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PROF. WALTHERE SPRING, of Liège, Belgium, has continued his interesting experiments on the formation of alloys by high pressures. It will be remembered that some years since he reunited particles of the various metals by compression, and even went so far as the formation of an easily fusible alloy of powders of bismuth, lead and cadmium. Latterly he has produced comparatively homogeneous brasses from compression of the powders of zinc and copper mixed in definite proportions. As in the early experiments, this was accomplished only after a first compression, redivision of the non-homogeneous and but partly alloyed metals, and a final compression. These experiments are of great importance for a consideration of the nature of alloys. They have proved beyond a doubt that metals will unite in alloys of definite composition at the ordinary temperature (for the heat evolved during the operation is too slight to cause any effect) when in intimate contact, as readily as chemical compounds are formed in solution.

The acceptance under a technicality of the bond of the Western Surety and Guarantee Company, of San Francisco, as surety for the damages awarded by Judge Hebbard in the suit of M. W. FOX vs. ALVINZA HAYWARD, *et al.*, is peculiar. This company, it has been shown, was organized after those damages were awarded, by friends and business connections of ALVINZA HAYWARD, and its capital amounted to but \$100,000, while it is accepted as responsible for a judgment exceeding \$1,000,000. It is universally conceded, also, that it was organized for this very purpose, as it has done no business and has no office, and that ALVINZA HAYWARD is the company itself, although ISAAC REQUA, C. D. LANE, P. B. CORNWALL and others figure in the incorporation. Briefly this incorporation is but a piece of juggling to nullify the action of the Court in mulcting HAYWARD. It is to be regretted that the bond has been accepted, but it is hoped that M. W. FOX's motion to proceed on judgment on account of insufficient surety will be granted.

In the latter half of the current year considerable work on timber has been done by the Forestry Division of the Agricultural Department, in spite of the small amount of funds at command, but little over \$4,000 being available. Work was, after a suspension since January, resumed in July at the Washington University Testing Laboratory, St. Louis, Mo., under the direction of Prof. J. B. JOHNSON. Tests have been made on specimens from 32 trees of long leaf pine, 4 of short leaf pine and 8 of loblolly pine, all of which were from Alabama, as well as specimens from 20 white pine trees from Wisconsin and 34 varieties of oak from Alabama. Collections are now being made in several States. The results on long leaf pine have been compiled into a bulletin which will be of special interest to Southern lumbermen and coal dealers, as these tests may settle a long disputed question as to the value of pine from which turpentine has been drawn for construction. At present this timber is excluded from standard specifications, although the mill owners still saw and ship it, claiming that it cannot be identified. Between 5,000 and 6,000 tests have now been made, and one bulletin describing the scope of the proposed investigation and the methods used, with illustrations of the machines employed, has been published. The first bulletin of results is delayed in order to fully mature a plan of publication which can probably be adhered to.

The traditional wealth and the romance attached to many of the Spanish-American mines is causing many of our prospectors who do not understand the difficulties of those countries, to journey to them in the hopes of finding new bonanzas. While it is not impossible that good mines might be discovered, it is hardly probable that one man in a foreign country could so develop them that they would be salable or in a condition for profitable work. Naturally, to sell the property, he has to appeal to capital in this or other countries foreign to the one in which he is located, for the natives of that country in the majority of cases are selling mines, not buying them. The difficulty of interesting capital in an exotic enterprise, unless the property is a magnificent one and a bargain, is too apparent to be seriously considered. And if perforce he is obliged to work his property he is still obliged to have capital or to interest it, for, save in Mexico, there are no custom works to which he can ship ores of average grade, so reduction works must be built.

The chances of finding a good property are lessened moreover by the thorough prospecting done through centuries by the natives, themselves good miners, in periods when labor and time were scarcely of value.

Our advice to American prospectors therefore is to remain at home, where a good property is readily purchased and the product disposed of at once to custom works, and to aid in developing a vast area of land in which there are known to be mineral resources.

GOLD MINING IN CALIFORNIA.

The production of gold since the closing down of the placer mines by the Débris Act has remained fairly constant, although many of the former large producers are now inactive. While new mines have been discovered and abandoned ones rejuvenated to supply the deficiency in production

of those closed down, there is probably no State in the West where so little interest is taken in the industry. Once the most active and enterprising investors, the Californians have either sunk into a lethargy or have entered other pursuits. Nor is an explanation wanting for this. In the first place Comstock manipulations and swindling methods have destroyed public confidence, and, secondly, many of the shining lights in whose systems the lesser operators were content to revolve have passed away. In fact, it might be said that with the death of single individuals such as JOHN GASHWILER and Messrs. BUEL and BATEMAN, names now all but forgotten, but to whom much of the development of the far West is due, mining, so far as Californians are concerned, began to wane. No where else was individual influence so strong, and with these deaths a powerful stimulus was lost.

Those now investing in mining properties in the State are mainly new men. To them is due the credit of such cases of rejuvenation as the North Star and the Empire of Grass Valley, the Clinton Consolidated in Amador County, the Brown Bear in Northern California, which is reported to be making \$30,000 a month, and the Julian in Southern, and many others lesser reputation, whose production goes far to swell the output of the State.

With the declining interest in mining naturally prospectors have lost energy and new discoveries of magnitude have been wanting, but the outlook in the aggregate is very favorable for large developments in the future. There are known to be bodies of low grade ore in the State which will pay with cheap power as in the case of the Spanish mine and the Dalmatia in Eldorado County. Nor is water power wanting in the greater number of cases. In a country like California where there is a sharp descent in a short distance from a mountain range averaging 7,000 ft. in altitude to the foot hills on which the mines are situated at less than 2,000 ft. elevation, there must be many opportunities for controlling the power developed by the streams from the melting snows of the Sierras. This has been done in some districts and the decreased cost of power, especially where electrically transmitted, has enabled mines to be worked to a profit which otherwise would be untouched.

The number of mines affording sure though small profits when worked under the immediate supervision of the owner, but whose profits would be inappreciable if owned by an incorporation, are constantly on the increase, and it is well for the State and for the mining industry that this is so, for these enterprises are conducted on a business basis which cannot fail to impress investors.

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 Tuscarora Mines, Nevada.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: My letters in your issue August 20th and September 3d, 1892, calling attention to the dishonest management of these properties, and urging co-operation on behalf of the outraged stockholders, with the view of obtaining an accounting, and if possible the conviction of the men in control, known as the "Tuscarora ring," have I am sorry to say, almost entirely failed. The apathy of these stockholders is simply astonishing. I am compelled to believe that it would be futile to make further effort on their behalf. The assessment will still grind on with a regularity equal to the imagined perpetual motion, and pay or not, the result will be the same, being as it is conducted on the same principle as the "thimble-rig game."

Before closing let me call attention of those who read your estimable journal to this one glowing instance of romantic fraud. The Navago Mining Company, financial condition October 1st, 1892, indebtedness, 6,640; offset by, due from other companies, \$4,300; net debt, \$2,340. The weekly official letters of superintendent of mine report as follows: October 8th, "Stopes looking better, yielding three cars, estimated \$367 per ton, and eight cars, \$45 per ton;" October 15th, "Stopes above 350 level improving, veins small, ore high grade;" October 22d, "Stopes looking very well and yield good quality ore," October 29th, "Stopes same, sent 106 cars second-class ore to concentrator," and November 5th, 1892, "Assessment No. 23 of 10 cents per share, equal \$10,000, if all stock paid same, payable December 9th, 1892."

I ask, is it possible that the stockholders of this property intend to pay this iniquitous assessment? Do they know how and on what value of ore other mines work, live and pay dividend? If so, I must conclude that they are unworthy of any one's exertion on their behalf.

THOMAS F. CHUCK, Stockholder.

FORT PORTER, BUFFALO, N. Y., November 17, 1892.

Notes on the Copper Market.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Certain Boston parties still maintain that the advance in the price of copper is due to manipulation or speculation. They apparently underestimate the fact that the demand for consumption of copper is unprecedented this year, especially for wire. Not only are the mills behind with deliveries, but they have also immense orders for months ahead, and that speculation in copper on this side of the Atlantic is a thing of the past. Four or five agents dispose of the total copper production in this country, and it is to their own and to their clients' interest that they act in harmony and not undersell each other. Moreover, the method of disposal of copper has greatly changed of late. A good many of the largest consumers are now supplied steadily with all the copper they need, and at the end of

each month settlements take place at the average price. These contracts are all of a private nature and do not appear in the reports of copper transactions in the daily and weekly journals. Formerly brokers and dealers were used as middlemen and their contracts were reported and became public property.

It has been stated that there is a firm agreement or understanding among the producers of copper to restrict their output—a sort of combination which, as far as the lake companies are concerned, would be contrary to the laws of Michigan. Nothing of that kind exists, except a very sensible understanding of the producers to limit production to a point where the supply will not exceed the demand, a fair business policy the Journal has always advocated with the view of steadying the market. The companies appear to have learned, by experience, the correctness of this advice.

Consumers prefer a steady market price and no fluctuations, which are brought about by speculation. Some very important transactions have taken place direct between consumers and producers, and 12 cents is freely bid for delivery of lake copper during the next three months and 11½ cents for casting copper. The visible supply of copper in Europe is a little more than half what it was three years ago. November 15th, 1892, 54,300 gross tons; November 30th, 1889, 99,900 gross tons.

Boston, usually the most enthusiastic on copper, and wildly speculating in copper stocks, is at present rather adverse to any movement which is said by some to be due to a large "short" interest in Boston & Montana stock. This is said to amount to more than 10,000 shares, or 1/10 of the whole capital of the company, and since the capital stock of the company is scattered among 1,100 stockholders, this short interest cannot easily be covered.

S. E. RAUNHEIM.

The Comparative Efficiency of Compressed Air and Electricity.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I should like to refer at length to the subject of Mr. David L. Lloyd's paper, "The Relative Efficiency of Electricity and Compressed Air in Mining," contained in your issue of Nov. 2.

First, I will draw attention to some historical facts and figures. In Mr. John Fox Tallis' paper, "Application of Electricity to Underground Haulage," Vol. XVI, "Proceedings of the South Wales Institute of Engineers," Nov. 2, 1888, page 147, a new plant is described which was intended to cope with a salt-water feeder of 5,100 gals. per hour, at a vertical depth of nearly 900 ft. below the surface. It was decided to raise the water at one lift, and at a rate of 7,200 gals. per hour. Since the pressure on the ram faces was about 400 lbs. per sq. in., specially designed pumps were required. The pumps were differential, with two 6-in. and two 4-in. rams. When doing full duty the pumps ran at 25 revolutions per minute. The loads on the rams varied largely at different parts of the stroke. The electrical current averaged 66 ampères, but varied at least 10 ampères on either side of the mean. The tension at the dynamo terminals was 600 volts, and on the motor 575 volts. The actual horsepower in the water, at the rate of 120 gals. per minute through 900 ft., was 33 H. P., nearly. The output of the dynamo was 53 H. P. Hence the efficiency between actual useful work and the output of the dynamo was 62%, approximately. Mr. Tallis, from his experience in this class of work, believed that compressed air would not give a return of more than 20% of the brake engine power. At any rate, it is curious, he says, that not one of the advocates of pneumatic transmission will publish a test of his plant.

Mr. Tallis also gave some notes prepared by Mr. Geo. Beith at the St. John's colliery, Normanton: Thirty-five horse power nominal Robey compound engine, driving on to generator by belting; speed of generator, 450 revolutions per minute, giving 610 volts 66 ampères current; lead to motor, 500 yards, in lead-covered cable, 1 1/2"; loss about 5%. Motor series wound, connected to first motion by belting, geared to second motion shaft by pinions at about 6 to 1, on which are fixed the cranks for driving the double action pumps at about 17 strokes per minute. Tests taken showing efficiency: engine total, 76.6 I. H. P. Electrical horse power in generator = 52.2 E. H. P.; horse power at pumps, 118 gals., 860 ft. lift, = 30.7 H. P.; giving a useful effect of 40%. The above has now been running close on twelve months and given the highest satisfaction, as is proved by their now putting down a 50-H. P. plant for driving an endless rope haulage, thus doing away with their air-compressing machinery, which was only giving from 18 to 20% efficiency test. This efficiency, taken six years ago, is low all through.

Next, let us see what a 7½-H. P. Thomson-Houston motor is capable of doing in the way of work. In November, 1891, I conducted a test of a 7½-H. P. motor geared to a 5 x 6 in. triplex pump, from which the following results were obtained:

Head, feet.	Volts.	Amperes.	Electrical H. P.	Mechanical H. P.	Efficiency, per cent.	Galls per minute.	
						Actual.	Cal'cd.
351.5	223	28.5	8.52	5.72	67.1	64.65	65.25
292	222	25	7.43	4.92	66.3	66.7	69.2
234.5	222	21	6.25	4.00	64	67.55	69
176.5	222	17	5.06	3.12	61.5	69.7	70
119	222	13.4	3.94	2.08	52.7	69.15	69.61
61.2	223	9.4	2.81	1.08	38.1	69.05	70.00

This gives 67.1% efficiency of the combined pump and motor, and the motor was not overloaded. With a 20 H. P. motor and pump I got readings up to 71.8% efficiency. It must be remembered that this is simply motor and pump and has nothing to do with the generator. In the Normanton test the generator output is 52.2 H. P. and the line loss is given as 5%, so 49.59 H. P. was delivered to the motor, and the combination gave 61% for motor and pump. We are doing 10% better to-day.

