-100 average of the car sample and railroad car sample. Under some such specific contract, Mr. Mills argued, Savage stockholders hope to receive dividends. His brother directors did not see things his way, and his opinion was overborne.

Union Consolidated Mining Company.—The work being carried on in this mine is of a most interesting character. The west drift on the 900-ft. level has been driven 2,300 ft. into the hill, the formation being clay and porphyry, with seams of quartz. This drift has been carried by the Union, Sierra Nevada and Mexican companies, cutting Consolidated Virginia ledge known formerly as the "Burning Moscow" ledges. It is thought that from 300 to 400 ft. more will have to be made before the ledge is cut. The "Old Burning Moscow" Company became involved with the Ophir Company in a dispute which ultimately in Ophir buying the title, since which time nothing has been heard of this ledge. The showing made in West Con. Virginia, however (it joins the O. B. M. on the south), induced the three companies named to run a joint drift and tap the west ledge at greater depth than ever before.

NEW MEXICO.

Bernalillo County.

(From our Special Correspondent.)

The large bodies of refractory ore at Sandia and elsewhere in the territory have puzzled mining men ever since their discovery. The problem of reduction on an economical basis has until now defied all attempts to solve it. A New York man has, however, made so many successful tests with an invention of his own that several mining men have contributed \$30,000 for the purpose of erecting a small working plant at Albuquerque. The ore is treated by electricity in some manner not divulged. The ore is pulverized, washed and then put in an electric bath for several hours when the metal becomes free and is saved by water and quicksilver.

Grant County.

The outlook for Pinos Altos, says the Silver City "Sentinel," is brighter now than it has been for several months. The Pacific Gold Company is treating about 30 tons of ore a day in the Mountain Key mill and will start up the mill here as soon as water can be had. The Manhattan Gold Mining and Milling Company is driving the Montana tunnel, but it will be several months before it is completed. The mill will not be started until the tunnel is finished and drifts have been run far enough on the vein to insure a supply of ore for the mill.

Solid Silver Mining Company, Black Hawk.—This company is sinking a 600-ft. shaft on its property.

Santa Fe County.

A dispatch from Espanola says: "There is a party of 10 operating one of the Rudd separators machines in the Chama placers west of Espanola. They claim to be saving \$5 to the man each day. Messrs. Conger and Mackus expect shortly to start up their hydraulic plant, which has been idle for several months."

OHIO.

Sandusky County.

Woodville Oil District.—This field leads all others in the Trenton rock district, says the Fremont "News," and is one of the largest producing fields opened in the State. At present wells are being bored at 34 places. A great advantage of this field is that the oil wells are natural producers, but few being pumped. The only well "shot" is that of the Portage Gas Company No. 1, which commenced at 300 barrels per day and gradually declined until it was worthless. Since the shot was put in the well has been producing 45 barrels per day. The largest well is that of Geo. W. Barnes & Co., which produces 850 barrels per day. The field has a daily output of 6,000 barrels from the 39 completed wells.

PENNSYLVANIA.

Coal.

In view of the old complaints that coal properties hitherto have not been assessed at their real value, the Commissioners of Schuylkill County have decided to correct the inequality. The average assessment was \$90 per acre of coal property; this has been raised to \$230 per acre. The coal lands in Butler township are assessed at \$3,110,000; Mahanoy township at \$4,120,000; Porter township, \$2,121,000; Reilly township, \$2,082,000, and in Hegins township, which is now known as a farming township, the coal lands are assessed at \$2,038,000. The revenue from the Girard estate lands in this county has amounted to about \$500,000 a year. The assessment of the Girard estate property has only been about \$1,120,000. The present assessment raises it to \$2,500,000. The Philadelphia and Reading Coal and Iron Company, which has the bulk of its coal lands in Schuylkill County, is assessed at \$15,000,000. The Commissioners have commenced to hear appeals from the assessment and will not finish before Sept. 20th.

SOUTH DAKOTA.

Custer County.

Gold and Silver Extraction Company.—This company, of Denver, Colo., has leased the Gold Star mill at Four Mile, a short distance from Custer, and will operate it under the MacArthur-Forrest process, says the Deadwood "Daily Pioneer."

Golden Reward Mining Company.—The chlorination barrel which was taken out and overhauled recently is now in place and operating successfully. Another barrel has arrived from the factory and will be put in within two weeks, making four in use. The mill at present has a daily capacity of 85 tons of ore. Three Bruckner roasters and the large one designed

by John E. Rothwell are running at fullest capacity to enable the accumulation of 150 to 200 tons of roasted ore, which is being stored. The brick smoke-stack from the Bruckners is to be raised 20 ft., necessitating a shutting down of those machines for a week. The Rothwell roaster, having a separate stack, will continue to run. The Elkhorn Railroad Company will shortly commence moving the track above the building about 40 ft. further away, which will give increased space for ore storage.

Lawrence County.

Bald Mountain Consolidated Mining Company.—It is reported that English capitalists have become connected with the company. The Deadwood "Daily Pioneer" says that the Annie Creek properties are to be more extensively developed, and that the company's chlorination works at Garden City will be enlarged. The present capacity is 60 tons daily.

Columbus Mining Company.—Workings consist of a shaft 90 ft. deep and 500 ft. of drifts and crosscuts. A shoot of high grade free milling gold ore has, according to the Black Hills "Times," been discovered.

Deadwood & Delaware Smelting Company.—The Black Hills "Times" reports Dr. Carpenter as saying that the smelter is laboring under several great disadvantages which prevents the blowing in of the entire plant. The first great drawback is the scarcity of pyritic fluxing ores from Idaho due to the trouble by striking miners. The next is the scarcity of native ores for reduction, caused by the inadequacy of transportation facilities. The third the scarcity of coke. As it is, the company is working only one stack on 50 tons of ore per day.

Geyser.—A tunnel has been run in about 100 ft., where a contact of black limestone and porphyry was found. In the contact, which is vertical, large quantities of carbonates assaying 9 oz. silver and 70% lead are found.

Harney Peak Tin Mining and Milling Company.—The company has issued a mortgage to Henry Clausen, Jr., of New York; Frank Crisp, of London, and Samuel Untermeyer, of New York, as trustees, to secure the bonds issued by the company to the amount of \$4,880,000. The mortgage includes all tin, both placer and quartz, and all other property owned by the company.

Iron Hill.—This mine has been allowed to fill up with water to the 200-ft. level, as no further work will be prosecuted on the lower levels for some time. The 700-ft. drift connecting the main shaft with the Home Run shaft is now nearly completed.

Mineral Paint.—The deal involving the Two Bit mineral paint mines, owned by the Harding Bros., J. G. Keith and Browning & Wringrose, was closed July 27th, the St. Louis Paint Company, through its agents, Messrs. J. M. Allen and W. S. Meller, paying in cash \$25,000 for the properties. The sale includes beside the mine three full mineral claims which the deposit covers. The company will at once put a large force of men to work on the property, says the Black Hills "Times."

Oro Fino Mining Company.—The mine has been pumped dry to the first station, at a depth of 136 ft. The timbers were found in a good state of preservation, although the mine had been flooded for nearly two years.

Pennington County.

Welcome Chlorination Works.—The works of this company are in full operation, says the Black Hills "Times." The company recently put in a gold refining furnace.

UTAH.

Juab County.

Mammoth.—One hundred men are at work and the mine is said to be shipping enough ore to pay running expenses. According to the Salt Lake "Herald," some fine ore is being uncovered.

Silver City.—The Denver & Rio Grande Western Railroad Company has contracted for a five-mile extension up the Tintic Valley, which will carry the line to the Mammoth mill. The contract was taken by the Springfield Grading Company. It is expected that the line will be carried to the Deep Creek district.

Salt Lake County.

Bingham.—Mining in this district is fairly active. A 40-ton shipment was made by the Butterfield Mining Company July 27th. The tunnel on the Coromandel Consolidated is being vigorously driven ahead. Yosemite No. 2 sent two carloads of ore to the sampling works at Pallas Station July 26th. It is reported that the workings in the Starlus mine have improved and shipments are expected.

Copper Placer.—The mill has been completed and was started on July 27th. Some alteration will have to be made before continuous working.

Emma Company, Limited.—The old Emma mine is taking on new life. H. C. Woodrow has become the managing director, and with ample funds will develop the property as rapidly as possible, says the Salt Lake "Tribune." Already a good showing has been made toward putting the machinery in order for better working. A body of ore was recently opened in the Illinois tunnel to the left of the old bonanza. This ore is of good quality and 10 ft. across, with a streak of first-class 6 or 8 ins. running through it. The first-class ore runs above 100 oz. in silver. Work is going ahead in tunnel No. 4.

Flagstaff Mining Company.—The company has shipped 100 tons of ore, and it is estimated that it has 3,000 tons to ship such as will average over \$30 in value. Twenty to 30 tons per day are being shipped.

Jordan.—Twenty tons of concentrates have been shipped. The old Excelsior tunnel, now in 300 ft., is being driven ahead to intersect the Jackson incline.

Montezuma.—A shipment of 300 tons of ore is being made, which will average 60 oz. silver and 30% lead, while there is enough iron to make it a desirable ore to smelt. This ore comes from several pipes, which have a strike of about 30°, and range in thickness from 6 ins. to 5 ft., and up to 7 ft. high. Three such pipes are being stoped out.

Stewart No. 1.—The mill is running steadily on ore from the Peabody mine. Seventy-five tons were shipped from that mine for the week ending July 30th.

Summit County.

Daly West Mining Company.—The shaft is down to a point between the 800 and 900 levels, and it is stated no drifting will be done until the 1,200 level is reached.

Glencoe.—In the Fourth of July tunnel the face is now in 1,900 ft. On this level the drift has gone through ore for 600 ft. The ore body averages 4 ft. wide. New stopes are also being opened on the upper tunnel. In the lower tunnel ore has hitherto been taken out only by running drifts, but stoping is now being done and the two tunnels have been connected by a winze. The mill is in good condition and working about 60 tons per day into 20 tons of concentrates. These concentrates average 48% lead, 38 oz. silver and \$3.70 gold.

Silver King Mining Company.—The company has decided to erect new hoisting works and put in new machinery. The old works are being pulled down and every preparation made for the building of the new works.

WASHINGTON.

Kittitas County.

Peshastin.—The Culver, Johnson and Cascade Mining companies' properties have, now that the Johnson-Donohue controversy is settled, been sold to a Seattle syndicate for \$160,000.

Snohomish County.

Everett.—A large customs smelter will be built at this place, according to the Seattle "Mining News." The mill will be fed from the Stillaguamish and Monte Cristo districts, and from the Silver Creek, Salmon Creek and Sultan districts on the Great Northern Railroad.

Stevens County.

Bonanza.—While working on the lower levels a ledge of ore 6 ft. wide was recently found. The Spokane "Miner" reports that it is a continuous vein. Over 50 tons of ore are now being taken daily to the concentrator.

Colville.—The mines of the district are steadily improving, says the Spokane "Miner," and the output is increasing in quality and quantity. Work at the Al-Ki Mining Co.'s properties has been temporarily suspended, but development work will, it is said, be resumed within a week. The Galena has a vein 8 ft. wide from which several carloads of ore have been sent to the smelters. A tunnel will now be run in 100 ft. In the Eagle mine a body of good ore has been struck and drifting on it is being pushed. The Daisy and Young America continue to prove good properties and are making shipments to the mill.

Colville Reservation.—Secretary Noble has directed the Commissioner of the General Land Office to take steps to immediately survey the ceded lands of the Colville reservation. They aggregate 1,000,000 acres. It is stated that trespassers are already crowding into the reservation, making selections of mineral and agricultural land, and trouble is feared.

Phoenix Mining Company.—This company, owning the Phoenix and Paris Belle mines, seven miles from Colville, will commence work at once. The Paris Belle has two shafts 45 and 67 ft. respectively and a drift from the bottom 110 ft. The Phoenix has a tunnel 215 ft. long. Assays of ore, says the Spokane "Miner," average 183 oz. in silver and 40% lead.

Whatcom County.

Fairhaven Coal Fields.—These mines, owned by the Great Northern Railroad Company, are being developed. The company expects to ship 200 tons of coal and 60 tons of coke daily as soon as the road is completed. The coal is uneven in thickness, varying from 4 to 40 ft., but it seems to maintain an average of fully 13 ft. of clean coal.

WISCONSIN.

Iron-Gogebic Range.

Superior Iron Mining Company.—This mine is now shipping ore, and its force may be increased.

WYOMING.

Albany County.

Centennial.—Twenty tons of ore from the vein recently discovered will, says the Laramie "Boomerang," be sent to the Keystone mill, South Dakota, for a test treatment.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

The mineral production of this province is constantly increasing, says the Canadian "Mining and Mechanical Review." The collieries of Vancouver Island now employ 3,194 hands, and the output in 1891 was 1,029,097 tons, against 678,140 tons in 1890. From July 1st, 1858, to Dec. 31st, 1891, the province has yielded \$53,113,127 in gold. The Kootenai district is rich in silver ores, but development work is backward. It states that an 80-ton smelter is now being built at Kootenai Lake.

MEXICO.

Mexican Onyx and Trading Company.—The properties which the company are working are located on the Hacienda del Carmen, on the line of the Vera Cruz Railroad. The quarries now opened are known as the Old Salinas, New Salinas, Reforma, Palma and Blanco, from which red, green, yellow, brown, white and variegated translucent onyx are obtained. Heretofore only 500 ft. were shipped monthly to New York, but now the output is 1,500 cu. ft. Mr. Wm. Cooper, the superintendent, says that in opening the quarries he discovered old workings over which new onyx had formed 2 ft. thick. Between the new formation and the old were found ashes, charred coals and about a ton of limestone balls 5 in. in diameter. It is thought that these balls were used to roll the onyx blocks out of the quarries, probably hundreds of years ago, by the Toltecs.

Chihuahua.

North Mexico Milling and Mining Company, Limited.—A general meeting of this company was held recently in London. The chairman, Mr. Anthony Pulbrook, stated that from the ore of the old mines the company had produced about \$11,000 in five months. It then entered into negotiations with the Don Enrique Mining Company for the treatment of its ore, whereby after six months working, finding that the other company was making a profit of \$6.50 per ton, it was determined to buy the ore outright at \$6 a ton and take all risks. As soon as these negotiations had been entered into, however, the character of the ore suddenly changed, but the manager of the company, Mr. Ottokar Hofmann, with his usual versatility, was equal to the occasion, discovering immediately a new process by which the ore could be treated. This necessitated the expenditure of some \$6,000, but now, it is said, the ore is being treated at a profit. Then the ore from the La Gloria became so mixed with waste that it was too poor to be treated at a profit, and as a consequence the company lost \$2,000, but during the next three months enough profit was made to leave a profit for the six months of \$9,000. While there is not much money on hand, the company congratulates itself that they have reduced their indebtedness considerably and that the prospects seem better for the future.

Durango.

(From our Special Correspondent.)

Durango gives promise of becoming one of the most important mining States of Mexico, but at present all industries are suffering severely from the protracted drought, which has now lasted for three years, the rainfall last summer and the summer previous having been very small. Last year at the beginning of the rainy season water was still running in the mountain "arroyos"; this year all are dry, and at many villages it is even necessary to go a long distance for the water for culinary and washing purposes. The crops having failed in 1890 and 1891 on account of the drought there is now great scarcity of food in many parts of Mexico and much suffering among the poor people in consequence. Corn is now selling in the city of Durango for \$6 per "fanega" (about 2½ bushels), and in the mountains for \$9; the ordinary prices are \$2 and \$3 respectively. The other great food staple "frijoles" (beans) has gone quite beyond the reach of the mass of the people, selling for \$15 per "fanega" in Durango and \$18 in the mountains. The cattle and live stock are suffering equally much from lack of grass and lack of water. Under these circumstances it is almost impossible to secure animals for the transportation of provisions, ore, mining timber, or other heavy freight, and of course mining operations are much impeded everywhere. The moving of heavy machinery for any considerable distance would be entirely out of the question. The optimists have been predicting a heavy rainfall this season, but although there have been occasional slight showers since May 28th, it is now July 5th and there has been no general rainfall. The "haciendados" say that unless the rains come before the 22d inst. this year's crops will prove a failure also, in which case the situation in the plateaus of Mexico will be serious indeed. Already people along the main highways are picking out of the dust, kernel by kernel, the corn which falls from the passing wagons. One of the great silver mines of the State—the Promontorio—is situated in the Sierra de San Francisco about 100 miles N.W. of the city of Durango. It is owned by Senor Maximiliano Damm, of the latter place, and is said to have an immense amount of ore in sight. The high grade ore is shipped to Durango and thence to the smelters, while the low grade ore (which would be of excellent shipping grade in Colorado) is dressed and the concentrates are shipped. A wagon road, 25 miles long, has been

constructed down the mountains to the Llano de Guatimape, which is a great plain between two spurs of the Sierra Madres, stretching almost to the city of Durango, and the haul thither is easy, the llano once gained. The owner of the Promontorio has recently installed an amalgamating plant for the treatment of the tailings from the concentrating mill. The pans are now running, I believe, but the concentrating mill is idle for lack of water. There are various reports of a projected sale of the Promontorio to American or English syndicates, but none have been verified as yet. The Pittsburg & Mexican Tin Mining Company is opening three mines on its property at Potrillos, not far from Promontorio, and the Eva Mining and Milling Company, a St. Louis concern, is operating some old silver mines at Coneito, about 25 miles south of Potrillos, which was quite an important mining town in the old Spanish days. Another American company is working at San Lucas, on the road from Coneito to Durango. The Durango Steel and Iron Company, the stock of which is held largely in Des Moines, Ia., owns the famous iron mountain at the city of Durango. No work is being done at present on this remarkable ore deposit, and the blast furnace (which is not a model of construction) is idle. The company is running its foundry, however, on its accumulated stock of pig iron, and is furnishing castings of various kinds for local consumption. The fate of this enterprise is a matter for much speculation. Here is an immense deposit of iron ore of very good grade, which can be quarried from the mountain side, situated far in the interior of Mexico, a long distance from coal and coke, and with not even a sufficient supply of charcoal within reasonable distance. Perhaps an attempt will be made to bring coke to the ore after the new railway to the city of Durango is completed. The city of Durango has occupied hitherto an isolated position with respect to Mexico's railway systems, being some 200 miles from Picardias, the nearest railway point on the Mexican Central. Early in the year the Mexican International (Huntington system) commenced construction on a line from Torreon, which is the junction of the Mexican Central and Mexican International, to Durango, with the possibility of its extension across the Sierra Madres to Mazatlan at some future date. The new line was opened for traffic to Yerbániz on June 1st, and is to be completed to Durango on Sept. 16th. The advantages which it will afford to the mining and all other industries of the State of Durango are obvious.

Candelaria Mining Company.—A shipment consisting of 30 bars of bullion, valued at \$31,000, has been received at San Francisco.

Candelaria Mining Company.—The Court of Appeal has put an end to the criminal proceedings instituted by Mark Birmingham against Dan. M. Burns.