Coming next to Mr. Lloyd's efficiency test. The motor takes, we are told, 80 ampères at 220 volts, or 23.5 H. P. of electrical energy. It may, however, mean something else. $R = E \div C = 220 \div 80 = 2.5$ ohms. From this I wish to infer, that if the motor was running at all it was going so slow as to appear as a resistance without any counter-electromotive force, under which conditions it is a question if the motor delivered any power at all. There is nothing in the paper to contravert this opinion.

"It requires 23.5 H. P. from the generator to operate a 7½-H. P. motor, thus showing an efficiency of only about 32%."

In the case of a motor pumping water we can measure the energy of input and the energy of foot-pounds in the column and get the efficiency. Mr. Lloyd does not prove that he used any means to measure the energy delivered by the nine drills of the cutter, but says "it never made but one complete cut." We are, however, told that a motor built to absorb 6,216 watts did absorb 17,600 or 2.83 times its capacity. *It must have been a first-class motor not to burn out.* The efficiency deduced must remain a matter of doubt until we know the speed of the armature, for a motor of any description must have definite speed for definite output.

Now with regard to the engine and generator efficiency. The electrical resistance of 1,000 ft. No. 00 wire is 0.07797 ohms; of 1,000 ft. No. 4 wire is 0.24858 ohms; of 500 ft. No. 4 wire is 0.12429 ohms; of 1,000 ft. No. 6 wire is 0.39528 ohms. Therefore the wire resistance was 0.84612 ohms. There were 80 ampères at 220 volts at the cutter, then E , the volts lost in line $C \times R = 80 \times 0.84612 = 67.6896$ volts. So the generator output was 80 ampères and 220 volts, which appeared at the cutter, plus 67.7 at least, for we have not taken the heat generated into account, $287.7 \times 80 = 23,016$ watts, or 30.85 H. P.

We are told that the engine gave 39 H. P., therefore the generator gave an efficiency of 79% against Mr. Lloyd's 60%. Again the Normanton generator only gave 68.1% and yet the whole plant gave 40%.

Again, to-day we are 10% ahead of six years ago with the generators, just as we are 10% ahead with the combined pump and motor.

Now, taking the efficiencies we have proved, let us see what the electrical efficiency would be in doing measurable work (pumping): Initial H. P., 100; generator output, 79%; loss in line, 10%; delivered to motor, 71.1%; efficiency pump and motor, 67.1%; useful effect in water, 47.7%.

It must be remembered that the loss in line can be made exactly what we care to lose there, this loss being governed by first cost in copper.

I do not care to discuss Mr. Lloyd's compressed air figures as there is nothing definite at the end of the air pipes. If he was doing work that could be measured the case would be different.

FRANCIS A. POCOCK, Mining Engineer.

SCRANTON, Pa., Nov. 2, 1892.

THE ELIMINATION OF SULPHUR FROM IRON.

By J. E. Stead, Middlesbrough, Eng.

(Concluded from page 486.)

VI.—DESULPHURIZING WITH ALKALINE SALTS.

Heaton's Process.—This was based on the oxidizing action of nitrate of soda, which, after being placed on the base of a suitable receiver, and kept in place by a grating of iron, fluid iron was poured upon it. The oxygen of the nitrate instantly acted upon the iron, removing some of the phosphorus, all the silicon, and nearly all the sulphur. Professor Miller gave the following results of analysis of three samples of metal produced at the Langley mills under his own observation:

	Cupola pig. Per cent.	Crude steel. Per cent.	Steel iron. Per cent.
Carbon.....	2.830	1.800	0.993
Silicon, with a little titanium.....	2.950	0.266	0.149
Sulphur.....	0.113	0.018	Traces.
Phosphorus.....	1.455	0.298	0.292
Arsenic.....	0.041	0.039	0.024
Manganese.....	0.318	0.090	0.088

Mr. Snelus practically confirmed Professor Miller's analysis, and found a considerable quantity of sulphate of soda in the slag, resulting probably from the action of the nitrate upon the sulphur in the iron. On the small scale in my own laboratory I have also found that the sulphur is completely removed by nitrate of soda.

Warner's Process.—This process is conducted in a receiver similar to that of Heaton, but instead of nitrate of soda a mixture of ground limestone and soda-ash, and small quantities of other materials, are placed on the bottom. In about ten minutes after the metal is poured in, the reaction is complete; the metal is then run into molds. The following are some of the results obtained:

Description.	Before. Per cent.	After. Per cent.	Before. Per cent.	After. Per cent.
Sulphur.....	0.18	0.04	0.10	0.10
Silicon.....	1.40	0.70	1.00	0.10
Sulphur removed.....		77.0		90.0

Flames of what appear to be sodium burst out from the top of the vessel: and the slags contain some of the sulphur as soluble sulphides.

Ball and Wingham's Process.—These gentlemen, in treating molten sulphurous iron with cyanide of potassium, caustic soda, carbonate of soda and sodium ferrocyanide of potassium, found the following results, taking the best result of each series:

Description.	Metal Containing. Per cent.	Sulphur Removed. Per cent.
With cyanide of potassium.....	0.72	100
Carbonate of soda and cyanide mixed.....	0.46	87
Carbonate of soda alone.....	1.11	86
Carbonate of soda and caustic soda.....	0.26	92
Caustic soda alone.....	0.72	83
Sodium.....	0.18	100

Massenez's Process.—This process has been so recently described that it will not be necessary for me to more than briefly describe it. Practically it consists in mixing together in a suitable "metal mixer," pig iron, poor in manganese and high in sulphur, with iron containing a larger percentage of manganese and little sulphur; the manganese of the one charge acting upon and combining with the sulphur of the second; the sulphur so formed separating from the metal and rising to the surface by gravity. The fact that manganese when added to metal containing sulphur caused elimination of that element was first noted by Caron, who melted sulphurous iron with ferro-(6%) manganese, and eliminated by that means 90% of sulphur. He also confirmed Parry, that manganese in the blast furnace caused the absence of sulphur in the pig iron.

Percy, on discussing Caron's remarks on the effects of manganese on pig iron, says: "It would appear that the Mn acts as a medium through which

the sulphur is oxidized and eliminated in the state of SO₂." Caron, however, is of a different opinion, and concludes that without any oxidizing action S disappears from cast iron in presence of Mn. Ponsard states that 80% to 90% of S may be removed from pig iron by stirring ferromanganese into the ladle at the time of running; 2.6 parts of Mn remove one of S; the S is found in the slag.

Mr. Edward Riley, in 1877, described an experiment of his in which he melted cast iron containing 0.207% of sulphur with 10% of ferromanganese in a crucible, and found that the sulphur was reduced to 0.037%; but I have failed to find any explanation as to the change or reaction which was effected. Walrand melted sulphurous iron and spiegel in separate crucibles, the latter under lime, and poured the metal into the crucible containing spiegel, and on stirring them together sulphurous acid was evolved, and the mixture of metals caused a reduction of the sulphur from 0.5 to 0.06%.

ANALYSES OF METALS BEFORE AND AFTER PASSING THE MIXER AT HÖRDE, MARCH, 1892, BY E. H. COOK.

	Metal from three furnaces.			After passing through mixer. Per cent.
	Per cent.	Per cent.	Per cent.	
Iron.....	92.65	93.40	91.81	92.41
Combined carbon.....	3.00	2.80	3.05	3.05
Manganese.....	1.72	1.30	2.50	1.68
Silicon.....	0.46	0.20	0.80	0.69
Sulphur.....	0.15	0.20	0.08	0.04
Phosphorus.....	2.02	2.10	2.39	2.13
Total.....	100.00	100.00	100.00	100.00

Mixer Slag.—Silica, 32.30; iron, 5.80; manganese, 33.46; sulphur, 5.75%.

The following experiment, to verify the statement of Herr Massenez, was made in my laboratory: One hundred parts of ferromanganese and a quantity of sulphide of iron, both in fine powder, were melted together in a plumbago-crucible. After fusion and cooling, the crucible was broken and the contents examined. On the surface of the metal scoria was found containing 56% of manganese and 28% of sulphur and 1% iron. The metal contained only 0.02% of sulphur, which demonstrated most conclusively that the reaction had been according to the following equation: $FeS + Mn = MnS + Fe$.

Ordinary foundry iron containing manganese, after melting in a cupola and pouring into large molds, in which it remains for a considerable time in a fluid condition, is liable to have a concentration of sulphide of manganese near the highest or most elevated part of the casting. This fact was, I believe, first noticed by my former assistant, Mr. Harold Ridsdale, who sent me the following analysis of the upper and lower part of a large ingot mold, viz.: Sulphur, upper part, 0.75%; lower part, 0.112%; manganese, upper part, 1.35%; lower part, 0.547%. Strange to say, this large quantity of sulphur and manganese did not cause the metal to be white, from which it may be assumed that when the manganese and sulphur dissolved in metal are combined together, they do not exert the same influence in preventing the carbon to assume the graphitic condition as when in combination with the iron.

[Mr. Stead then proceeds to discuss the Saniter process, which will receive due attention at our hands.—ED. E. & M. J.]

THE GREAT FALLS WORKS OF THE BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.

From the report of the superintendent at Great Falls, Mr. Frank Klepetko, we devise the following information:

Development of Water Power.—On one penstock is located a pair of 44 in. wheels. These furnish the power for driving the crushing and washing machinery in the concentrator and the roasters and other machinery in the smelter. About one half of the power of these wheels is utilized in this way now. The other remaining power will be used in driving the electrolytic dynamos.

The power of a 40-in. wheel is used in driving the blowing engine and the two rotary pumps, and a 9 in. x 24-in. duplex high pressure pump. The blowing engine furnishes blast for the Bessemer converters which are located in the smelter building. The rotary pumps have a capacity of 3,500 gallons per minute each, and furnish the necessary water for the concentrator. The pair of 20-in. wheels drive three Thomson-Houston dynamos, one for arc lighting, one for incandescent lighting, and one for generating current to run the electric crane in the smelter building.

Power Transmission.—The power transmission is by means of manilla ropes. The driving and carrying pulleys are put on wooden towers built high enough so that all railroad tracks are cleared safely. The plant was designed by the manufacturers to transmit 400 H. P. to the concentrator and 250 H. P. to the smelter.

To convey the necessary water for concentration a 24-in. wrought iron riveted pipe has been laid. This large size was necessary on account of the distance which is over 1,000 ft.

The blast is conveyed to the Bessemer converters in a 30-in. rivetted pipe. The long distance, over 1,600 ft., necessitated a large pipe. The blowing engine is a 48-in. x 48-in. duplex. It is capable of blowing two 5-ton converters at 17 lbs. pressure. At somewhat reduced pressure it could probably blow three.

Concentrator Building.—This building was erected and fitted up during this year. It is a wooden building 136 ft. x 262 ft. in size. The bins at the top of concentrator have a capacity of 3,600 tons of crude ore while the extension of the same bins has an additional capacity of 4,300 tons. Two-thirds of the concentrator are now fitted up with crushing and washing machinery. There are two 10-in. x 20-in. and four 7-in. x 10-in. Blake crushers, six sets of 15-in. x 26-in. rolls and two Huntington mills for the crushing of the ore. The concentrating machinery consists of two slide arm jigs, 64 Collum's jigs, twelve double round tables and twenty Frue vanners, beside the necessary elevators, trommels and slime tanks. A portion of the third section is occupied by a 22-in. x 48-in. Fraser & Chalmers Corliss engine and a 15-in. x 30-in. Ball stamp. The engine is intended for reserve power in case of breakdown in the water power plant or in the transmission. The Ball stamp is intended to be used only in case of a breakdown in the crushing machinery of the concentrator.

The present capacity of the concentrator is between 500 and 600 tons

of ore per day. This capacity could be increased 50% by the fitting up of the third section of the concentrator with the necessary jiggling and re-crushing machinery. Our present machinery for treatment of slimes is sufficient for the three sections of the concentrator. The cost of such additional jiggling and re-crushing machinery would not be over \$12,000 to \$15,000.

The first concentration was done in March. This part of the plant did not start well, but since then all difficulties have been overcome.

Smelter Building.—This is an iron building 30 in. × 455 in. in size. The retaining walls of the different benches were finished during the year as well as some excavation; the building was erected, the machinery placed, the furnaces built. The bins of this building have a capacity of 1,800 tons of coal and 4,700 tons of concentrates. The bins under the Bruckner calcines have a capacity of 875 tons of calcines.

There are 25 Bruckner cylinders for calcination, each capable of holding a charge of 16 tons of concentrates, the plant having a capacity of about 250 tons of concentrates calcined per day.

There are 24 Wellman Gas Producers for the purpose of gasifying the cheap Sand Coulee nut and slack coal.

The regenerative reverberatory gas furnaces are of the tilting type, that is, by a hydraulic arrangement the furnace can be tilted forward and thus the slag skimmed more easily and the matte can be poured out of the furnace without the labor of tapping. There are five of these fired by gas, two by direct coal firing and one undergoing construction.

The difficulties experienced with gas making are due to the character of the fuel, and also to the placing of the gas producers on a much higher level than the furnaces. This extra height is about 45 ft. and necessitates the forcing of the gas down under comparatively high pressure. This causes a higher blast pressure and consequently a higher percentage of carbonic acid in the gas. The character of the fuel is another source of trouble. Such poor fuel is not used anywhere in the United States. Besides the dusty and dirty character of it, it is low in volatile matter and high in ash, combinations of circumstances which are all against good work. Acting on the advice of the consulting engineer, and who also had been the engineer of the former management, the Wellman Producers were adopted. This fuel however requires a special producer. Four Taylor Producers are being erected and have 10 others ordered. We believe these will do satisfactory work.