Mezquital del Oro Gold Mining Company.—At a meeting of the shareholders of this company, held at London, June 21st, it was stated that the position of the company had greatly improved during the past year, the net profit for the year being £13,038, which enabled the board to wipe off the debit of £11,000 (to profit and loss account last year), to pay the interest on debentures, and to carry forward £250.

Hidalgo.

San Rafael y Anexas Mining Company, Pachuca.—According to the official report for the first six months of 1892 the output has been nearly the same in quantity as last year, although work was once suspended to allow the erection of a new hoisting machine. The average yield of the San Rafael mine was 80.95 oz. for La Sorpresa mine it was 135.58 oz. At La Soledad mine the average weekly production of ore increased from 328 to 536 cargans of 300 lbs., the average assay value being 86 oz., against 59.2 oz. the preceding half year. The drilling capacity has been doubled and electric lights introduced.

Lower California.

Calmali Gold Mines.—Messrs. Cantrell, Rhodes and others have, it is said, made an arrangement with the owner of these mines by which they agree to develop them to a depth of 300 ft. and to pay a certain price if the ore holds out in quality to that depth. At present the deepest workings are 80 ft.

SPAIN.

New Mining Law in Spain.—The new mining law came into operation on July 1st. By this law the yearly rental of all mines is increased 30%, and imposes an additional 1% on the ore extracted. An extract from this law reads thus: "Mines of iron ore shall pay a fixed annual rent of 4 pesetas (80 cts.) per hectare. This rent must be paid from the date on which the concession is granted, and so long as the owner of the concession pays punctually this amount the government agrees not to deprive him of the ground conceded." Mines of tin, lead, copper, etc., other than precious metals, pay 10 pesetas, or \$2 per hectare. For precious metals there is a different scale, but not more in proportion. This new enactment is supposed to benefit the internal industries of Spain. Most of the ore is shipped from Spain and not refined there. British capital is mainly employed in working the mines and the railways connected with them. The laws hitherto have been the easiest and most liberal that could be desired, but this direct paying through the nose of a tax which will do no good, on the protection and

encouragement of home industries principle, will cause many small mining corporations to give up work.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, August 5th.

Heavy Chemicals.—The heavy chemical market continues quiet. There is a steady consumptive demand for the various chemicals, and the aggregate business now doing is quite fair, but, owing to the causes which we have mentioned for some time in this column, there are no new features; it is due to the latter fact that dealers continue to report a very quiet market. During the week under review there has been a better demand for alkali, which article is now firmer in prices and scarcer; contracts for delivery extending into 1893 have been made. An improved demand may be reported also of caustic soda. Our quotations this week are as follows: Caustic soda, 60%, 3-17½@3-20c. 70%, 2-95@3-12½c.; 74%, 2-97½@3-12½c.; 76%, 3-12½@3-25c.; 77%, 3-12½@3-25c. Carbonated soda ash, 48%, 1-60@1-62½c.; 53%, 1-52½@1-55c. Alkali, 48%, 1-50@1-55c.; 53%, 1-47½@1-52½c. Sal soda, English, 1-07½@1-15c. American, 1-05@1-10c. Bleaching powder, 2-15@2-20c. on the spot, according to quantity.

Acids.—There is nothing new to report of the acid market. Manufacturers continue busy with orders for current consumption, but prices are absolutely unchanged. We quote: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@2 according to quality; muriatic, 18", 80c.@\$1.20", 90c.@\$1.10; 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, 11½@12½c., according to quality and quantity.

Brimstone.—The usual amount of trading is being done in this market. Cable advices from the other side report that the market is firmer. Quotations this week are as follows: On the spot, best unmixed seconds, \$24.50; best unmixed thirds, \$23.50; To arrive, best unmixed seconds, \$24; best unmixed thirds, \$23.

Fertilizers.—A better feeling is noticeable in the market for fertilizing chemicals, especially in the case of ammoniates. There has been an improved demand and more buying of crude material has been done during the week. As yet, however, there have not been many shipments of manufacturers' goods. We quote this week: Sulphate of ammonia, \$2.85 for bone goods and \$2.90@2.95 for gas liquor. Dried blood, \$2 per unit for high grade and \$1.90 for low grade; acidulated fish scrap, \$13.50 f.o.b. factory; dried scrap, \$23. Azotine, \$1.95. Tankage, \$18@22, 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-vessel New York: 48-53%, \$1.13½@1.23½; 90-95%, \$2.13@2.23½.

Kainit.—The market for kainit is very quiet. Prices remain \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia.

Muriate of Potash.—Arrivals during the week aggregated 500 tons. Sales amounted to 100 tons to arrive. The prices fixed by the Sales Syndicate prevail as follows: Fifty-ton lots or over, New York and Boston, \$1.81½; Philadelphia and Baltimore, \$1.84; Southern ports, \$1.86½.

Nitrate of Soda.—Quotations are \$1.70@1.72½ for both spot and nearby.

Liverpool. August 4.

(Special Correspondence of Joseph P. Brunner & Co.)

The trade in heavy chemicals is in rather a stagnant condition at present, and very little is moving.

Soda Ash.—There is practically nothing to be had for prompt delivery and very scarce to the end of the year. On account of scarcity quotations are quite nominal, as follows, viz: Caustic Ash, 48%, £5 6s. 3d. per ton; 57@58%, £6 7s. 6d. per ton; Carbonic Ash, 48%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d. per ton.

Soda crystals are selling at £3 7s. 6d.@£3 10s. per ton, less 5%, but there is no active demand. Caustic Soda is rather quiet again and not much doing. The only new feature to report in this article is that the Alkali Company lately included Canada in their list of shipping "bars." On the spot we quote: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s.@£12 10s. per ton, net cash. For parcels under 10 tons 5s. per ton extra is charged.

Bleaching powder is selling at £7 15s.@£8 per ton for hardwood packages, for all quarters except United States and Canada.

Chlorate of potash has gone rather dull, and for prompt delivery we quote 6¼d.@6½d. per lb. less 5%, while these figures are about nearest values for August, December. For the last three (3) months resellers could probably be found at 6¼d. per lb. less 5%.

Bicarb. soda in request at £6 15d. per ton less 2½% for one cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia is disappointing and holders show more disposition to force sales, the result being that quotations are rather easier at £10 2s. 6d.@£10 3s. 9d. per ton for good grey 24%, and £10 7s. 6d. for 25%, both in double bags less 2½% f. o. b. here.

increase in their wages. Most of the miners never care to make over a certain amount per week in wages, and they knock off work when they have excavated sufficient to bring up their wages to this point. If their price per ton increases they knock off earlier, as they have to raise less coal in order to bring their earnings up to the level they expect. Consequently a restriction of output with higher prices does not disturb them at all.

The Philadelphia & Reading Coal & Iron Company give the following prices at loading points:—

	Broken.	Egg.	Chestnut.	Stove.
Hard White Ash.....	\$4.00	\$4.30	\$4.40	\$4.50
Free White Ash.....	3.90	4.20	4.40	4.50
Shamokin.....	—	4.40	4.40	4.70
Schuylkill Red Ash.....	—	4.45	4.65	4.85
Lorberry.....	—	4.45	4.65	4.85
Lykens Valley.....	5.00	5.50	5.00	6.00

On Monday last the decision was given in the case of Gummere and others versus the Philadelphia & Reading Railroad, brought in the Northampton County Court. The plaintiff applied for a receiver for the Lehigh Valley Railroad because of a conspiracy to ruin that property in the interest of the Philadelphia & Reading Railroad; they also applied for a preliminary injunction against the lease of the Lehigh Valley by the Philadelphia & Reading, on the grounds that the lease was illegal, owing to the lines being parallel and competing. The first petition was dismissed as absurd, and the second was dismissed because it would do the plaintiff no good, and work injury to the Philadelphia & Reading. As regards the latter argument, it may be said to involve two questions, first, whether the directors had power to make the lease, and, second, whether the roads are parallel and competing. The presiding judges said they could not take upon themselves the responsibility of deciding these points, and that they would eventually have to be settled by the Supreme Court of the State. They also gave utterance to their disappointment in not being able by law to arrive at a different decision, for they shared the opinion of the people in general in disliking the hot race after dividends at the expense of the public.

The litigation in the New Jersey courts has not progressed at all lately. All the Reading briefs are not yet in. The case will drag on a long time yet; in fact, the Reading people themselves put down one year as the probable extent of time devoted to it.

NOTES OF THE WEEK.

The Potomac Valley Railroad, an extension of the Western Maryland Railroad, was opened for freight traffic this week. The road extends from Williamsport, on the Western Maryland, to Cherry Run, in West Virginia, where it meets the main line of the Baltimore & Ohio Railroad. By this the latter system will be given a direct connection with the Reading road, thus forming a continuous line east and west for these two systems. This connection will be made at Shippensburg, Pa., where the Western Maryland connects with the Reading road.

The old scheme for the building of a railroad from Tomhicken, the terminus of the Sunbury, Hazleton & Wilkes-Barre road in the Lehigh coal region, to Port Jervis on the Erie Road in New York, was formerly revived in Philadelphia on Wednesday. The line is really a continuation of the Sunbury, Hazleton & Wilkes-Barre road as originally planned by S. P. Chase. The Sunbury, Hazleton & Wilkes-Barre was stopped, however, at Tomhicken. It fell into the control of the Pennsylvania Railroad Company, and the unfinished portion, now owned by what is known as the Pennsylvania, Lehigh & Eastern, has been the subject of litigation of different forms for many years.

The distance from Tomhicken to Port Jervis is 109 miles, and the line, if built, would reduce the rail route to New England from the anthracite coal region about 50 miles. The idea in reviving the project now is believed to be to effect a sale of the enterprise. The capital is \$10,000,000.

The Shippen and Wetherill tract of coal land, lying about one and a half miles west of the Philadelphia & Reading Railroad, near Brockville, has been bought up by Benjamin S. Lyman, of Philadelphia, who has associated with him A. D. W. Smith, of Kingston, Pa., formerly of Pottsville. The tract covers about 215 acres, and is underlaid with the Skidmore, Buck Mountain, Orchard, Lykens Valley and Mammoth veins, the best veins in the anthracite regions. It is said that the deposit contains 9,000,000 tons. These pits show an excellent quality of coal, varying in thickness from 3 to 15 ft. When the colliery is in full operation, the coal shipments will aggregate 1,000 tons per day.

It is proposed to build a railroad up the Delaware Valley from Stroudsburg, Penn., to Port Jervis, and to extend the Port Jervis, Monticello & New York Railroad from Summitville, the present terminus, to Kingston, Pa. The ultimate object is the consolidation of the various routes proposed under one company, to be known as the Philadelphia & New England Railroad Company. This line will afford a connection between the Philadelphia coalfield and New England.

Bituminous.

In the bituminous coal trade the demand from contractors is slightly increasing, though there are very few orders from new customers. The supply of cars on all the railroads is very poor, in fact poorer than it has been for sometime. The supply of vessels, however, is good. Freights from Philadelphia to Providence are particularly low, and stand now at 65 cents. From Philadelphia to Sound

ports freights are 65-70, to Boston 70 cents and to Portsmouth 75 cents. From Baltimore, Newport News & Norfolk the freights are the same. The local market for bituminous coal shows no change. Consumers and retailers are taking regular amounts.

A report was circulated in the city during the beginning of the week that a strike of 1,100 men had taken place at one of the Berwind-White collieries. On inquiry at the Berwind-White offices, however, we found that this report was false. As a matter of fact the men did cease operations in order to hold a meeting to consider matters akin to strikes, but they went to work the next day. There has been a very uneasy and restless feeling among miners in the bituminous districts for some years and the Homestead affairs have been making the men more restless lately. At present, however, there is no prospect of a strike at any of the collieries.

Boston. August 4.

(From our Special Correspondent.)

The coal market has not changed since last week. The trade here is satisfied with the action of the sales agents in letting July prices remain unaltered for August. It is very doubtful if the market could stand an advance now, as there is so little business and the New York stocks are so large. The limiting of the production for August to 3,000,000 tons is thought a wise move generally, as this will undoubtedly be a dull month. Prices, though unchanged, are very firm.

We quote f. o. b. prices at New York: Stove, \$4.50; egg, \$4.20; free broken, \$3.90; chestnut, \$4.40. Lykens Valley (at Philadelphia), broken, \$4.75; egg, \$5.25; stove, \$5.75; chestnut, \$4.75.

In bituminous coal business is slack. It is difficult to say anything about the market. Most of the business is being done on old contracts. We quote: Clearfield, \$3.15; George's Creek, \$3.45 per ton on cars here.

Freights as a rule are easier. In some cases they are lower. From New York to Boston they are from 65 to 70 cts. From Baltimore to Boston they range from 75 to 80 cts. From Newport News to Boston they range from 70 to 75 cts.

The retail dealers have decided to leave the old prices alone, as no advance was made in a wholesale way. They all feel as though they should meet another advance by an advance.

We quote: Stove, \$6; nut, \$6; egg, \$5.75; furnace, \$5.50; Franklin, \$7.25; Lehigh egg, \$6; Lehigh furnace, \$6.

Buffalo. August 4.

(From our Special Correspondent.)

The anthracite coal market is very quiet; quotations unchanged and no special incidents to report. Bituminous coal is moderately active with prices shaded at times to effect sales. The stocks are ample—much too large for the requirements of trade. The harbor towing of canal boats is so light now that many tugs have laid up, thereby lessening the consumption of fuel. Lake freights are steady and the movement of coal is not heavy.

The following statistics are interesting, showing the coal trade of this port thus far this season and other particulars: Railroad receipts and shipments of coal at Buffalo are not published by request. Receipts of coal by lake thus far this season none. Shipments of coal by lake westward for month of July 425,785 net tons, as compared with 311,500 net tons in 1891 and 244,320 net tons in 1890; for season to August 1st, 1,194,215 net tons, as compared with 1,144,250 net tons in 1891 and 841,200 net tons in 1890. The receipts of coal by canal for month of July 4,482 net tons, as compared with none in 1891 and 5,666 net tons in 1890; the shipments 1,893 net tons as compared with 6,146 net tons in 1891 and 1,887 net tons in 1890. The total receipts by canal of coal for this season to Aug. 1, 4,491 net tons as compared with 481 net tons in 1891, and 8,180 net tons in 1890; the shipments 15,219 net tons as compared with 16,849 net tons in 1891, and 3,400 net tons in 1890. The aggregate shipments of coal westward by lake thus far this year as compared with 1891 show an increase of 49,965 net tons, and with 1890 an increase of 352,925 net tons. Freights on coal hence to Chicago during July, 1891, were 50c., and to Duluth 30c. per net ton; this year 60c. and 30 @ 35c. respectively.

The shipments of coal by lake from Buffalo this season to Aug. 1 were distributed about as follows:

Buffalo to	Net tons.	Buffalo to	Net tons.
Chicago.....	418,730	Ashland.....	5,350
Milwaukee.....	254,955	Bay City.....	9,730
Duluth.....	93,958	Saginaw.....	19,350
Superior.....	75,535	Sheboygan.....	3,640
Gladstone.....	24,150	Escanaba.....	1,450
Green Bay.....	18,475	Marquette.....	14,835
Racine.....	14,475	Marinette.....	650
Toledo.....	36,885	Manitowoc.....	5,240
Detroit.....	7,200	St. Ignace.....	200
St. William.....	6,780	Menominee.....	2,108
Algona Mills.....	1,110	Windsor.....	1,910
St. Clair.....	1,420	Marine City.....	640
Alpena.....	300	Cheboygan.....	1,050
Pt. Huron.....	3,320	Kenosha.....	2,260
S. Ste. Marie.....	775	Traverse City.....	400
Kincardine.....	480	Hancock.....	600
Owen Sound.....	460	Vessels from Tonawanda not reported in addition to above.....	—
Pt. Dover.....	764		

Freights on coal by canal hence to various points during July were as follows:—1 load to Syracuse 50c., 11 loads ditto 45c., 1 load to Utica 60c., 1 load to Oriskany 55c., and 1 load to Warners 45c.; all gross tons, and free on and off.

Freight on coal by lake during July hence to various ports were as follows,—60c. to Chicago, Mil-

waukee and Green Bay; 35c., 30c., 35c. to Duluth and Lake Superior ports; 65c. to Sheboygan; 70c., 65c. to Racine; 40c. to Faginaw; 35c. to Bay City, and 25c. to Toledo and Detroit per net ton free on and off.

Chicago. August 4.

(From our Special Correspondent.)

The coal trade here was surprised at the action of the sales agents in deciding not to advance the price of anthracite for August. It has had the effect of causing an almost entire suspension of business, which, during the earlier part of last week, was becoming somewhat active. Said one large jobber: "The non-advance has certainly blocked trade; the public look upon it as a sign of weakness, and country dealers and retailers are again withholding orders." Shippers' solicitors are most persistent in their efforts in canvassing the trade for orders, which is taken as an indication that, notwithstanding the claims made of shortage of cars, they can manage to get all they require in a pinch. To an outsider it would seem that business was not as brisk as the combined companies have claimed it to be, or they would call in some of their salesmen. If the true inwardness of the situation could be probed and ascertained, we believe that we should find that cars are plentiful enough to supply all demands, and that, in point of fact, the companies are in actual need of business.

Buyers have no difficulty in obtaining all they want at short notice. Since the first proximo, the truth is trade has been very dull and shippers are beginning to entertain grave doubts as to their ability to maintain a tonnage equal to that of last year. At the same time it must be confessed that business is nearly always quiet during the earlier part of the month, and so far August is no exception to the general rule. Dealers evidently feel they have nothing to lose by waiting 10 or 15 days, and after the 15th there will probably be a stronger demand from all sources. Retail trade is very light just now, some of the largest distributors having only a few teams busy, and prices are being slightly shaded.

Bituminous coal is improving in demand, and orders are certainly enlarging. Probably the most notable feature in the soft coal trade is the increased number of inquiries for Eastern as well as Indiana grades to take the place of hard coal for steam raising purposes. It is an assured fact that for domestic use many consumers have already decided to revert to the better qualities of bituminous coal. Country trade is increasing in a quiet way, though of course there is no sort of activity to it. The outlook for soft coal is very promising; the tonnage will be large and prices later on will be stronger and higher. This fad of circulars every month is very absurd, as prices in nearly every instance are cut and slashed right and left. We know that in some grades of Illinois coal which bear a good reputation as steam raisers are being sold practically at cost. With some of the mining companies tonnage is all that is cared for, in some instances so much so that prices are entirely "out of sight."

Coke is quiet and without special features of comment. Consumption, though light, is steady, and as soon as the mills in this vicinity get started up, improvement will be on hand. Further inquiry is noted for domestic sizes of crushed coke, and we believe there is a future for this fuel here.

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, \$5.90; 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, are: Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90 @ \$2; Brazil block, \$2.35.

Pittsburg. August 4.

(From our Special Correspondent.)

Coal.—As noted in our last report, coal shipments by water from this port have been suspended until there is a rise in the Ohio. Prices in Cincinnati, Louisville and the Southern markets are very unsatisfactory; coal men expected an advance when low water set in, but no advance is in sight, yet sales are reported very slow even at the old prices. Shipments to the lakes are very much crowded, owing to overstocking and the scarcity of vessels. Of course no coal is being shipped to the valleys, and very little is wanted here.