The gas furnaces work fairly well when supplied with good gas. Experience with them leads the belief that minor changes of detail will adapt them better to smelting of copper ores. These changes can be made as each furnace has to undergo repairs.

To convey the melted matte from the reverberatory furnaces to the converters, an electric crane which commands the lower bay of the building for the whole length has been put up. This crane has a capacity of 20 tons.

There are two converters, intended each to blow five tons of matte to pig copper. The original intention was to mend the linings of bottoms and tuyère section only, but it is found that the clay lining wears much higher than the tuyère section, and that practically about half the converter has to be relined about every five heats, and consequently one converter is being relined while the other one is running. In consequence of this two more converters are needed in order to treat all the matte. These have already been ordered. The large charges of matte will prove to be more economical than small charges, as the same crew of men will work a large charge as is required for a small one, and in consequence of higher blast pressure the time will not be much greater, if any. To furnish water under high pressure there is a duplex intensifier by which water at a pressure of 150 lbs. furnishes a certain amount of water at a pressure of 450 lbs. for tilting the converters and the tilting furnaces.

The Matte House is a wooden frame structure 40 × 40 ft. in size covered with corrugated iron. The crushing machinery consists of a 9 × 15 in. Blake crusher. This same crusher is also used for crushing silicious rock for furnace sand, in connection with a pair of 10 × 16 in. rolls. The same building also contains the grinding pans for grinding the necessary materials for the claying of the converters. It also contains bins for storing sand, fireclay, and the ground material. In the smelter building there is a crushing plant of 9 × 15 in. crusher and 10 × 16 in. rolls for such ores as do not need concentration but need calcination. The bins for storing such crushed ore are arranged to discharge into the cars which feed the ore to the Bruckner roasting cylinder.

It is estimated that the average smelting capacity when the furnaces are running well will be about 350 tons of calcines smelted per 24 hours, one of the furnaces being used as a well for holding the matte to be charged to the converters. This would be equal to about 1,000 tons of concentrating ore or to say 800 tons of such average ore as is being treated at the Butte Works at present.

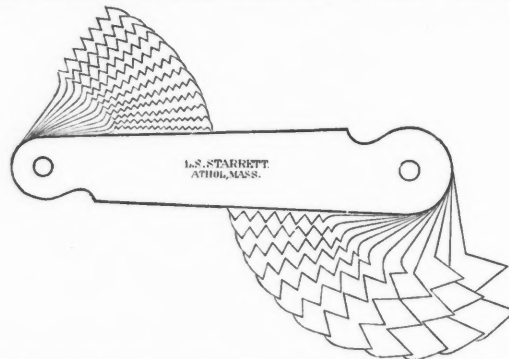
Electrolytic Plant.—Construction is now going on on the electrolytic plant. Three 180-kilowatt multipolar machines will be furnished by the Thomson-Houston Electric Company. One of these has already arrived on the ground. These will furnish current for the electrolyzing of the copper solutions in the vats. The current will be conducted a distance of about 2,000 ft. from the power house to the electrolytic building. This building is of brick, 110 × 174 ft. in size, and will contain 288 depositing vats, beside the necessary solution tanks. All necessary lead is on the ground, and work has been commenced on the lining of the vats and on placing these in position. All copper for conductors is on the ground.

A stone and brick boiler house 34 × 55 ft. has been erected. This will contain for the present two 125-H. P. locomotive boilers. These will furnish steam for heating the buildings and boiling of solutions. There is room for an additional boiler whenever it should be necessary to add one by the erection of another depositing building. The estimated capacity of the electrolytic plant is 1,000,000 lbs. of electrolytic copper per month. In connection with the electrolytic plant, construction will start at once on a sulphate of copper building. An iron refining furnace building 80 × 130 ft. is now under construction. In this will be placed two refining furnaces for the present, to refine all electrolytic copper and put it into ingots, bars, or cakes.

The electrolytic plant will be a source of large profit to the company as it will save about 30 ozs. of silver to the ton of copper and for which the company now receives no pay, as well as cause an increase in selling price of the copper.

A NEW SCREW PITCH GAUGE.

Mr. L. S. Starrett, of Athol, Mass., has recently brought out a screw pitch gauge with coarser pitches than his No. 40 and No. 11½ gauges, which have already met with considerable success. The new gauge



has twenty-four pitches, varying from four to the inch to thirty to the inch. It is a reliable gauge by which to grind and test a threading tool at 60°, and it is especially convenient for an inside tool. The accompanying illustration is full size. Mr. Starrett will shortly bring out another gauge with pitches from 32 to 52.

NEW HAMPSHIRE BERYLS.

The most celebrated localities in the State for great beryls are in the towns of Grafton and Acworth. Dr. Charles Y. Jackson, formerly State Geologist of New Hampshire, was shown a highly valued beryl 8 in. in diameter in the imperial cabinet at Vienna, which was regarded as a remarkable specimen, and which was represented to have come from Acworth. Fogg's "Gazetteer of New Hampshire" states that one of the Acworth beryls eight inches in diameter, presumably the one shown to Dr. Jackson, was sold in New York City for \$15,000, and that it went to the imperial cabinet at Vienna.

The Acworth locality has long had great celebrity on account of the immense crystals of beryl that it has afforded, which have been sold to go as cabinet specimens to various parts of the world. The locality is still a very interesting one, and is often visited. About 30 miles above the Massachusetts line on Cold River is Williams Hill, or Beryl Mountain, famous for its beryls, says a correspondent of the New York "Evening Post." It is about a mile south of the village of South Acworth.

Leaving the highway one comes upon the debris that covers the steep slope between an old quarry and the wood. This consists of blocks and fragments of white quartz, among which are many pieces of beryl, blue, green, or yellowish in color. The excavation into the hillside which has been made for mica and beryl is only a rod or two in width and depth. The opening has been made in white quartz, and at the entrance of the grotto are masses of quartz of a delicate rose color.

More than 24 crystals of beryl, from 6 in. to a foot in diameter, are set in the quartz that forms the sides of the cavity. Most of these are at the farther end of the opening, where they are overlaid by a mass of overhanging white quartz 15 or 20 ft. thick. There the blue and green glassy beryls are so plentiful over a surface 6 ft. square as to constitute about half of the wall. What appears to be one crystal is there exposed to the length of 52 in., and is a foot in diameter. On cross-sections some of the beryls show the hexagonal form of the crystals perfectly. About the beryls the rock is somewhat granitic.

It is said that a beryl was once extracted from this quarry that was 4 ft. long and 2½ ft. in diameter; but still larger crystals have been formed at Grafton. On Isinglass Mountain, in that town, large beryls have been discovered; but on Alger's Hill, almost south of Isinglass Mountain, and across a deep ravine, the largest known beryls in the world have been found. One hexagonal crystal from this locality weighed 2,900 lbs. and measured 4 ft. 3 in. in length, and had diameters of 22 and 32 in. A still larger crystal was partly dug out, but, being left exposed to the weather, it fell to pieces or was broken up. It had diameters of 24 and 45 in., and was calculated to weigh 2½ tons. This crystal was among the largest that any species of mineral has afforded, and its destruction is to be regretted. A beryl from Grafton exhibited by the Boston Society of Natural History measured 2 or 3 ft. in both length and diameter. A beryl originally 6½ ft. long is said to have been found at Grafton.

Smaller but much more beautiful beryls have been found in the quarries with the large crystals, and in sixteen or more towns in various parts of the State, principally upon the highlands between the Connecticut and Merrimac Valleys. The beryls occur in veins of coarse granite—often so coarse that the plates of mica are several inches in length and breadth, and the masses of quartz and feldspar in proportion—which are sometimes of great size, and in some of the towns, notably those about Grafton, may be seen whitening the crests and sides of the hills. From these veins fine crystals have been obtained, which are so clear and of such a fine color that they have been cut into gems of great beauty. But the stones from which the most beautiful jewels have been cut have been found loose in the soil, where they have been deposited by the decomposing of granite, as it is a difficult operation to extract perfect crystals from the granite veins without fracturing them, since they are very brittle, and, moreover, the large crystals are filled with rifts, and a jar breaks them when not well secured. They have usually been well hooped before an attempt has been made to move them.

On Fletcher Mountain, in Groton, about two miles south of Rumney station, there is an extensive and recently abandoned mica quarry with a deep excavation and with subterranean chambers that have a roof supported by stone columns and by great logs. Portions of the roof are of pure quartz; and in it, together with some large sheets of gleaming mica, some great crystals of beryl may be seen. At the time of my visit, about two years ago, there were many beryls lying on the grass near one of the

deserted buildings, some of them perfect hexagonal crystals too heavy for me to carry away; but from some of them quite clear fragments of small size could be obtained.

Some beryls have great value. The emerald is a variety colored, a rich green by chromium, or, as has been asserted, by organic matter; while ordinary beryls are paler, and in color vary from a pale honey-yellow through soft sea-green to blue, the same crystal sometimes exhibiting more than one hue, and are colored by oxide of iron. Aquamarines are clear sea-green beryls, but sometimes have a pale greenish or bluish-green tint. In 1827 an aquamarine was found in Siberia which is said to have been valued at 600,000 francs.

THE LATE ADOLPH SOETBEER.

Dr. Adolph Soetbeer, the eminent statistician on the production and coinage of the precious metals, an accomplished writer and privy councillor to the King of Prussia, died in Germany October 23d, aged 78. He was born in 1814 in Hamburg, where his father was a successful merchant, and after a thorough preparatory education obtained the degree of doctor at the University of Göttingen. After this he entered the educational service of his native city, and remained in this department until a work of his on "the Origin, Progress and State of the Tolls at Stade," attracted so much attention, for the duties on the Elbe were of great importance to Hamburg, that he was appointed Librarian to the Deputation of Commerce, which body afterward became the present Chamber of Commerce. From this comparatively humble position he was advanced to that of secretary and councillor, and in this latter office occupied himself with the compilation of works relating to the commerce of Hamburg. His works

of the narrowing of the degrees of longitude, and the compass, sextant (if the weather is cloudy), and chronometer are of little use then. A process for taking the point at the pole has been described by M. E. Durant Gréville, which depends on the properties of the gyroscope. The apparatus consists of two gyroscopes and a plumb-line. To determine the latitude a gyroscope which has been oriented by its axis to the pole of the sky—or a gyroscope-compass—is employed. The angle which its axis makes with the vertical of the place is complementary to the latitude. To determine the longitude, a second gyroscope is needed, which has been adjusted so as to turn in a plane parallel to the meridian of the point of departure. The plane of the gyroscope-compass being necessarily parallel to the equator, if we project the vertical of the place upon it, and measure the angle which that projection makes with the line of intersection of the planes of the two gyroscopes, we shall have the difference in longitude of the point of departure and the point of arrival. A practical arrangement for taking this measure has been devised by M. Trouvé. Before starting, the traveler set in motion the gyroscope-compass and the gyroscope whose plane is the meridian of the point of departure. When the position of a point is to be determined, the axes of the two gyroscopes are conveyed parallel to themselves, and the vertical of the point reached is taken with a plumb-line. If the axis of the gyroscope-compass is parallel to the plumb-line, the balloon is immediately above the pole. The result is not affected by height above the earth's surface, for the directions of the three instruments continue the same at all points of the same vertical.

Nickel Steel for Machinery.—Very little has been published in regard to the use of nickel steel for other purposes than armor plates.



THE LATE ADOLPH SOETBEER.

were of so great excellence that the degree of doctor of jurisprudence was conferred upon him by the University of Kiel.

About 1845 the confused condition of the German coinage attracted his attention, as Hamburg was then suffering commercially in its international relations, and he issued a brochure on "The Hamburg Coinage." At the very outset he took the position of a single standard, that of gold, and 1860 was called the "Father of German Gold Coinage," but it was not until 1873 that he saw his ideas go into effect.

In 1872 he was appointed to a chair in the University of Göttingen, but his reputation is due to his writings, not to his scholastic work.

In his latest work on the Literature of Coinage, etc. (Berlin, 1891), he states clearly his views on the condition of the silver question at the beginning of the current year. He considered that at that time it was enveloped in more darkness than at any previous period, and that the prospects of a rehabilitation of silver, and its establishment at a fixed price, was in no ways favorable. It would be premature, however, he continues, to assert that the labors of the United States in opposition to the depreciation of silver, and to bring about a stable ratio of values between the precious metals, would be unsuccessful. Soetbeer considered that the continual decline in the values of silver was a commercial iniquity, and to the last was occupied with propositions to facilitate the greater use of silver within the limits of gold coinage.

Roscher, in his History of Political Economy, says "Soetbeer has raised himself to a first authority on money mints and coinage, through a happy blending of extensive practical experience, statistical observations and historical researches."

The Exact Point of the Pole.—If any of our arctic explorers ever reach the pole, they will be confronted by a very difficult problem in determining the exact point, says the *Popular Science Monthly*. Geographical determinations increase in difficulty on approaching the pole, an account

Commodore Melville, the Engineer-in-Chief of the Navy, has been placed in possession of the results of some very valuable experiments which have been made by the Bethlehem Iron Company, and as a consequence has decided to test the value of nickel steel in connection with machinery. To this end a section of the propeller shafting of the "Brooklyn" and the sea-going battle ship "No. 1" will be made of nickel steel, in order to test on a practical working scale whether it really has the advantages that it promises. It can readily be seen that this metal will have an immense value for use in connection with machinery—if it should prove entirely successful in its present application—when it is learned that its tensile strength is 90,000 lbs. per sq. in., with 20% elongation, as against 60,000 and 65,600 lbs. tensile strength, with the same elongation, for the carbon steel ordinarily used. The shafting of the two ships mentioned will necessarily have the same outside diameter as the other sections, and the greater strength of the nickel steel will be utilized by making the hole through the shafting of the appropriate diameter to bring the strength to an equivalent of the 65,000-lb. steel. Another place where the nickel steel would save an immense weight would be in boiler construction. Boilers are now constructed of 58,000 lbs. tensile steel and sometimes are as much as 1½ in. in thickness. As the thickness is inversely proportioned to the strength of the material it is a matter of course that if it is possible to use a material whose tensile strength is one and half that now in use, the boiler shells will only have two-thirds the thickness of the present shells, or a boiler would have a shell 1 in. thick instead of 1½ in. One additional argument in favor of the use of nickel steel is found in the fact that the cost would be slightly, if any, in excess of the cost of ordinary steel, inasmuch as the percentage of nickel used is very small and is mixed with the charge in the furnace before the metal is poured. Commodore Melville has not rashly decided to make experiments for which there is no warrant, as he has not resorted to nickel steel until after thorough investigation of the experiments which have already been made.

A THEORY OF PUDDLING AND STEEL MAKING.

In his presidential address to the South Staffordshire Institute of Iron and Steel Works Managers, Prof. Thomas Turner, of Birmingham, England, made some interesting remarks on the prevention of waste in puddling. When Henry Cort first introduced this process it was considered good practice to produce 10 cwt. of bar iron from a ton of pig. The introduction of the refinery made it possible to use only 30-35 cwt. of pig in producing a ton of bar iron. The subsequent use of iron bottoms reduced the amount of pig to the ton of iron by another 5 cwt., and a similar reduction was the result of the use of oxidized fettling for the sides of the furnace. At the present time the amount of pig used in producing a ton of bar iron varies from 21 cwt. to 23 cwt. in different works.

It is usual in puddling and steel-making to speak of atmospheric air oxidising and removing the impurities present in the pig. The following series of experiments, however, show the matter in a different light. If in the first place a globule of cast iron is melted in the air and exposed to a blast of air or oxygen, the iron itself is oxidised in about the same proportion as the other elements, and a layer of impure magnetic oxide of iron is formed on the surface of the globule, while the portion of the metal left in the interior is practically of the same composition as the original iron. If the cinder is allowed to run away as rapidly as it is formed the whole of the iron is converted into magnetic oxide. In this experiment no purification has taken place, but only a general oxidization.

Secondly, if in this experiment the fluid made is allowed to remain and cover the fused metal, instead of being carried away, a different result is obtained. The oxidation is checked directly the globule is coated with oxide, and a reducing action on it is commenced. The silicon, carbon and other easily oxidizable elements will be removed and at the same time a corresponding weight of iron will be returned to the globule from the surrounding slag. Thirdly, if a globule of cast iron is covered with magnetic oxide of iron to protect it from air and to supply the necessary cinder, and if it is then strongly heated, the globule increases in weight.

The first experiment here described corresponds exactly to the ordinary process of reheating or remelting. The oxide which is formed runs away and a loss is caused. The second experiment resembles the original method of puddling, for in that part of the iron was wasted to produce the cinder which was required to remove the impurities from the remainder of the metal. The modern method of puddling resembles the last named experiment, where oxide is added to cover the globule of iron. It is much cheaper to buy oxide of iron than it is to form a covering of oxide from the molten pig itself, and time also is saved by the newer method. The waste of iron in puddling is reduced to a minimum by this addition of oxide, for hardly any of the molten pig is lost, and some of the iron in the oxide added is reduced and adds to the total iron produced in the process.

The Bessemer steel process corresponds to the second experiment, for part of the cast iron is oxidized and wasted in order to provide cinder for the purification of the remainder. The Siemens-Martin process corresponds to the third experiment. The amount of oxide ore added is much greater than in the improved puddling process and consequently the output of steel from the pig is considerably increased by the reduction of the ore.

This way of looking at all iron and steel making processes enables Mr. Turner to speculate on future possible improvements and economies in the manufacture of iron and steel. The desired end to be attained is to devise some method of intimately mixing fluid pig iron and fluid oxide of iron. The Bessemer process is very expensive in fuel, etc., but efficient as regards time. The mixture of the iron and oxide in the puddling process requires great manual labor and the Siemens-Martin process occupies too much time. The heat requisite to reduce oxide of iron is less than that given off by the oxidation of the contained silicon phosphorus, carbon, etc., so that, under certain circumstances, unfortunately not yet ascertained, the heat given off in getting rid of the impurities would be quite sufficient to reduce the oxide and form iron or steel. What is wanted is a mechanical means of intimately mixing the fluid pig and ore; if such an apparatus could be designed the process would be far quicker than the puddling and Siemens-Martin processes and no exterior source of heat would be required. Such a process would also have the advantage of being applicable to the treatment of a great range of chemical constitution of the pig and ore, and thus would be far more universally useful than any existing process. Here is a field for an enterprising inventor.

Laying of Flexible Water Pipes.—The Rotterdam authorities lately started the work of laying a tube in the bed of the River Maas, for the conveyance of water from the intake to the other side of the river, where the town has very much increased in population during the last few years. Up to this moment the water passes through cast iron pipes, carried under the big foot bridge connecting the banks of the river. These pipes were about three miles in length, and much too small in diameter to supply the factories and hydraulic cranes which, with the other causes of water consumption, now require several thousand cubic meters a day. A new and larger pipe was determined upon, but to sink it in the river bed was not an easy job, for the river traffic is heavy at that point. It was impossible to make a wooden structure on which a long length of pipes could be bolted together, and then, when finished, sunk horizontally, as is usual in sinking gas and water-tubes in the Belgian canals. Therefore a flexible tube was constructed, composed of short pieces connected with ball joints. Each pipe is 23.5 ins. in diameter and 0.4 ins. thick, made of mild steel and provided with steel flanges. The ball unions are cast-iron, outside diameter 1.350 m. m., or 4.5 ft.; weight about 2,300 kilos., or 2.26 tons. To sink the tube, two barges are fastened together, and between them is constructed a wooden inclined platform of about 120 ft. in length, and one end of which hangs in the furrow made in the bottom of the river to receive the pipes. The tube is built upon that platform, one end of the pipe being made fast on the bank. Afterward the barges are pulled back so far that there is room enough on the platform to put on another length of pipe with its ball joint, and so on. The length of one pipe with union is about 29.5 ft. The depth of the river is about 36 ft. The work has progressed rapidly, each day about 85 ft. being laid. The whole length of the tube will be about 3,000 ft.

NICKEL ANALYSIS.

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

The substances usually submitted to analysis for the determination of the contained nickel may conveniently be classified as follows:

1. Regulus and minerals containing arsenic, viz., speiss and arseniferous ores of nickel.
2. Regulus and minerals containing no (or but little) arsenic, viz., matte, nickeliferous pyrrhotite and non-arseniferous ores of nickel.
3. Metallic nickel, nickel steel, German silver and other alloys of nickel.

The principal published methods of analysis of these substances are summarized in the following three tables:

TABLE I.—SPEISS AND ARSENIFEROUS ORES.

Operation.	Reagent employed.	Substance separated.
A. Watts—Dictionary:		
1. Fusion with reagent and lixiviation with water.....	$KNO_3 + Na_2CO_3$; or, S + K_2CO_3	As
2. Dissolve and filter.....	HCl + HNO_3	SiO_2 + insol.
3. Nearly neutralize.....	Sodic or am. carbonate.	Fe
4. Precipitate and filter.....	Sodic or am. acetate.	
Or, 1. Dissolve.....	$HNO_3 + HCl$	SiO_2 + insol.
2. Filter and heat.....		
3. Nearly neutralize.....	Sodic carbonate.	As + Fe
4. Precipitate and filter.....	Sodic acetate + Fe_2Cl_6	
5. Acidulate.....	HCl	Cu
6. Precipitate and filter.....	H_2S	Ni + Co.
7. Boil, precipitate and filter.....	Na_2CO_3	
B. Watts—Dictionary (new ed.):		
1. Dissolve and evaporate.....	$HNO_3 + HCl$	
2. Dissolve and filter.....	HCl	SiO_2 + insol.
3. Boil.....	$NaHSO_4^*$	
4. Precipitate and filter.....	H_2S	As + Cu.
5. Concentrate, precipitate and filter.....	Oxalic acid.	Ni + Co.
Or, 5. Evaporate, dissolve and filter.....	H_2O	
6. Gasify.....	(C)	
7. Precipitate and filter.....	$BaCO_3$	Fe + Co
8. Precipitate and filter.....	H_2SO_4	As
9. Precipitate and filter.....	Na_2CO_3	Ni

* To reduce As_2O_5 to As_2O_3 .

TABLE II.—MATTE, PYRRHOTITE AND NON-ARSENIFEROUS ORES.

Operation.	Reagent employed.	Substance separated.
A.—Fresenius (Allen and Johnson).		
1. Dissolve and filter.....	$HNO_3 + H_2SO_4$	SiO_2 + insol.
2. Precipitate and filter.....	H_2S	Cu.
3. Peroxidize, precipitate and filter.....	$HNO_3 + NH_3$	
4. Dissolve the precipitate.....	HCl	
5. Precipitate and filter.....	$NH_3 + Na_2CO_3$ (or, am. carb. + acetic acid).	Fe.
6. Repeat 4 and 5.....		
7. Alkalinize the combined filtrates from 3, 5 and 6.....	NH_3	
8. Aridify slightly, precipitate and filter.....	HCl + H_2S	Ni + Co.
B.—Cheney and Richards.		
1. Dissolve and filter.....	$HNO_3 + HCl$	SiO_2 + insol.
2. Precipitate and filter.....	H_2S	Cu.
3. Peroxidize and begin to precipitate.....	$HN_3 + NH_3$	
4. Dissolve.....	Acetic acid	Fe.
5. Boil, precipitate and filter.....	Con. sol. of sodic phosphate.	
6. Boil, add reagent until odor of NH_3 is distinct; filter.....	KHO	(Ni + Co) phosphate.
7. Dissolve the precipitate.....	H_2SO_4	
8. Alkalinize and electrolyse.....	NH_3	Ni + Co.
C.—Sutton—Vol. Anal., 6th ed., p. 168.		
1. Dissolve and filter.....	HNO_3 ; or, $HNO_3 + HCl$	SiO_2 + insol.
2. Nearly neutralize.....	Na_2CO_3	
3. Dilute.....	H_2O (cold)	
4. Precipitate and filter.....	Freshly precipitated $BaCO_3 + NH_4Cl$	Cu + Fe.
D.—Moore—Sutton's Vol. Anal., p. 224.		
1. Dissolve and filter.....	$HNO_3 + HCl$	SiO_2 + insol.
2. Precipitate and dissolve.....	$Na_3P_2O_7$	
3. Acidify faintly.....	HCl	
4. Alkalinize distinctly.....	NH_3	
5. Convert the blue color into a yellowish tint.....		
6. Change to violet brown.....	Standardized sol. of KCy Precipitate from $CuSO_4 + K_4C_6N_4Fe$ dissolved in sol. of ammoniac oxalate. Standardized solution of KCy	Determination of Ni.
E.—Sperry—Peterson's Modern Copper Smelting.		
1. Dissolve and evaporate.....	$HNO_3 + H_2SO_4$	SiO_2 + insol.
2. Dissolve and filter.....	$HNO_3 + H_2SO_4 + H_2O$	Cu
3. Electrolyse.....		Ni.
4. Ditto.....		

TABLE III.—METALLIC NICKEL, NICKEL STEEL, GERMAN SILVER AND ALLOYS.

Operation.	Reagent employed.	Substance separated.
A.—Thorpe—Applied Chemistry.		
1. Dissolve and evaporate.....	$HNO_3 + HCl$	C + insol.
2. Dissolve and filter.....	HCl	Cu
3. Precipitate and filter.....	H_2S	Fe + Al
4. Precipitate and filter.....	Sodic or am. acetate.	Ni + Co
5. Precipitate and filter.....	H_2S	
B.—Clowes and Coleman.		
1. Dissolve and evaporate.....	HNO_3	SnO_2
2. Dissolve and filter.....	H_2O	Cu
3. Precipitate and filter.....	H_2S	
4. Add reagent until precipitate begins and dissolve.....	$Na_2CO_3 + HCl$	
5. Precipitate and filter.....	Am. Acetate + H_2S	Zn
6. Acidify and boil.....	HCl	
7. Precipitate and filter.....	NaHO	Ni + Co

It may be broadly stated that none of the analytical methods above set forth are satisfactory if practiced in strict accordance with the publish

TABLE IV.—METALLIC NICKEL, NICKEL MATTE, NICKEL OXIDE, ETC.