Connellsville Coke.—The trade during the week showed an increase of 45 cars all told; this was divided between the East and the West. The Frick coke company has closed down 200 ovens. In their running order of its active plants, the company averaged a fraction over four days as against four and one-sixth days the previous week. Of their 22 plants in operation 15, with 2,685 ovens, made five days; the other plants, with 1,864 ovens, made four days; the three plants of the United Coal and Coke Company on good ovens, with 326 in blast, made five days.

The McClure Coke Company worked only 4 days at their 8 plants, with 1,431 ovens, against 5 days the previous week. The 4 plants of the Southwest Company, with 1,202 active ovens, made their usual 6-day run. Foreseeing that the lockout of the iron workers in the Pittsburg district must needs be a long one, preparations continue to be made for curtailed production. Week's shipments distributed as follows: To Pittsburg, 1,800 cars; points east of

Pittsburg, 1,400 cars; points west of Pittsburg 2,700 cars; total 5,900 cars. Western shipments gained 35 cars; Eastern, 160; Pittsburg fell off 150 cars.

METAL MARKET.

NEW YORK, Friday Evening, Aug. 5, 1892.
Prices of Silver Per Ounce Troy.

July.	Sterling Exch'ge.	London.	N. Y. Centa.	Value of sil. in \$.	Aug.	Sterling Exch'ge.	London.	N. Y. Centa.	Value of sil. in \$.
30	4'88½	39 1/16	85¼	*658	3	4'88½	39 1/16	85¼	*658
*1	4'88½	39 1/16	85¼	*658	4	4'88½	39	85¼	*658
*2	4'88½	39 1/16	85¼	*658	5	4'88½	38 1/16	85	*657

* August.

The London market has been marked by extreme dullness, and owing to lack of any supporting order prices has gradually given away, until to-day it is quoted in London at lowest figure on record, 38 1/16 pence.

The supply here continues slightly in excess of Government purchasers, so our market follows the decline in the London market.

The United States Assay Office at New York reports the total receipts of silver for this week to be 93,000 ounces.

Government Silver Purchases.

WASHINGTON, D. C., August 5th.—(By Telegraph.)—The Treasury Department purchased to-day 567,000 ounces of silver at '8540 per ounce fine.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars.....	67¼	.68
Peruvian soles and Chilean pesos.....	.62½	.63½
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.

	Exports.		Imports.	
	Week ending July 30.	Since Jan. 1.	Week ending July 30.	From Jan. 1.
Gold.....	\$3,974,500	\$49,780,373	\$18,303	\$6,611,751
Silver.....	374,325	12,710,115	18,799	1,044,171
Totals.....	\$4,348,825	\$62,490,488	\$37,101	\$7,655,922

At this time in 1891 there had been exported \$74,760,770 in gold and \$8,136,218 in silver against imports of \$2,507,763 in gold and \$1,249,370 in silver. Of the gold exported last week all but \$23,000 went to France; the silver went to London. Of this year's exports of gold Germany has taken \$19,557,350; France, \$16,310,228; England, \$6,202,143; the West Indies, \$6,624,099, and the balance scattering.

NOTES OF THE WEEK.

It is said that the names of the American and English delegates to the International Silver Conference will be simultaneously announced during the ensuing week. It has been frequently mentioned that President Harrison will appoint Senator Jones, of Nevada, to this responsible position, which, if true, is to be sincerely deplored. Senator Jones' views on silver, biased by his connection with the silver mines of Nevada, will not inspire confidence in our cause, either here or abroad; at the same time the history of his connection with the Comstock mill ring cannot fail to inspire a personal disrespect detrimental to his usefulness as a delegate. It is currently reported that Gen. Francis A. Walker will be selected as one of the representatives, and no better selection could possibly be made. Governor McCreary, Judge Culbertson or W. C. Breckinridge are also named as possible appointments, and they would be acceptable.

The British Government will appoint five delegates, of which two will represent the interests of India. It is more than probable that Chancellor Goschen will himself be a delegate. The meeting will take place at Paris or Brussels some time in September.

A recent cable from London states that Mr. Walker, Secretary of the Indian Currency Association, has written a letter to the Finance Minister of India suggesting that in case the conference fails to attain its object, that India form a direct agreement with the United States to maintain the stability of silver. No doubt England would be glad to have the United States make such a foolish bargain, but there is not the slightest fear that such a stupid policy will be adopted by our government.

Among contributors to a solution of the silver question, the latest is the eminent statistician Dr. Soetbeer. In an article in the Vienna *Neue Freie Presse* of August 2d he recommends that the conference should agree that no gold coin containing less than 2'8065 grammes of fine gold be coined or circulated in the contracting countries; that silver be coined in the ratio of 20 value units of silver to 1 of gold; that silver be legal tender up to \$20 only and that silver coins below the standard fixed be withdrawn from circulation.

The present market price for silver gives a ratio of 24'12 to 1 of gold and it is quite certain that if the Sherman Bill of 1890 be repealed the price of silver would fall still lower, possibly giving a ratio of 30 or 35 to 1.

Copper.—There is no new feature in this article, the market remaining very quiet. Manufacturers, especially those who have a little copper on hand do absolutely nothing, a policy hardly calculated to create a better feeling. In view of this fact, and also as speculation is entirely absent, the market is slightly lower, some little copper having changed hands at 11'65, with more offered thereat than buyers could be found for. Casting copper remains unchanged at 10½c. delivered—say 10'55 at refiner's works. Arizona pig remains unchanged at 9¼ @ 10c., but these are to be considered nominal figures as no business has been done, prices being too high either for home or export trade. We understand that some of the mining companies are accumulating their output either at the mines or elsewhere. The absence from the market of this copper, important sales of which have not been made for sometime past, is not yet felt. Monday was a holiday in London, but on Tuesday G.M.B.'s opened at £44 15s. for spot and £45 5s. for futures, while the closing figures of £44 12s. 6d. @ 15s. and £45 2s. 6d. @ 5s. show a loss of 2s. 6d., stocks for the last half of July showing an increase of 800 tons.

Tin.—After more than following the decline in London, early in the week prices here had reached to 20'40 for spot and 20'75 for futures, but the turn for the better abroad brought up prices here to the extent of per pound, the closing quotations being 20'70 for spot and 20'90 for futures. As prices here had been unduly depressed, it was only natural that the movement upward should have been exaggerated, but as prices have not yet reached the parity of those abroad, we should not be surprised at a further and even more pronounced advance; provided the market abroad does not weaken and undermine the confidence now gaining ground.

On Tuesday the opening prices in London were £97 @ 2s. 6d. for spot and £96 12s. 6d. @ 15s. for futures, from which prices there has been a decline to the closing figures of £96 2s. 6d. @ 5s. for spot and £95 10s. @ 12s. 6d. for futures. The statistics show increase of 1,700 tons.

Lead.—There has been a little more activity this week than there was last, and several hundred tons have changed hands at about \$4.10, but there remain sellers at that figure, manufacturers having taken in all they require for present wants and withdrawn from the market. To-day the price has again declined to \$4.05. While the condition of the lead market is sound, business in general is not very satisfactory, and though supplies of lead are not excessive they are ample to meet the demand, so there is little prospect of a material improvement. The London market for Spanish lead is £10 7s. 6d. @ 8s. 9d., while English is quoted at 2s. 6. more.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: "Lead is quiet but steady at 3'95c. Neither buyers nor sellers are making any special effort to trade."

Spelter continues in fair demand for early delivery, sufficiently so to maintain present prices of \$4.50, East St. Louis or \$4.70 New York, while for later deliveries the demand is not so active at \$4.45.

Antimony.—We quote Cookson's at 14 L. X. at 12 and Hallett's at 10½.

Nickel is steady at 60c.

Quicksilver.—This market is quiet. Only the usual amount of business is being done. Quotations are as follows: New York, \$40@41; London, £6 15s.

IRON MARKET REVIEW.

The state of affairs in the Pittsburg strike is hopeful. Some hundred non-union men have commenced work in the Homestead mills; in fact there are as many men employed as house room can be found for inside the inclosure. The Carnegie officials think that the union men will give in soon, and this opinion is shared by independent parties. The strike leaders are indicted for murder and outrage, and the men have retaliated by indicting the Carnegie officials in a similar way. There is no case however against the officials. As far as can be seen at present, the strike is in a fair way for settlement in the employers favor.

Pig Iron.—The following tables give the estimated output of the blast furnaces for the week ending Saturday, July 23d, 1892, and for the first 29 complete weeks of the year 1892 up to and including July 21st, together with the output for the week ending Saturday, July 22d, 1892, and for the first 29 complete weeks of the year 1891 up to and including July 20th, 1891:

ESTIMATED OUTPUT OF BLAST FURNACES FOR WEEKS ENDING JULY 23D, 1892, AND JULY 22D, 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.	
1892—	74	32,000	140	127,000	42	10,700	256
1891—	92	36,900	152	121,600	51	10,700	295

ESTIMATED OUTPUT OF BLAST FURNACES IN 1892 AND 1891 FOR FIRST 29 WEEKS UP TO JULY 21ST AND JULY 20TH, RESPECTIVELY.

	Anth'cite. Gross tons.	Coke. Gross tons.	Charcoal. Gross tons.	Total. Gross tons.
To July 21st, 1892.	1,427,639	3,968,142	312,015	5,308,156
To July 20th, 1891.	1,193,100	2,600,900	319,200	4,113,200

These figures have been corrected by the official figures for the first six months of the year, published by the American Iron and Steel Association.