Substance.	Manufacturer.	Date.	Analyst or authority.	Percentage composition.							
				Ni.	Co.	Total Ni and Co.	Fe.	Cu.	S.	C, SiO ₂ and other impurities.	
Matte (Swedish)			Wagner's Chem. Tech., 8th ed.			26.00	16.33	31.67	26.00		(1)
Do. (Sudbury)	Canadian Copper Co.	1889	F. L. Sperry	14.81	27	14.71	31.00	27.06	26.90	.92	
Do. (do.)	do.	do.	do.	13.04	20	14.04	31.47	26.76	27.00	.95	
Bessemerized do. (do.)	do.	1892	Canadian Copper Co.			35.93	1.09	40.98	19.71	2.29	(2)
Do. (New Caledonia)			Thorpe's Dict. of Applied Chem.			67.17	11.90		17.08	3.85	
"Fonte" (do.)			do.			67.95	25.87		1.95	2.90	
Nickel oxide (Sudbury)	Orford Copper Co.	1891	Hunt and Clapp			74.60	1.51	1.25		1.45	
Do. (New Cal.)	Société le Nickel	do.	Ledoux			77.92	1.25	.09			
Artificial nickel ore		do.	E. F. Wood			48.23	23.87	trace	.264	27.636 (inc. 0)	
Nickel (German)		do.	Lassaigne (Watts' Dict.)	56.75		56.75	12.55	27.50		3.70	
Do. (do.)		do.	do.	54.60		54.60	11.30	30.10		4.00	
Do. (English)		do.	do.	73.30	22.10	95.40	1.00	trace		3.00	
Do. (New Cal.)	Christofle	1881	Christofle and Bouilhet			97.75	(Mn) .36			1.79	
Disc do. (do.)		do.	Thorpe (Dict. of Applied Chem.)			98.83	.72			.45	
Cast do.		do.	Gard (Wagner, 13th ed.)	97.44	trace	97.44	.301		.104	2.155	
Sheet do. (German)	Fleitman	1891	F. P. Dewey	97.050	1.858	98.908	.829	.498	.012	.042	(3)
Roller anode (do.)	do.	do.	do.	97.63	1.19	98.82	.75	.15	.04	.24	(4)
Disc nickel	Société le Nickel	do.	do.	97.38	1.70	99.08	.06	.68	.013	.167	(5)
Cube do.	H. Wiggins & Co.	do.	do.	96.757	1.586	98.343	.32	.113	trace	1.224	
Grain do.	J. Wharton	do.	do.	94.988	.856	95.844	.374	.047	trace	3.755	(6)
Do. do.	Orford Copper Co.	1892	do.	96.29	.93	97.22	1.92	.20	.104	.556	(7)
Cast nickel anode	Hanson & Van Winkle Co.	do.	do.	83.68	trace	83.68	7.10	.15	.19	8.88	(8)
Do.	Zucker & Levett	1891	do.	84.776	1.133	85.909	12.091	.103	.05	3.847	(9)

- (1) Average of three assays.
- (2) Ditto.
- (3) "It showed by qualitative analysis slight traces of arsenic, antimony and aluminum, and a perceptible amount of silicon. No other metal or phosphorus was found." Note by Mr. Dewey.
- (4) "Showed some silicious residue." Note by Mr. Dewey.
- (5) "A small amount of hard, gritty grains left on dissolving the metal." Note by Mr. Dewey.
- (6) "It showed by qualitative examination the slightest traces of arsenic and antimony, some aluminum and considerable silicon and calcium. Distinct grains of slag were found. No other metal or phosphorus was found." Note by Mr. Dewey.
- (7) "There is some Si and considerable As in this sample." Note by Mr. Dewey.
- (8) "It contained a considerable amount of tin, probably 7%. There is also considerable silicon present." Note by Mr. Dewey.
- (9) "It showed on qualitative analysis slight traces of arsenic and antimony, some aluminum and calcium and considerable silicon. No other metal or phosphorus was found." Note by Mr. Dewey.

accounts. The precipitation methods introduce a serious source of error by reason of the separated ferric hydroxide carrying down a portion of the associated nickel and cobalt. The direct electrolysis of an acid solution containing copper, iron, nickel and cobalt cannot be relied upon to effect a complete separation of either the copper or the nickel and cobalt, especially if a current of comparatively high voltage (e. g. from three Bunsen cells in series) be employed. And Moore's volumetric method must obviously fail in the presence of copper and iron.

In the absence, then, of any generally recognized and accepted system of accurate nickel analysis, Mr. Charles T. Mixer (Princeton, '91), the chemist of the Emmens Metal Company, has, in conjunction with myself, devised the following methods, which we find to be sufficiently trustworthy for all technical and commercial purposes.

METHOD A.—FOR SUBSTANCES HIGH IN NICKEL AND LOW IN COPPER AND IRON—e. g. METALLIC NICKEL, BESSEMERIZED MATTE, NICKEL OXIDE, ETC.

Operation.	Reagent.	Separation.
1. Dissolve (about 2 grammes) and evaporate.	HNO ₃ + HCl or, fusion with KHSO ₄	
2. Dissolve and filter.	HCl + H ₂ O	SiO ₂ , C, etc.
3. Precipitate and filter.	H ₂ S	CuS.
4. Dissolve the washed precipitate and evaporate till white fumes are produced.		
5. Dissolve and electrolyse.	HNO ₃ + H ₂ SO ₄	Cu.
6. Boil filtrate from 3 and peroxidize.	H ₂ O + HNO ₃	
7. Cool and make solution up to 400 c.c.	HNO ₃	
8. Boil 1/2 of 7, precipitate and filter.	H ₂ O	
9. Redissolve the precipitate.	NH ₃	
10. Precipitate and filter.	HCl	
11. Dissolve and reduce the well-washed precipitate.	NH ₃	
12. Tlrate.	H ₂ SO ₄ + Zn	Fe.
13. Precipitate and filter 1/3 (10 c. c. of 7).	KMnO ₄	
14. Dissolve the washed precipitate.	NaHO	
15. Make alkaline.	Dilute H ₂ SO ₄	
16. Electrolyse.	NH ₃	Ni + Co

METHOD B.—FOR SUBSTANCES HIGH IN IRON AND LOW IN NICKEL—e. g. PYRRHOTITE AND ONCE-RUN MATTE.

Operation.	Reagent.	Separation.
1. } 2. } 3. } 4. } 5. } 6. }		Cu
7. Precipitate and filter.	NH ₃	Fe ₂ O ₃ H ₂ O
8. Boil the washed pp. and refilter.	H ₂ O made faintly acid with H ₂ SO ₄ or HCl	Fe ₂ O ₃ H ₂ O
9. Precipitate and filter.	NH ₄ Cl + NH ₃	Fe ₂ O ₃ H ₂ O
10. Add together the filtrates from 7 and 9; evaporate to small bulk; precipitate and filter.	Na HO in large excess.	
11. Dissolve the washed pp.	Dilute H ₂ SO ₄	
12. Electrolyse.	NH ₃	Ni + Co

METHOD C.—Qualitative examination of pyrrhotite and other lean ores of nickel.

1. Reduce to fine powder.
2. Dissolve in aqua regia; evaporate to dryness; dissolve in HCl and H₂O; filter off from gangue and insoluble matter.
3. Pass H₂S through the solution to remove Cu.
4. Boil free of H₂S; peroxidize with HNO₃.
5. Precipitate the Fe with NH₃; boil; add HCl until the supernatant liquid is faintly acid; boil sharply for 10 minutes.

6. Make strongly alkaline with NH₃ and note the color of the supernatant solution. If it be distinctly blue the percentage of nickel in the ore is commercially important.

7. If the solution be colorless, filter and boil down to a small bulk free from the odor of NH₃. Then add a few drops of a solution of potassium sulpho-carbonate, which will give a pink coloration if there be any trace of nickel in the ore.

N. B.—Test 7 is also useful for determining when the electrolytic separation of the Ni is complete in methods A and B. We find that the reaction is best observed when the solutions are neutral instead of being alkaline as recommended in the text-books.

A distinguishing feature of our process is the treatment of the precipitated ferric hydroxide with a minute quantity of acid. This has the effect of dissolving any Ni or Co hydrate that may have been carried down with the iron; and it is more efficient than the numerous tedious and troublesome repetitions of solution, precipitation, filtration and washing necessitated by the older methods. At first sight, indeed, it may be doubted whether sulphuric or hydrochloric acid will unite with nickel in preference to iron, seeing that the latter metal oxidizes more energetically than the former; but the following thermo-chemical data (taken from Muir and Wilson's *Thermal Chemistry*), will make the matter clear:

Reaction.	Heat generated per formula weight.
Fe + O + SO ₂ Aq.	93,200 units.
Ni + O + SO ₂ Aq.	86,950 "
Fe + Cl ₂ + Aq.	93,700 "
Ni + Cl ₂ + Aq.	83,280 "
Fe + O + H ₂ O.	60,840 "
Ni + O + H ₂ O.	60,840 "

It results from these figures that the heat of formation of one molecule of ferrous sulphate by the union of ferrous hydroxide and dilute sulphuric acid is 93,200 — 60,840 = 32,360 units; while that of nickel sulphate formed by the union of nickel hydrate with dilute sulphuric acid is 86,950 — 60,840 = 26,110 units. Under these conditions, therefore, Berthelot's law of maximum work calls for the formation of nickel sulphate in preference to ferrous sulphate. If HCl be the acid the figures are:

Formation of nickel chloride.	93,700 — 60,840 = 32,860 units.
ferrous "	99,950 — 63,280 = 36,670 "

In the particular case under consideration the replacing power of nickel is still more marked, as, owing to the iron being peroxidized, its basic efficiency is lessened. The heat values per formula weight of acid, as given by Berthelot (*Mécanique Chimique*, tome 1, p. 384) are:

Formation of ferric chloride.	11,800 units.
sulphate.	11,400 "

In concluding these brief notes I may remark that the text books contain very few examples of the analyses of commercial nickel, matte, etc. I therefore add the table 4 above, which will serve to indicate the general character of the substances that the nickel analyst is called upon to examine nowadays.

Addition to the Russian Navy—The Russian navy is having its strength very much increased at present by the building of seven very large cruisers of exceptional coal carrying capacity. The first of these was launched on November 3d, and was christened the "Rurik." She is 435 ft. long, 65 ft. broad and 11,000 tons displacement, and she can carry coal sufficient to carry her 26,000 miles at average speed. Her engines are designed to give a maximum speed of at least 18 knots, and it is expected that 20 knots may be developed. It will be thus seen that she is much larger than any cruiser in the United States or British navies, though her maximum speed is not so great as several in each of the latter. The protective armor on the water line is 10 in. thick, and the armament consists of four 8 in. and thirteen 6 in. quick firing guns and six 120 mm. guns.

THE THOMAS PATENT COKE OVEN.*

The Thomas oven is not a modification of the Belgian oven altogether, as is generally believed, except in similarity of shape and method of drawing the coke. It has none of the arrangements for the application of the heat, the saving of by-products, etc., which characterize the Belgian oven. It is more like the old "Welsh oven," differing from this, however, in being of greater capacity and in having both ends movable. The old Welsh oven has a movable front, and the drag is placed in the oven before charging.

At Coalburg there are 64 Thomas ovens in a continuous battery. They are constructed on the same general principles as the Beehive, and of the same materials, except that the bottoms are of hard red brick.

Dimensions are:

Length.....	36 ft.
Width inside.....	7 ft. 3 in. at back. 7 ft. 9 in. at front.
Height over all.....	8 ft.
" of door.....	4 ft.
" inside.....	5 ft.
Slope of bottom, back to front.....	1 in.

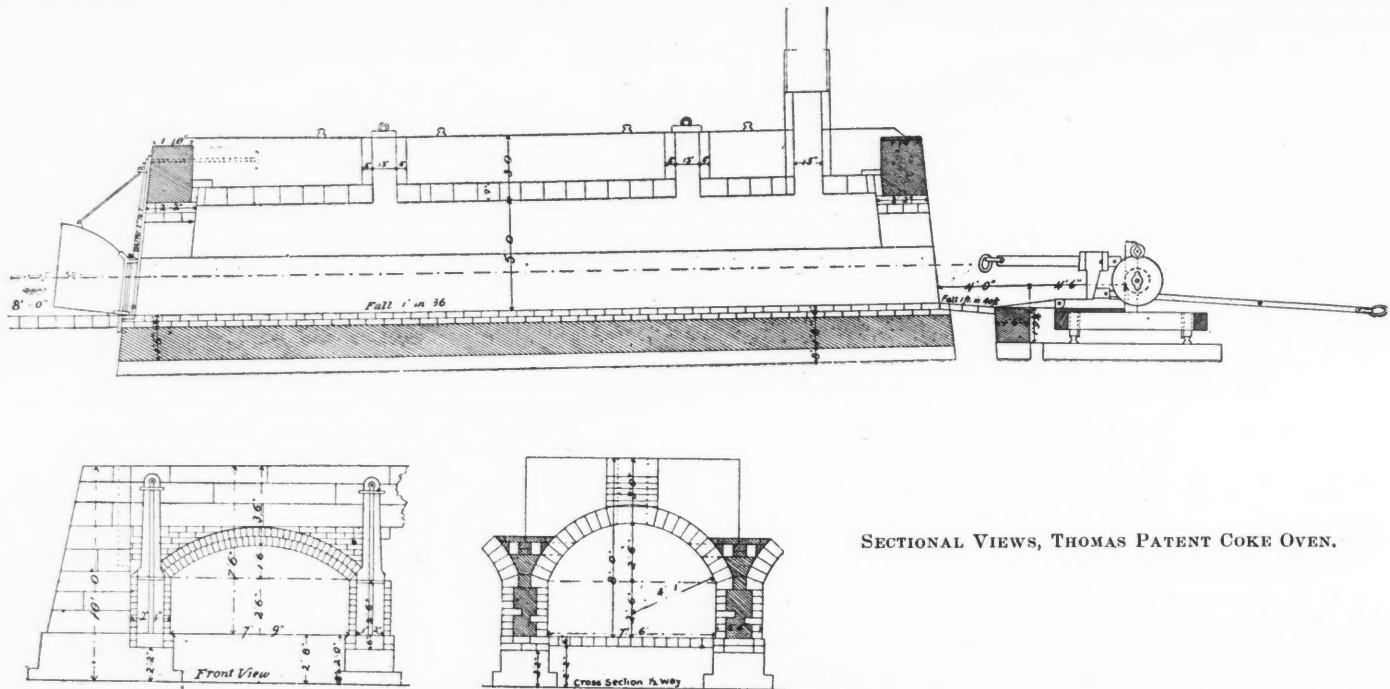
Both back and front are movable and have swinging doors which are in two sections and are built of fire brick, of special design, laid in iron frames. There are three openings on top—two tunnel heads and one draught stack near the back end of the oven. In front of and on a level with the floor of the ovens is an "apron" of stone and brick masonry, 8 ft. wide and running the entire length of the battery. Four feet below this apron is another piece of masonry 7 ft. wide, on which the "dinkey" track is laid, and below this again is the railroad track. At the rear of the battery is a track for shifting the drag from oven to oven, and manipulating the crab.

Originally the ovens had an air flue, but this is now kept closed, as sufficient air is admitted through the crevices of the doors. Twelve tons of coal are charged at once and leveled from both ends. In drawing, the

HARNEY PEAK TIN MINES.

[The following report of Capt. Josiah Thomas seems to us to represent the actual condition and value of the Harney Peak tin mines quite fairly and accurately. He makes the average yield per ton of ore to be about 40 lbs. of black tin, carrying 73% metallic tin, or, say, a percentage of 1.3 of metal in the ore. This will not pay to work.—ED. ENGINEERING AND MINING JOURNAL.]

Capt. Josiah Thomas, of Dolcoath Mine, Cornwall, has reported on the properties of the Harney Peak Consolidated Tin Company, Limited. The report, which is dated August 11th, 1892, and addressed to the chairman of the company, reads as follows: "Having recently returned from an inspection of this company's mines, I now beg to send you my report thereon. I was informed that the mining properties owned by the company consisted of about 1,100 claims, 1,500 by 300 ft. each, and I observe, by an examination of a neatly executed map of the district with which I was furnished at the office, that those claims extend for a total length of about 30 miles, in a somewhat circular form, for upward of three-fourths of the distance around Harney Peak. In the ten days I spent on the property it was obviously impossible that I could visit the whole of the claims. I was able, however, to inspect all the important points where mining operations have been and are now being carried on, as well as what are considered to be the most promising lodes and ledges, which have for the most part been partially explored by pits and shallow workings. On a large number of claims, I understand, little or nothing has been done as yet, beyond the 'assessment work' which is necessary in order to retain possession. I was accompanied by Mr. Beringer, principal of the Camborne Mining School, an excellent assayer and analytical chemist, who during the whole of my stay at the mines was engaged in assaying the samples I personally took from the several workings and from the heaps of ore raised from underground, and now lying at the surface. Some samples



SECTIONAL VIEWS, THOMAS PATENT COKE OVEN.

end doors are opened and an iron rod passed over the top of the coke to the drag at the rear. The hot coke is drawn in a body out of the front end of the oven and over a screen, where it is watered. From the screen it goes into the railroad cars. No water is thrown into the oven, so that it is hot and dry for the next charge.

There is practically no difference in yield or quality between the Thomas and the Beehive. As regards economy of production the difference is in favor of the Thomas. The average labor cost per ton for Beehive coke at Coalburg during 1890 was 44 cents and for Thomas coke 29.1 cents, a difference of 14.9 cents per ton in favor of the latter. Under Mr. Hill's administration, during 1890, there was a steady diminution of labor cost per ton in Thomas coke from 40 cents in February, 1890, to 24 cents in December, while during the same period the labor cost per ton of Beehive coke rose from 41 cents to 73 cents. The lowest labor cost reached by Thomas coke in 1890 was 23.9 cents and by Beehive 38.5, the highest being respectively 40.2 cents and 73.1 cents.

[The Thomas oven has been used in Alabama several years, but has not worked its way into general use, nor have any new ovens of this kind been built by those who have tried it.—ED. E. & M. J.]

Chinese Labor in Belgium.—Chinese labor is being introduced into the iron and steel works of the Société Cockerill, at Seraing, Belgium. Twelve have recently been given employment there, six at the rail mills and six at the Bessemer steel foundry. Others have been employed a year or more at the blast furnaces.

An English Vanner.—The first English-designed vanner is being placed on the market by Boves-Scott & Western, London. It does not differ in principle from the Frue vanner, but it is made mostly of metal and hardly any wood is used in its construction. It is made in pieces small enough to be transported on mules and can be erected without much skilled labor.

* Abstract of paper read by J. T. Hill, manager of the coal mines of the Sloss Iron and Steel Company, Coalburg, Ala., before the Alabama Industrial and Scientific Society, Birmingham, Ala. Proc., Vol. I., No. 2.

which he had not time to assay on the spot have been assayed by him since our return to Camborne; so that I have now a complete list of the results of his assays of all my samples. In taking the various samples, my object was, of course, to endeavor to ascertain as accurately as possible the value of the ore in bulk. Rich stones as well as rocks, containing 20% and upward of tin, could easily be selected from several points; but it should be remembered that very rich stones of tin can generally be found in the poorest mines, and the selection and assays of a few picked stones would not enable one to form anything like a correct opinion of their actual commercial value.

"It should be observed, further, that some of the ores in the Harney Peak district, which are thickly impregnated with black spots, and which to a casual observer would appear to be rich in tin, are really very poor, the black spots being principally schorl, columbite, etc. In his report to me of the results of his assays, Mr. Beringer remarks, 'Even in vanning the results are deceptive, and it is on this account that in my assays I got the tin in metal before weighing it.' In order to give a general idea of the district, I may observe that Harney Peak itself is composed of granite, in which rock, I understand, no lodes have been yet discovered. The various lodes and ledges are in slates and schists surrounding the granite peak, and, generally speaking, are at about right angles to a line drawn from any point to the centre thereof. Thus, where the lodes and ledges are situated to the north of the peak they have a direction of about east and west, and where they are to the west of the peak their direction is about north and south. In almost all instances the lodes and ledges are either nearly vertical or dipping away from the granite. The lodes are generally small, but continuous, being from 1 ft. to 3 ft. wide, composed principally of quartz. The ledges are for the most part large near the surface, but not continuous, and usually become much smaller in depth. These latter are mostly of granitic character, and contain large quantities of mica. Both lodes and ledges are very different in their character and composition from the tin lodes of Cornwall, but closely resemble some of the tin deposits I have seen in Spain, and some of the tin ores from New South Wales exhibited at the Crystal Palace Mining Ex-

hibition. In making my estimates I have calculated the amount of tin ore, or black tin, in a ton of 2,240 lbs. According to Mr. Beringer's assays the tin ore will produce about 73% of metallic tin of superior quality. Having made these preliminary remarks, I now proceed to describe the various workings I inspected, beginning with the easternmost at Etta, proceeding westward toward Hill City, and thence southward to the neighborhood of Custer City. The several points thus reported on can be easily traced by reference to the map.

"Etta.—This is a very peculiar and irregular deposit, being in the form of a mountain, and having no defined direction or dip. A tunnel, 160 ft. below the top, was driven eastward through a mass of spodumene granite upward of 150 ft. wide, containing no tin of value, with patches of tin stone containing large quantities of mica. Some hundreds of tons broken from the whole mass, without selection, were put through the mill, and no wonder, therefore, that the result was so very unsatisfactory. The mill itself appears to be well constructed; but the dressing appliances for separating the tin from the waste are very inefficient, which is evident from the fact that a sample I took from the leavings produced 15 lbs. of black tin per ton. The only possible method of working by which this deposit can be made to pay is to select those parts which are clearly seen to contain tin, and which are almost entirely in connection with mica. Those tin producing portions, however, occur only in patches, and are of so limited a quantity compared with the whole mass that I think it extremely doubtful if any profit can be made by the most careful working unless the price of tin is very high. This deposit, being of such great size and strength, may, of course, improve in depth; but I cannot recommend any expensive trials to be made here at present.

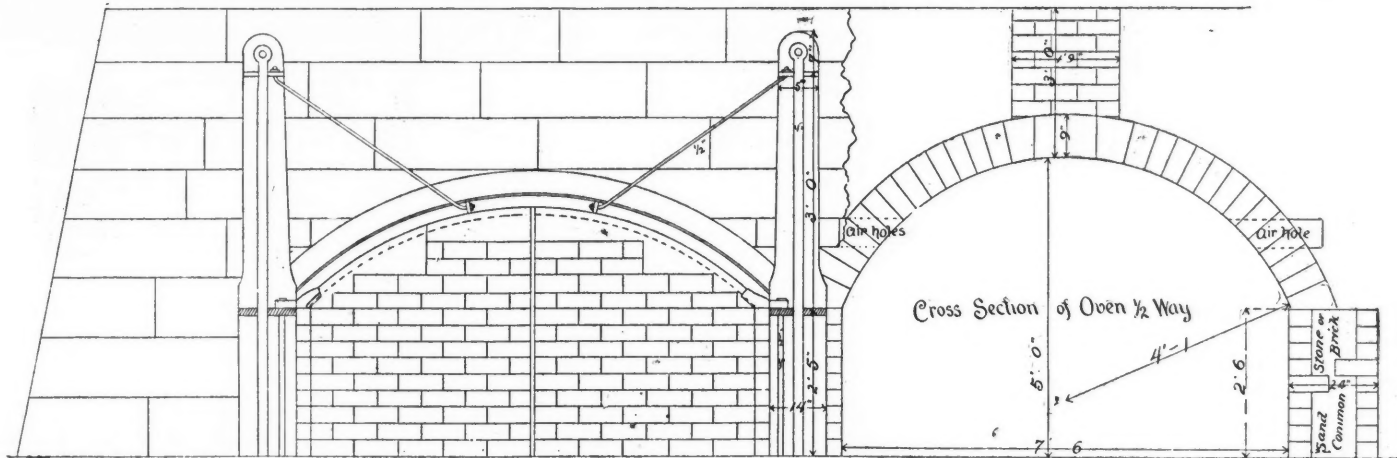
"Ingersoll.—Near the summit of the hill a large ledge is seen cropping up above the surface. Lower down a tunnel has been driven through it, where it is found to be upward of 30 ft. wide, and this tunnel has been extended on its course under the hanging wall for 50 ft. in length. Large spots and crystals of tin are occasionally visible in connection with masses of almost pure mica, but, taken altogether, this ledge is of poor quality, and, according to my samples, will only produce about 10 lbs. of black tin per ton.

"So far as yet developed, this ledge cannot be profitably worked; but it is not thoroughly tested, and can be intersected by another tunnel from

composed principally of hard quartz with only a small quantity of tin, which will not pay for extracting. The prospects here are by no means bright.

"Ingersollia.—A shaft has been sunk on a ledge 5 ft. wide, which contains more quartz and less mica than the ledges generally. One sample taken from here produced upward of 60 lbs. of black tin per ton, but this I judge to be better than the average produce of the whole width of the ledge, which would probably be about 40 lbs. This is worthy of further exploration and development.

"Addie.—Large boulders, some of which are rich in tin, are scattered over the surface. Pumping, hoisting, and air-compressing machinery have been erected on this mine, and a shaft has been sunk to a depth of 600 ft. The 135-ft. level is driven 700 ft., and the ledge, which is of a granitic character with a good deal of mica, varies in width from 6 ft. to 9 ft. for 200 ft. in length. In the remainder of the 500 ft. driven the lode is either very small, being only 3 in. or 4 in. wide, or is composed principally of shorl, with scarcely any tin. At the 200-ft. level the ledge in some places is 9 ft. wide, but for the greater part of the distance driven it is very small, and of no value. At the 300-ft. level nothing has been discovered for the whole length that will pay to work, and the ledge, which in the upper levels was from 6 ft. to 10 ft. wide, has dwindled down to a small leader of 1 in. or 2 in. in thickness. In the southern end, which is now being driven, the leader has increased in size, but does not contain much tin. At the 400-ft. level, which is driven 200 ft. south of shaft, there is merely a wall, with sometimes a very small leader on it. Cross-cuts are now being driven east and west in order to prove whether the ledge has been shifted from its usual dip; but, although these levels have been driven 70 ft. east and 60 ft. west, nothing but country rock has yet been met with. The ledge has not been seen below the 400 ft. level; but the shaft is sunk 200 ft. deeper at a greater inclination than the ledge, so that a cross-cut will have to be driven east at the 600-ft. level in order to intersect it. The pumping machinery is very inefficient, and it is with great difficulty that the mine can be kept drained to the bottom; but I understand there are new boilers ordered for raising steam, and that the 4-in. pumps now in the shaft are shortly to be replaced by pumps of 7-in. diameter. When these changes are effected no further trouble need be apprehended from



CROSS SECTION, THOMAS PATENT COKE OVEN.

200 ft. to 300 ft. deeper. I think there are many other points in your property, however, that are of a much more promising character.