If anything the pig iron market is weaker this week. Almost every consumer is holding off in the expectation of lower prices and refuses to go beyond current monthly supplies. Producers are feeling doubtful about the ability to enforce present prices. In fact several lots of Pennsylvania brands have been disposed of at 50 cents below the schedule price, \$15. This weakness in the market is due to the decrease in consumption. Although the production is gradually becoming smaller the pig is being stacked in large quantities at the furnaces. When the consumption begins to increase again, as it will when the labor difficulties are surmounted, the large quantity of stocks will greatly interfere with the reinvigoration of the pig iron trade. The market here for Southern irons is dull with the exception of grey forge, though even in this department the schedule price, \$9 at mill, has to be shaded to \$8.75 before any business is done.

Spiegeleisen & Ferromanganese.—There have been no transactions in ferromanganese during the week, and no large lots of ferromanganese have been sold. The price of 80% ferro is still quoted at \$60.61, but \$58.50 is likely to be obtained from some dealers.

Steel Rails.—No transactions in steel rails are reported this week. The railroad companies evidently do not consider the present time a suitable one for extending their lines nor for renewing their roads. Prices, however, are firm at \$30 at mill.

Rail Fastenings.—There have been no sales in rail fastenings this week. Prices are as follows: Fish and angle plates, 1'55@1'65c., at mill; spikes, 1'90@2c.; bolts and square nuts, 2'50@2'70c.; hexagonal nuts, 2'70@2'80c., delivered.

Tubes and Pipes.—There is nothing new in the market for tubes and pipes. New orders do not come in fast and the trade is quiet.

Merchant Iron and Steel.—The state of this market is not so good as sellers desire. Most of the lots disposed of are small and this number is not great. Special steel for agricultural machinery is a good trade at present, as is usual at this time of year. There is no variation in prices, which stand as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6¼@7¼c.; special grades, 13@18c.; crucible machinery steel, 4'75c.; crucible spring, 3'75c.; openhearth machinery, 2'25c.; openhearth spring, 2'50c.; tire steel, 2'25c.; toecalks, 2'25@2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Material.—The market for structural material in this district still continues good, firm and producers are very well satisfied. So well filled are the mills with orders that deliveries are slow. There does not appear to be any prospect of the demand slackening for some time, and producers are expecting to be busy for the next two months. Prices are well maintained and are fairly stiff, but no alterations can be noted above last week's rates which are as follows:

Beams, 2'22@3c.; angles, 2'15c.; sheared plates, 1'90@2'10c.; tees 2'40@2'60c.; channels, 2'35@2'50c.; universal plates, 2@2'10c.; bridge plates, 2@2'10c.; all on dock.

If the Pittsburg labor difficulties are settled soon, some of the fullness of business here will disappear within the next month or two. The housemiths strike in this city is stopping the business of some of the large producers, but the small producers have all given in.

Buffalo. August 5.

(Special report by Rogers, Brown & Co.)

There is little more activity to be noticed, some one or two good-sized sales having been made. A little more disposition to consider prices on the part of buyers is also apparent. One of the most demoralizing effects on the present market is produced by a circular letter asking for offers on a special lot of iron, no prices being named. We continue to quote the prices of last week as a fair indication of the present market. Terms cash f. o. b. cars Buffalo: No. 1 X Foundry Strong Coke Iron Lake Superior ore, \$15.25; No. 2 X Foundry Strong Coke Iron Lake Superior ore, \$14.25; Ohio Strong Softener No. 1, \$15.50; Ohio Strong Softener No. 2, \$14.50; Jackson County Silvery No. 1, \$17.30; Jackson County Silvery No. 2, \$16.80; Lake Superior Charcoal, \$16.50; Tennessee Charcoal, \$17; Southern Soft No. 1, \$14.15; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

Chicago. August 4.

(From our Special Correspondent.)

The victory practically won at Homestead by H. C. Frick is the most serious blow the Amalgamated Association has yet received, and some concerns here, large employers of skilled labor, working under the scale, believe it to be the beginning of the end. In a great measure the Association has out-

lived its usefulness, or rather has arrogated to itself powers and authority foreign to the policy with which it was started. It has lost the support of the largest steel employers in this country, and in that will be its death blow. The Belleville Steel Company, Belleville, in the southern part of this State, and the officers of the Amalgamated Association, have come to an understanding, and the scale was signed July 30th. The works were resumed in nearly all departments this week. The crude iron market is dull, and Southern brands are particularly weak, in fact all but demoralized on some of the cheaper grades. Demand in a general way runs very largely to small quantities, such as usually characterizes the market at this season. In Lake Superior charcoal iron more steadiness is noted, and this grade is stronger on account of the well sold up condition of many of the larger furnaces. Finished iron and steel is in good demand for quick shipment, and there will soon be a better supply, as mills the country over are resuming operations.

Pig Iron.—The tonnage of local coke iron sold during July was satisfactory to furnaces and exceeded that of last year. Beyond a few contracts for from 500 to 1,500 tons there has been little doing in this class of iron, and producers here say they look for no improvement in demand until September. Orders run mainly to carloads, and from those upward to 50 or 100 tons. Lake Superior charcoal iron displays more real firmness than any other grade of crude iron, due largely to heavy selling during the past 60 days and to the fact that some consumers have yet a good tonnage to place. Values are now so low on Southern iron that agents say there must soon be a change for the better, despite which buyers practically dictate prices and nearly always find willing agents to concede. Some of the stronger furnaces refuse further concessions, preferring to let the business go by. At the same time there is nothing in the outlook on which to base hopes of a radical improvement in demand, anyhow, for several months.

Quotations per gross ton f. o. h. Chicago are: Lake Superior charcoal, \$16.55@17.00; 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, \$14.50; No. 2, \$13.25; No. 3, \$12.75; Southern coke, soft, No. 1, \$13.25; No. 2, \$12.75; 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.—Makers are pretty well sold up on rods and price steady at \$34.50. Billets are dull at \$24 @ \$24.50.

Structural Iron and Steel.—Some contractors have been nipped rather sharply by the rise on beams. Prices on contract work are merely sufficient to cover prime cost of material and the advances made are of no benefit to contractors. Inquiry continues good. Regular quotations, car lots f. o. b. Chicago, are as follows: Angles, \$2@2.25; tees, \$2.30@2.40; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.25@2.50.

Plates.—Demand from warehouses is improving and there is some inquiry for mill lots. Increased demand is noted for crucible firebox steel for locomotives. 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 1/2 in. and smaller, 60%; 7 in. and upward, 70%.

Merchant Steel.—Further large contracts from implement makers are noted, but they are becoming fewer each week, as most of them have placed their requirements. Tool steel is in good demand from all sources. 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 it is almost impossible to handle the mill orders offering and make satisfactory deliveries. Discounts are steady at 70 on mill lots, and 67 1/2 off on Juniata, and 67 1/2 and 5% off on charcoal from warehouse.

Black Sheet Iron.—Demand continues active and some mills are well booked up. Quotations remain steady at 2-90@2-95c. for No. 27 Common, f. o. b. Chicago. Steel sheets are 10c. higher. Dealers quote 3-10@3-20c. from stock, same gauge.

Bar Iron.—Specifications for iron are in the market for 2,500 cars—box and gondola—for the Illinois Central and the Louisville & Nashville railroads. General demand is fair in 100 to 250 ton lots, and quotations on such are steady at 1-63@1-65c., Chicago. Demand from warehouse is large at 1-90@2c.

Nails.—Steel cut and wire nails continue in good demand from mill, and prices firm at \$1.60; 30c. average for the former and \$1.70 base for the latter. From stock, wire are quoted at \$1.80 and cut nails \$1.70.

Steel Rails.—The tendency of railroads is to cover for immediate requirements only, and recent orders have been limited to lots of 1,000 to 2,000 tons. The outlook for crops is such that larger orders are expected later. Standard sections are steady at \$31@32. Small orders for other track supplies are nu-

merous 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.—Very little doing and dealers look for no improvement until mills fully resume. Prices entirely nominal. No. 1 railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$9.50; fish plates, \$17; axles, \$19; horseshoes, \$15.50; 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; coil steel, \$14; leaf steel, \$15; tires, \$14.50.

Old Material.—Brokers and agents hold iron rails at \$18. The Western Pacific Railroad sold 500 tons Duluth delivery, at \$17. Old steel rails are held \$12@14, according to length and condition. Old car wheels are very dull at \$14.50@14.75.

Louisville. July 30.
(Special Report by Hall Brothers & Co.)

There is nothing especially new to be said about the pig iron market. Buyers are still dictating prices and terms and always find submissive sellers. This, too, is not confined to cases of sellers of urgent wants for quick shipment, but applies to long extended deliveries as well. Under all circumstances it is not surprising that each week discloses evidence of further slash in prices, which, in some cases, are known to be considerably below cost of production, and the all-absorbing question is how long can this be endured.

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@20.50.

Philadelphia. Aug. 4, 1892.
(From our Special Correspondent.)

Pig Iron.—A general improvement, though not of very large dimensions, has set in during the past few days, and inquiries for future wants are also more numerous, larger quantities of iron being asked for. There is not the first symptom in price and none is expected. Makers are too anxious to sell, and looking for orders at current rates. Considerable Southern iron is being offered, and those representing it say they are making good sales. Founders are buying quite freely, though a little slow for later than thirty days delivery; No. 1 is \$15; No. 2 \$13.50 to \$14. Forge, bottom price for poor stuff, \$12.50. Southern is sold at \$14.25; Northern, \$13.50.

Muck Bars.—Muck Bars have improved within two days, but after all buyers hang back without good reason. Makers think an upward tendency will come soon, but their orders to date show hot-ton July quotations.