"Black Diamond.—A shaft has been sunk 30 ft. from the top of the hill, on a ledge from 6 ft. to 7 ft. wide, with regular walls dipping a little to the north, a sample from which produced 34 lbs. of black tin per ton. The hill being steep, this ledge could have been intersected by a cutting at a greater depth than the shaft, and at less cost. A tunnel driven about 500 ft. from the valley would intersect this ledge about 300 ft. deeper, and would probably lay open a large quantity of the ground for stoping.

"Mountain Boy.—A shaft was sunk a few feet to water. Another shaft, now being sunk higher up the hill, has just reached the lode, which is principally composed of quartz of a hard and flinty character containing a little tin. A sample from this lode produced 20 lbs. of black tin per ton.

"California.—A shaft is said to have been sunk 65 ft. deep on a soft lode 6 ft. deep. There were no means available for getting down the shaft, so that I could not see the lode. A sample of the ore raised therefrom produced 40 lbs. of black tin per ton.

"Hopeful (in California Group).—The lode here is 2 ft. wide, with regular walls, and is composed principally of hard quartz, with spots and small particles of tin. Two shafts have been sunk on this lode—one of them, I was informed, to a depth of 100 ft.; but, being now idle, and the bottom covered with water, I could not inspect the lode at the deepest point. From what I could see of the lode and the ore raised therefrom, I should judge that it is by no means of a promising character, and, so far as yet explored, will not pay for working.

"Evergreen.—A shaft, now 40 ft. deep, is being sunk on a lode 1 ft. wide, composed chiefly of hard white quartz, with only a very small quantity of tin. The ground is hard, and the lode, in my opinion, too small and poor to warrant any further outlay being made thereon.

"Samehas No. 3.—The lode near surface is 1 ft. 6 in. wide, and a shaft is said to have been sunk thereon to a depth of 100 ft.; but there was water in the shaft, and I could not see the lode much below the surface. A few rich stones of tin are to be seen in the heap near the shaft, and a sample from the heap produced 30 lbs. of black tin per ton. The lode, however, if all of this quality, is too small to be profitably worked.

"Samelias No. 4.—The lode near the surface is 3 ft. wide, and at the bottom of the shaft, which has been sunk on its course 30 ft., is 2 ft. wide,

the water. From the heaps at surface of upward of 3,000 tons I took several samples, of which the average produce was 44 lb. of black tin per ton. It is fair, therefore, to assume that the tin ground standing between the various levels above reported on will be found, on stoping, to be of somewhat similar quality.

"El Dorado.—This lode is situated a little to the west of Addie, and a shaft has been sunk on it 70 ft. deep. This lode in the shaft is said to be 4 ft. wide; but I could not see it at the deepest point, on account of the water being in. One sample from the largest portion of the heap produced 51 lb. of black tin per ton, and another sample, principally quartz rock, was comparatively poor. The whole would probably average about 44 lb. of tin per ton. The lode stuff is rather hard, but the indications are promising for continuance in depth.

"February Group.—At No. 2 a shaft is said to have been sunk 200 ft. and a ledge of good size intersected; but, the mine being full of water, I could only see the heap at surface that came from the underground workings, a sample from which produced 13 lbs. of black tin per ton. This cannot be worked to advantage with the present price of tin; but the ore in the heap being already broken, will, no doubt, pay for putting through the mill. Another large ledge, 70 ft. wide at surface, belonging to the February group, has been partly cut across. This ledge, so far as explored, contains more quartz and feldspar and less mica than usual, with but a small quantity of visible tin. There is another ledge in the February group, close to the road leading to Addie, which is about 50 ft. wide. A shaft has been sunk on this ledge to a depth, I was informed, of 100 ft.; but, water being in the shaft, I could not get down to see it. I could only discover a small quantity of tin in the stuff raised therefrom.

"Excelsior.—The lode here is said to be 3 ft. or 4 ft. wide; but I could only see it close to surface. I was informed that a shaft had been sunk here to a depth of 100 ft. The steam engine by which the mine was drained has been removed, and the workings are full of water. The stuff in the heap is of a promising character, and contains some very rich tin. A selected stone produced by assay 164 lbs. of black tin per ton. The whole heap will average about 40 lbs. per ton. This mine is worthy of further trial.

"Colossal.—A shaft has been sunk here to a depth of 60 ft., on a ledge 6 ft. to 7 ft. wide. A sample taken from the stuff that came out of the shaft produced 78 lbs. of black tin per ton.

"Mewonitock.—This ledge is situated a little to the west of Colossal

and is from 6 ft. to 7 ft. wide. It has been stoped a little way into the face of the hill, and a shaft has been sunk on it to a depth of 35 ft. Some very rich stones and rocks of granite matter, with considerable quantities of mica, are lying at the surface. A sample from the heap produced 16 lbs. of black tin per ton.

"White Whale.—This is a large ledge or lode, upward of 20 ft. wide, lying to the west of Mewonrock, and underlies toward it at an angle of 50° from the horizontal, so that they will probably unite in depth. This has every appearance of being a continuous lode, and is composed principally of quartz, frequently interspersed with branches of rich tin from 2 in. to 4 in. wide. Some samples taken from here produced on an average 59 lb. of black tin per ton. These three last-mentioned ledges are nearly parallel to each other, and at no great distance apart. They are also very conveniently situated for working, being on rising ground just to the south of the railway leading from Hill City to the new mill. They can all be explored to a depth of about 200 ft. below the above-named workings, by tunnels or open cuttings, as may be deemed best after a careful examination, and in my opinion early attention ought to be directed to these points, which will probably result in laying open a large quantity of productive tin ground of more than average value.

"Nevada No. 2.—This is a very large ledge, and a shaft is said to have been sunk on it to a depth of 200 ft., but, being now full of water, I could only inspect the ledge in the cuttings at surface to the south of the shaft. It is of similar composition to most of the other ledges, but with rather less mica. A sample produced 32 lb. of black tin per ton. There are some large boulders lying about which are of much better quality.

"Cowboy.—The lode in this mine varies in width, from two feet to three feet wide down to a few inches. It is composed principally of quartz, containing some very good tin, and is decidedly of a regular formation likely to continue in depth. Two shafts have been sunk on this lode, about 150 ft. distant from each other. At the 60-ft. level there is a good

TREATMENT CHARGES ON ORES FROM THE BULLION-BECK MINE, TINTIC, UTAH.

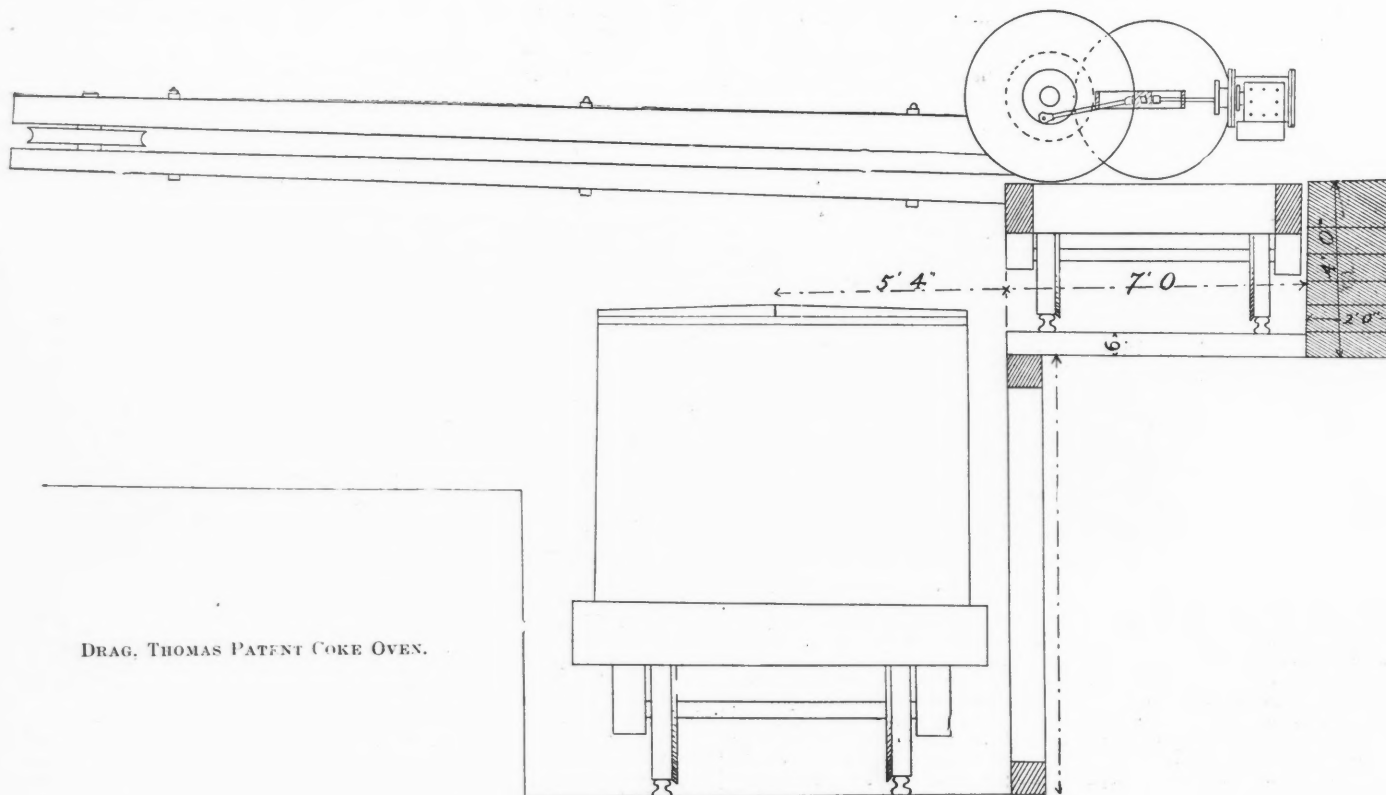
The following table shows the treatment charges per ton of 2,000 lbs. for ore of varying contents of lead from the Bullion-Beck mine, Tintic, Utah, according to Mr. Moses Thatcher, who is interested in the property. The other details of the bids were the same in each case, viz., payment made for 90% of the lead at New York quotations, less two cents per pound; 25% of the silver at three cents per ounce less than New York quotations, and gold at \$16 per oz.

	Under 10%.	10 to 15%.	15 to 20%.	20 to 25%.	25 to 30%.	30 to 35%.	35 to 40%.	Over 40%
1890....	19.25	19.25	16.25	16.00	15.50	15.50	14.50	14.50
1891*....	24.50	23.50	23.00	21.50	20.50	19.50	18.50	17.50
1891f....	21.00	.....	19.75	18.50	19.50	17.50	17.50	17.50
1892....	22.15	.....	19.65	18.65	16.27	16.27	15.65	15.65

*Rejected bid by Omaha and Grant Smelting Company.
fFinal and accepted bid.

It will be remembered that the first scale, that of 1890, was in effect immediately before the passage of the bill shutting off Mexican lead ores, while the others followed it. The effect was pronounced; the average charge on these ores, which average 15% lead, was raised \$3.40 a ton. In the meantime Mexico has gained a great industry.

Railroads of the World.—The Census Office has issued a bulletin giving statistics of the railway mileage of the world in 1890. It shows that out



lode for 120 ft. in length between the shafts. In the remainder of this level for 150 ft. in length the lode is very small and poor. At the 100-ft. level the lode is two feet wide for a short distance only, where it is fairly productive. For the remaining 250 ft. of this level the lode is small and of little or no value. At the 200-ft. level there is a pumping station, but the lode has not been opened out. At the 300-ft. level the lode is said to be from three feet to five feet wide, producing good ore; but, the pumping machinery being out of order, the water was in at this level, so that I could not inspect the workings at that depth. Two samples from the large heaps at surface produced respectively 49 lb. and 25 lb. of black tin per ton averaging 37 lb. The lode in this mine is not large, but if, as reported, it is becoming larger and more productive in depth, the prospects for still deeper sinking are very encouraging. More efficient pumping machinery ought, however, to be provided for the purpose of sinking deeper.

"Coates.—A shaft has been sunk on a ledge, which is from 6 ft. to 8 ft. wide, near the surface. At the 60-ft. level it retains its size for 120 ft. south of the shaft, but to the north of the shaft for 100 ft. in length it is much smaller, and in the end is very small and poor. At the 125-ft. level the ledge is about 6 ft. wide for 120 ft. in length to the south of the shaft, and beyond this for 60 ft. in length it is much smaller. To the north of the shaft at this level it is only from 2 in. to 6 in. wide for 70 ft. in length. At the 225-ft. level the ledge is 6 ft. wide for about 100 ft. in length, and for the remaining 400 ft. driven at this level it is very small and poor. The shaft is sunk to the 400-ft. level, but the ledge has not been seen below the 225. Judging from its appearance there, I should expect it will be found to be smaller at the deepest point. Samples taken from the large heaps at surface produced 18 lb. of black tin per ton.