Steel Billets.—A large amount of business has been done for early delivery; in fact, this is the only kind of business now considered. Quotations have been asked for for sixty day deliveries, but no sales have yet been made. Quotations may be given at \$26@26.25.

Merchant Iron.—Several mills have started up, and several more will resume on next Monday. Work is quite abundant, and everything looks better than it has for some months. Bars now range from \$1.70 to \$1.80 for refined.

Nails.—The active movement in nails in retail lots is rather surprising to storekeepers, who were not expecting it. Any attempt to advance prices now would be a failure.

Sheet Iron.—All the sheet mills are working to full capacity; several good orders were booked yesterday for galvanized. Heavy plate is having a better call than any other kind.

Skelp Iron.—Mills have been put in shape and work will begin soon on two or three large lots.

Wrought Iron Pipe.—The rumor to-day is that a large amount of business for pipes will soon be placed. The only fact developed is that inquiries have been made.

Plate and Tank Iron.—All mills report steady orders at strong prices for both early and late deliveries, which is about the best report that has been made for six months. Prices have all advanced one-tenth, and there is talk of another tenth advance very soon.

Structural Material.—There was a newspaper statement that ten thousand tons had been contracted for by the Pennsylvania Railroad Company, but it turns out that the actual contracts foot up somewhere between three and four thousand tons, which is an exceptionally large order. Orders are quite abundant and mills are in excellent shape for Fall. Quotations have been advanced to 2-25, and for some lots higher quotations are named on beams, tees and channels. Flange steel sold yesterday at 2-60; fire-box, 3c.

Steel Rails.—Additional rumors are afloat concerning large transactions, but nowhere can positive information be obtained. The probability is that inquiries have been renewed for a good deal of steel rail stock for repairing, as all the railroads leading to Chicago are intending to lay a good many new rails, either as side tracks, or repairing. The

demand from this source has not yet made itself felt. Quotations \$30.

Old Rails.—The brokers are making no effort, and buyers have not shown themselves for several days.

Scrap.—A few industrious brokers are hunting all the railroad scrap they can find, and meeting with some success, but they are not offering it for sale. Quotations are nominally \$17.50 for No. 1 Railroad.

Pittsburg. August 4.
(From our Special Correspondent.)

Raw Iron and Steel.—There has been no appreciable change in the condition of the iron market for some time past. Undoubtedly the excessive heat has interfered at least to a certain extent with work in the mills throughout the country. Prices for leading descriptions of Grey Forge, Bessemer and steel billets have been fairly maintained for prompt delivery.

We are now in the second month of the last half of 1892, with the labor troubles not yet adjusted, the idleness of so many mills restricting the demand for most descriptions of iron to limited proportions. The largest consumers are making very few purchases of material beyond what they actually require to fill current orders, and as many of them have already made arrangements for their supply of crude material for some time to come, sales are naturally restricted.

It is currently reported that concessions have been offered by some of the producers of the less-favored grades of pig iron, but the difference between the cost of production and the selling price is so narrow that the offerings are not of a character to tempt consumers to try experiences with new mixtures. A well informed dealer has this to say: "Production is gradually diminishing, and it is not unreasonable to anticipate an improvement of conditions, so far as demand is concerned, in the near future. The improvement in prices must be an after effect, therefore it will come later, and its development will be slow. Over production results from over estimated competition. Human nature causes us to be peculiarly prone to take extravagant views of questions which affect our interests. American manufacturers over estimated the capacity of home consumption and accordingly have been over producing. This is all there is in it and of it; it is one of those disorders that will adjust itself, and the operators that control this process of adjustment cannot be accelerated in their work by arrangements of the protective system."

The finished iron trade of Philadelphia has been strengthened by the award of the Pennsylvania Railroad contract for the material for the new Broad Street Station. The contract, which will reach 4,000 tons, has been taken by the Pencoyd Iron Works. Other large orders for various points have been placed recently, and the mills are thus well filled up.

Furnaces in various parts of the country continue to shut down, the latest being the Dunbar furnace in the Connellsville region. The company has a good stock of pig iron on hand, and propose to remain out of blast until prices advance. An advance is reported in structural iron. The plate mill at the Etna Iron Works of Spang, Chalfant & Co. has been started with non-union labor. A force of men was got into the works, and before the Amalgamated men had recovered from their surprise the department was in full operation.

Coke Smelted Lake and Native Ores.

3,000 Tons Bessemer, Aug. to Jan.	\$13.90 cash.
2,000 Tons Bessemer City Furnace, prompt.	14.00 cash.
1,000 Tons Grey Forge, City Furnace.	12.75 cash.
2,000 Tons Bessemer, City Furnace.	14.00 cash.
500 Tons Bessemer, City Furnace.	14.00 cash.
500 Tons Grey Forge, City Furnace.	12.75 each.
500 Tons Grey Forge, f. o. b. at furnace.	12.40 cash.
500 Tons Bessemer High Silica.	14.25 cash.
300 Tons No. 1 Foundry.	14.75 cash.
200 Tons No. 1 Foundry.	14.75 cash.
200 Tons No. 2 Foundry.	13.75 cash.
200 Tons White and Mottled.	12.00 cash.
200 Tons White Iron.	16.50 cash.
100 Tons Silvery Extra.	15.50 cash.
50 Tons Grey Forge.	12.75 cash.
50 Tons Open Mill.	12.00 cash.

Charcoal.

100 Tons Cold Blast.	26.50 cash.
50 Tons No. 1 Foundry.	20.00 cash.
50 Tons No. 2 Foundry.	19.50 cash.
50 Tons No. 3 Foundry.	19.00 cash.

Steel Slabs and Billets.

1,000 Tons Billets, Aug., Sept.	23.75 cash.
500 Tons Billets, August, at Mill.	23.75 cash.
500 Tons Billets and Slabs.	23.75 cash.
500 Tons Billets, August.	24.75 cash.
300 Tons Steel Slabs.	24.00 cash.
300 Tons Steel Slabs at Mill.	23.25 cash.

Muck Bar.

600 Tons Neutral, August.	24.75 cash.
400 Tons Neutral, August.	24.50 cash.

Ferro-Manganese.

10 Tons 80%, Seaboard.	67.50 cash.
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Steel Skelp.

350 Tons Wide Grooved.	147 1/4 in.
300 Tons Wide Grooved.	117 1/2 in.

Iron Skelp.

300 Tons Wide Grooved.	165 in.
200 Tons Narrow Iron.	185 in.
200 Tons Narrow Grooved.	162 1/2 in.

Steel Wire Rods.

300 Tons American Fives, August.	32.35 cash.
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Old Iron and Steel Rails.

500 Tons Old Steel Rails, long.	15.75 cash.
250 Tons Old Iron Rails.	20.00 cash.
250 Tons Old Iron Rails.	19.75 cash.

Scrap Material.

200 Tons Country Mixed Steel Scrap, gross.	14.50 cash.
150 Tons Heavy Steel Scrap, net.	15.25 cash.
150 Tons Open Hearth Steel, net.	14.00 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 30 to Aug. 5, and Sales. Includes sub-sections for Dividend-paying and Non-dividend-paying mines.

*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 8,603. Non-dividend shares sold, 11,129. Total shares sold, 19,730.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names, dates from July 29 to Aug. 4, and sales figures.

Dividend shares sold, 4,149. Non-dividend shares sold, 2,180. Total shares sold, 6,329.

COAL STOCKS.

Table of Coal Stocks, listing company names, dates from July 30 to Aug. 5, and sales figures.

Total shares sold, 325,228.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing names of stocks and closing quotations from July 29 to Aug. 4.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

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

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 Cons. 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.

STOCK MARKET QUOTATIONS.

Aspen. July 30. The closing quotations were as follows: Agnes C., Argentum Junata, Aspen Deep Shaft, Aspen Contact, Best Friend, Bimetallic, Binswacker, Carbonate Chief, Empire Champion, Justice, Little Annie, Mollie Gibson, Nolan Creek, Park, Mamie & Queen, Pontiac, Sheep Mountain S. & M. Co., Smuggler, St. Joe & Mineral Farm, Yellow Boy.

Baltimore, Md. Aug. 3. COMPANY. Atlantic Coal, Balt. & N. C., Big Vein Coal, Conrad Hill, Cons. Coal, Diamond Tunnel, George's Creek Coal, Lake Chrome, Maryland & Charlotte, North State, Silver Valley.

Pittsburg, Pa. Prices highest and lowest for the week ending Aug. 4:

COMPANY. Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas, Columbia Oil Co., Consolidated Gas Co., East End Gas Co., Fisher Oil Co., Forest Oil, Hazelwood Oil Co., Hidalgo Mining Co., La Nora Mining Co., Luster Mining Co., Mansfield C. & C. Co., Manufacturers Gas Co., Nat. Gas Co. of W. Va., N. Y. & Clev. Gas Coal Co., Ohio Valley Gas Co., Pennsylvania Gas Co., People's Natural Gas Co., People's N. G. & P. Co., Philadelphia Co., Pine Run Gas Co., Pittsburg Gas Co., Red Cloud Mining Co., Silverton Mining Co., South Side Gas Co., Sterling Silver Mining Co., Tuna Oil Co., Union Gas Co., Washington Oil Co., W. Moreland & Camb., Wheeling Gas Co., W. House E. Light, W. House Air Brake Co., W. House Brake Co., Ltd.

Deadwood. July 30. Bid. Asked. Bullion, Caledonia, Calumet, Cambrian, Carthage, Cora, Deadwood Terra, De Smet, Double Standard, Elk Mountain, Emmett, Equitable, Florence, Golden Reward, General Merritt, Harmony, Hester A., Homestake, Hermit, Iron Hill, Isadorah, Maggie, Monitor, Rainbow, Retriever, Ross-Hannibal, Ruby Bell, Ruby Queen, Seabury-Calkins, Silver Wilkes, Spanish R., Stewart, Tornado, Troy, Uncle Sam.

St. Louis. Aug. 3.

The closing quotations were as follows: Adams, Colo., American & Nettie Colo., Bi-Metallic, Mont., Central Silver, Elizabeth, Mont., Granite Mountain, Mont., Hope, Leo, Little Albert, Montrose Placer, Colo., Mickey Breen, Pat Murphy, Colo., Silver Age, Silver Bell, Small Hopes, Colo., Yuma, Ariz.

Helena, Mont.

(Special report by SAMUEL K. DAVIS.) Prices highest and lowest for week ending July 30: Bald Butte (Mont.), Benton Group, Mont., Bi-Metallic, Mont., California (Castle), Mont., Champion (Oro Fino), Mont., Combination (Phillips'g), Mont., Copper Bell (Cataract), Mont., Cornucopia, Mont., Cumberland (Castle), Mont., Elizabeth (Phillipsburg), Mont., Florence (Neihart), Mont., Fourth of July, Wash., Glenary (Butte), Mont., Helena & Victor, Mont., Ingersoll, Mont., Iron Mountain (Missoula), Mont., Jersey Blue (Butte), Mont., Lone Pine Consolidated, Moulton, Mont., Polaris (Beaverhead Co.), Mont., Poorman (Coeur d'Alene), Idaho, Queen of the Hills (Neihart), Southern Cross (Deer Lodge), Mont., Whitlatch Union & MacIntyre, Yellowstone (Castle), Mont.

Foreign Quotations.

London. July 23. Highest. Lowest. Alaska Treadwell, Amador, Cal., American Belle, Colo., Appalachian, N. C., Can. Phosphate, Can., Colorado, Colo., De Lamar, Idaho, Dickens Custer, Idaho, Eagle Hawk, Idaho, East Arevalo, Idaho, Eberhardt, Nev., Elkhorn, Mont., Elmore, Idaho, Emma, Utah, Esmeralda, Nev., Flagstaff, Utah, Garfield, Nev., Golden Feather, Cal., Golden Gate, Cal., Golden Leaf, Mont., Golden River, Cal., Idaho, Jay Hawk, Mont., Josephine, Cal., Kohinore, Colo., La Luz, Mex., La Plata, Colo., La Valera, Mex., Mald of Erin, Colo., Mammoth Gold, Ariz., Mount McClellan, Montana, Mont., New California, Colo., New Consolidated, New Eberhardt, Nev., New Gold Hill, N. C., New Guston, Colo., New Hoover Hill, N. C., New Russell, N. C., New Viola, Idaho, Old Lou, Colo., Parker Gold, N. C., Pittsburg Cons., Nev., Poorman, Idaho, Plumus Eureka, Cal., Richmond Con., Nev., Ruby, Nev., Sam Christlan, N. C., Sierra Buttes, Cal., Plumus Eur., Cal., Silver King, United Mexican, Mex., West Argentine, Colo., Yankee Girl, Colo.

Paris. July 23.

Francs. East Oregon, Ore., Forest Hill Divide, Cal., Golden River, Cal., Laurium, Greece, Lexington, Mont., Nickel, New Caledonia, Rio Tinto, Spain, Tharsis, Spain, Vieille-Montagne, Belgium.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, No. 8, pure, 1,040, Commercial, in bbls. and cbsys., Carbonic, liquefied, Chromic, chem. pure, Hydrobromic, dilute, U. S. P., Hydrocyanic, U. S. P., Hydrofluoric, Alcohol-95%, Absolute, Ammoniated, Alum-Lump, Ground, Powdered, Lump, Alumina Chloride-Pure, Amalgamating solution, Sulphate, Ammonia-Sul., in bbl. lots, Carbonate, English and German, Muriate, white, in bbls., Aqua Ammonia-(in cbsys), Antimony-Oxymur, Regulus, Argois-Red, powdered, Arsenic-White, powdered, Red, Yellow, White at Plymouth, Asbestos-Canadian, Italian, Ashes-Pot, 1st sorts, Pearl, Asphaltum-Prime Cuban, Hard Cuban, Trinidad, refined, Egyptian, Californian, at mine, at San Francisco, Barium-Carbonate, pure, Chlorate, crystal, Chloride, commercial, pure, Iodide, Nitrate, Sulph., Am. prime white, Sulph., foreign, floated, Sulph., off color, Carb., lump, f. o. b. L'pool, No. 1. Casks, Runcorn, No. 2, bags, Runcorn, Bauxite, Bichromate of Potash-Scotch, American, Bichromate of Soda, Borax-Refined, San Francisco, Concentrated, in car lots, Refined, Liverpool, Bromine, Cadmium Minion, Cadmium Iodide, Chalk, Precipitated, China Clay-English, Domestic, Chlorine Water, Chrome Yellow, Chromic Iron Ore, Francisco, Pure, Commercial, Cobalt-Oxide, Copper-Sulph. English Wks, Vitriol (blue), ordinary, extra, Nitrate, Copperas-Common, Best, 100 lbs, Liverpool, in casks, Corundum-Powdered, Flour, Cryolite-Powdered, Emeric-Grain, Flour, Epsom Salt, Feldspar-Ground, Crude, Fluorspar-Powdered, No. 1, French chalk, Fluorspar-Lump, Glauber's Salt-in bbls., Glass-Ground, Gold-Chloride, pure, crystals, pure, 15 gr., c. v., liquid, 15 gr., g., s. v., Chloride and sodium, 15 gr., c. v., Oxide, Gypsum-Calcined, Land Plaster, Iodine-Resublimed, Iron-Nitrate, Kaolin-Sec China Clay, Kieserite, Lead-Red, White, English, in oil, Acetate, or sugar of, white, Granulated, Nitrate, Lime Acetate-Am. Brown, Litharge-Powdered, English flake, Magnesite-Crude, Kilos, Calcined, Brick, ton of 2,240 lbs., Manganese-Ore, per unit, Oxide, ground, Mercuric Chloride-(Corrosive Sublimate), Powdered.

Marble Dust, Metallic Paint-Brown, Red, Mineral Wool-Ordinary slag, Ordinary rock, Ground, Mica-In sheets according to size, 1st quality, Naphtha-Black, Nitre Cake, Ochre-Rochelle, Washed Nat Ox'rd, Lump, Washed Nat Ox'rd, Powder, Golden, Domestic, Oils, Mineral-Cylinder, light filtered, Dark filtered, Extra cold test, Dark steam refined, Phosphorus-Red, white, Plumbago-Ceylon, American, Potassium-Cyanide, Bromide, domestic, Chlorate, English, Chlorate, powdered, English, Carbonate, by casks, Caustic, lb, pure slick, Iodide, Nitrate, refined, Bichromate, Yellow Prussiate, Red Prussiate, Pumice Stone-Select lumps, Original cks., Powdered, pure, Pyrites-Non-oupreous, p. units, Quartz-Ground, Kotten Stone, Powdered, Lump, Original cks., Rubbing stone, Sal Ammoniac-lump, in bbls., Salt-Liverpool, ground, sack, Domestic, fine, Common, fine, Turk's Island, Salt Cake, Salt Peter-Crude, Soapstone-Sodium-Prussiate, Phosphate, Stannate, Tungstate, Hyposulphite, in casks, Strontium-Nitrate, Sulphur-Roll, Flour, Sylvinit, 23 2/3%, S. O. P., per unit, Talc-Ground French, American No. 1, Terra Alba-French, English, American No. 1, American No. 2, Tin-Crystals, in kegs or bbls., Muriate, single, feathered or flossed, Double or strong, 5 1/2 B, Oxy, or nitro, Tin Plates, box, Swansea, best charcoal, best coke, Vermilion-Imp. English, Am. quicksilver, bulk, Am. quicksilver, bags, Chinese, Trieste, American, Zinc White-Am. Dry, Antwerp, Red Seal, Paris, Rod Seal, Sulphate crystals, in bbls.

THE RAREER METALS.

Aluminum, Arsenic-(Metallic), per lb., Barium-(Metallic), per gram, Bismuth-(Metallic), per lb., Cadmium-(Metallic), per lb., Calcium-(Metallic), per gram, Cerium-(Metallic), per gram, Chromium-(Metallic), per gram, Cobalt-(Metallic), per lb., Didymium-(Metallic), per gram, Erbium-(Metallic), per gram, Gallium-(Metallic), per gram, Glucium-(Metallic), per gram, Indium-(Metallic), per gram, Iridium-(Metallic), per oz., Lanthanum-(Metallic), per gr., Lithium-(Metallic), per gram, Magnesium-(Powdered), per lb., Manganese-(Metallic), per lb., Chem. pure, per oz., Molybdenum-(Metallic), per gm, Niobium-(Metallic), per gram, Osmium-(Metallic), per oz., Palladium-(Metallic), per oz., Platinum-(Metallic), per oz., Potassium-(Metallic), per lb., Rhodium-(Metallic), per gram, Ruthenium-(Metallic), per gm., Rubidium-(Metallic), per gram, Selenium-(Metallic), per oz., Sodium-(Metallic), per lb., Strontium-(Metallic), per gm., Tantalum-(Metallic), per gram, Tellurium-(Metallic), per lb., Thallium-(Metallic), per gram, Thorium-(Metallic), per gram, Tungsten-(Metallic), per lb., Uranium-(Oxide), per lb., Vanadium-(Metallic), per gram, Yttrium-(Metallic), per gram, Zirconium-(Metallic), per oz.