(To be continued.)

of a total railway mileage for the world of 370,281 miles the United States have no less than 163,597 miles, or 44.13% of the whole, and that the railway mileage of the United States exceeds by 3,493 miles the entire mileage of the Old World, Europe's 136,865 miles, Asia's 18,793 miles, and Africa's 3,992 miles making an aggregate of but 159,655 miles. It is interesting to note the astonishing growth of the railway mileage of the United States from the census year of 1830, when there were less than 40 miles of railways, up to 1890. In 1841 the figures were 2,755 miles; in 1850 they had risen to 8,571 miles; in 1860 the total had swelled to 28,919 miles. The census of 1870 showed the mileage to be 49,168 miles; that of 1880 placed the figures at 87,724 miles; while the eleventh census figures give the astonishing total of 163,697 miles. The following shows the mileage of the world by countries: Germany, 25,969 miles; Austria and Hungary, including Bosnia, 16,467; Great Britain and Ireland, 19,939; France, 22,586; Russia, including Finland, 18,728; Italy, 8,117; Belgium, 3,218; Netherlands, 1,887; Switzerland, 1,929; Spain, 6,127; Portugal, 1,280; Denmark, 1,223; Norway, 971; Sweden, 4,915; Roumania, 1,580; Servia, 327; Greece, 440; Turkey in Europe, Bulgaria and Roumelia, 1,097; Malta, Jersey and Man, 68; United States, 163,597; British America, (Canada,) 13,322; Newfoundland, 115; Central America (Guatemala, Salvador, Costa Rica, Nicaragua and Honduras), 559; Mexico, 5,344; United States of Colombia, 231; Cuba, 1,056; Venezuela, 441; Republic of San Domingo (eastern part of the Island of Hayti), 71; Puerto Rico, 11; Brazil, 5,779; Argentine Republic, 5,129; Paraguay, 149; Uruguay, 470; Chile, 1,926; Peru, 994; Bolivia, 106; Ecuador, 167; British Guiana, 22; Asia, 18,798, of which British India supplied 15,837; Japan, 907; China, proper 124; Africa, 3,992; Australia, 11,137.

THE IVES HELIOCHROMOSCOPE FOR COLOR PHOTOGRAPHY.

An interesting exhibition bearing on the question of color photography was given at the rooms of the New York Camera Club recently by Frederick E. Ives, of Philadelphia. Mr. Ives is the inventor of the heliochromoscope, a device, as he himself describes it, intended to do for color what the phonograph does for sound and the stereoscope for binocular vision.

The instrument Mr. Ives displayed—the only one in existence—had an appearance not unlike that of the ordinary camera, with the difference that polished wooden sides took the place of the usual leather bellows, and that it was placed on a table so that the lens could be adjusted to the eye. The entire instrument, lens and all, is hardly more than one foot in length.

The system of color reproduction in which this instrument plays a part is based upon the Young-Helmholtz theory of color. According to this theory, all color is probably the result of the action of the rays of light upon three distinct color nerves—one for each fundamental color sensation. Loosely speaking, one set of nerves produces the sensation of red, another that of green, and still another that of violet, the three fundamental colors of this theory. The combined results of these cruder sensations are supposed to account for all the delicate phenomena of color.

So in Mr. Ives' system, he first uses a device which, when affixed to an ordinary camera, gives upon the same plate three pictures representing in light and dark the relative effect of the three fundamental color sensations, or their value in light and dark; for the negatives made by this system look like those made by a common camera. If these three pictures, or "color records," as Mr. Ives terms them, were translated back

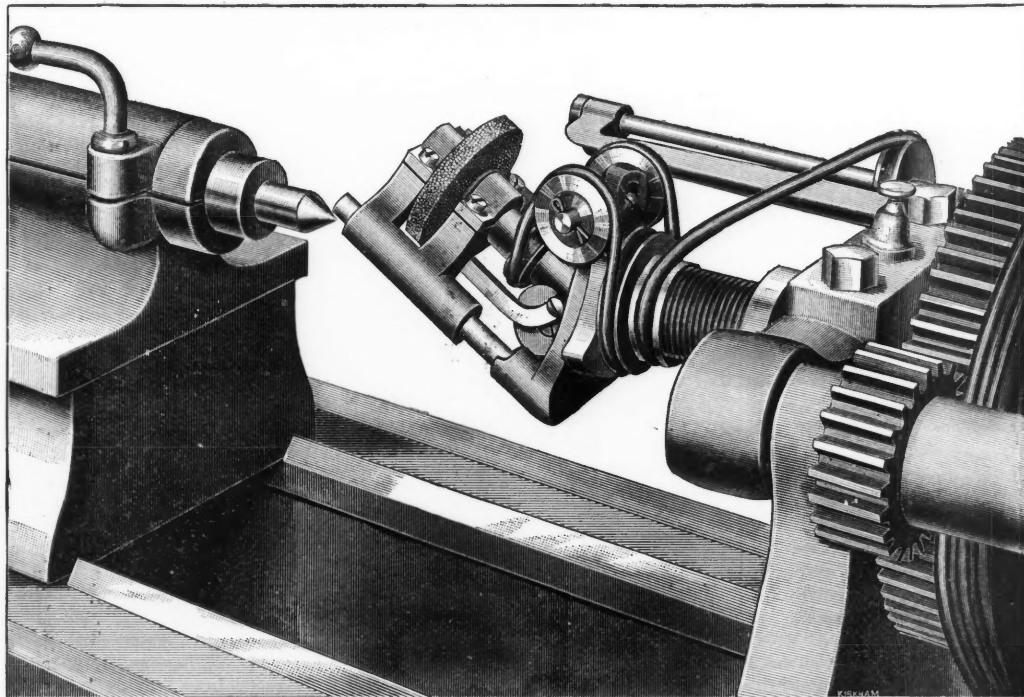
combined produced the neutral gray of the photograph, were seen overlapping each other in red, green and violet.

Mr. Ives, who has devoted fifteen years to the study of photographic color reproduction, is very sanguine that he has solved the problem, and asserts that his system reproduces the color of nature as accurately as the ordinary system does her light and shade. Mr. Ives first displayed his invention before the Royal Society of Arts and Sciences of London in May.

HAWES' AUTOMATIC CENTER GRINDER FOR LATHES.

By means of the novel center grinder here illustrated perfect alignment is automatically obtained in lathe centers. The apparatus consists of an ordinary emery wheel which is connected in such a manner with the motive power that it is not only rotated on its own axis, but also simultaneously revolved in a conical orbit concentric with the center of rotation of the line spindle, and also of course with the longitudinal axis of the dead center. It will be seen, therefore, that this apparatus does not require any specially skilled labor such as is usually necessary in center grinding, as the centers are inevitably ground so that their points come exactly to the axis of the two spindles.

In the cut the device is shown in position for grinding the footstock center. A plug fits the center hole of the spindle and a plate is fitted to its outer end. Another plate secured to this plate has two studs fixed in it, parallel to each other and at an angle of 30° to the center line of the lathe spindles. They form the guides upon which moves a small carriage carrying the emery wheel. Motion is derived from a supplementary shaft, which is supported by the tool post and driven from the large step



HAWES' AUTOMATIC CENTER GRINDER FOR LATHES.

into color separately, one would appear largely tinged with red, another with green, and so on, thus presumably corresponding to the effect made by natural objects on the three sets of color nerves.

The office of the heliochromoscope is to re-combine the three photographs into one, translating the "color records" into color again. In the heliochromoscope each image of the chromogram, as Mr. Ives terms his plate, is seen with light exciting exclusively the fundamental sensation which it represents, but the three are blended into one, which no longer has the appearance of a photograph, but of the object itself seen through a lens.

The interior of the heliochromoscope box reveals nothing except three bits of colored glass, one red, one green, and one violet.

One of the experiments consisted of a color reproduction of a bit of still life. The subject consisted of a small Chinese vase decorated with gilt and bright colors, and placed on an ordinary cigar box. As the natural objects were placed near the heliochromoscope, it afforded a fair test of the success of the system. The result that the instrument afforded was like a weak water color of the object, or like a piece of cheap Japanese decoration. All delicate tints and half tints were lost, while the cruder colors were rather exaggerated in intensity. The "accents" were wanting in force. Much of the modeling of the natural objects was lost, and the texture of the vase was hardly hinted at.

A bouquet of flowers afforded a still more striking example of what the system can do and what it cannot. Crude blues, reds and greens came out with vividness, but that was all.

The reproduction of an ordinary chromo showed the same tendency of the instrument or system to insist upon the cruder colors of the model and ignore all delicate transitions and variations.

One of the most interesting examples of all, perhaps, and one that seemed best to illustrate the truth of the principle upon which the heliochromoscope was constructed, was afforded by a reproduction of an ordinary photograph pinned against a background made up of strips of blue, yellow, and green paper. Under the lens of the instrument the photograph appeared in its proper neutral gray, while the strips of paper came out in telling colors. By tilting the plate slightly, so as to throw it out of its proper position, the three separate "color records," which when

of the cone pulley. The double grooved loose pulley, shown just in front of the live spindle, is driven from this shaft.

This pulley, by means of the two idlers, drives the pulley of the grinding spindle. On the grinding spindle there is a worm, which drives a small worm wheel below. To this worm wheel is connected a small bent connecting rod. The other end of the rod is attached to the emery wheel carriage and thus the latter is given a slow reciprocating motion. When the lathe is started up, the emery wheel rotates rapidly, the whole device revolves slowly, and the wheel reciprocates slowly. If the dead center be fed up toward the wheel gradually, it is evident that it will be ground to the correct angle. To grind the live center, it is only necessary to place the device in the footstock spindle and connect in such a way as to drive the emery wheel in the same way. The rotation of the live center takes the place of the revolution of the grinding device round the axis of centers. This apparatus is made by the Hawes Automatic Center Grinder Co.

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, NOVEMBER 22D, 1892.

- 486,443, 486,450. Manufacture of Cement. Louis Enricht, Chicago, Ill., Assignor to the United States Duroithic Company, West Union, Ia.
 486,444, 486,445, 486,446, 486,447, 486,448, 483,449. Manufacture of Stone. Louis Enricht, Chicago, Ill., Assignor to the United States Duroithic Company, West Union, Ia.
 486,495. Method and Apparatus for Separating Graphite or Like Substances from Crushed Rock. Axel W. Nibelius, Hackettstown, N. J.
 486,540. Gas Furnace. Frederick Siemens, Dresden, Germany.
 483,575. Process of Electrically Reducing Refractory Compounds. Thomas D. Willson, Leaksville, N. C.
 486,591, 486,595. Method of Treating Minerals, Mattes, Speiss, or other Substances Containing Nickel. Jean de Coppet, Paris, France.
 486,698. Process for and Apparatus for Treating Ores of Gold. Louis C. Daumas, Paris, France.
 486,770. Process of Making Salicylate of Phenyl. Paul Ernert, Ludwigshafen, Germany.

PERSONALS.

Mr. E. E. Yates has been appointed superintendent of the Lemhi Gold Placers, Lemhi County, Idaho.

Mr. Percy L. Fearn, mining engineer of Chicago, Ill., has resigned from the management of the Costa Rica Mining Company, and is now visiting New Mexico and Colorado on professional business.

Messrs Henry R. Merton & Company, the well known copper experts in London, have purchased the copper smelting and spelter manufacturing works of Pascoe, Grenfell & Company, Swansea, South Wales. Messrs. Merton already own the Morfa Copper Works in the same district.

Mr. Walter Renton Ingalls, who has been mining engineer for the Pittsburg & Mexican Tin Mining Company, at Potrillo, Durango, Mexico, during the past year, has resigned his position and returned to New York. His temporary address will be in care of the Engineering and Mining Journal.

OBITUARY.

Percival M. Parsons died at London on the 10th November, aged 73. He was the inventor of several alloys, of which white brass and manganese bronze have been the most successful.

Francis B. Nichols died at Englewood, N. J., on the 20th inst. Mr. Nichols was at one time a well known broker in chemicals. He published monthly statistical reports on nitrate of soda which appeared duly in the Engineering and Mining Journal, to which he also contributed other articles on the statistics of various chemicals.

SOCIETIES.

A meeting of the Canadian Society of Civil Engineers was held yesterday at the Society's rooms in Montreal. The discussion on "Transition Curves" was resumed and a paper on that subject was read by Mr. M. W. Hopkins.

INDUSTRIAL NOTES

The Amalgamated Association of Iron and Steel Workers has declared the strike off at the Homestead, Pa., plant of the Carnegie Steel Company, Limited.

According to a Homestead dispatch, the Carnegie Steel Company, Limited, has contracted for improvements and extensions to the mills to the amount of \$175,000.

The employees of William & Harvey Rowland's Steel and Norway Iron Works, at Frankford, Pa., about 200 in all, have been notified of a reduction in wages, to take effect on the 26th inst.

The plate glass manufacturers met again on the 16th inst. at Pittsburg, Pa., and decided to restrict production. The delegates said that no combination had been formed and that no change would be made in rates.

The B. F. Sturtevant Manufacturing Company has purchased the four-story building No. 135 North Third street, Philadelphia, and is now refitting the store and placing a complete line of its goods in stock. The top floor will be used as a place for the manufacture of sheet iron pipe. Mr. C. H. Gifford, who has been connected with the firm for 15 years, is in charge of this branch.

According to an Associated Press dispatch the Illinois Steel Company's steel plant at South Chicago, Ill., which employs about 3,500 skilled and unskilled laborers, is expected to shut down on December 15th. The duration of the shut-down has not been announced, but two or three months is spoken of. One of the officers of the company said the works would not shut down as long as orders were received.

The Stewart wire plant, in South Easton, Pa., which recently passed into the hands of the reorganized Stewart Wire Company, will start up shortly on double shift, employing twice as many hands as it did a year ago. The number of wire machines, it is said, has been increased from 100 to 150. A large building, idle for many years, has been taken by the company and made a part of its plant. The South Easton Wire Nail Company has been chartered under the laws of New Jersey, and will operate in conjunction with this plant.

The Colorado Iron Works, of Deuver, through their Chicago office, have secured the contract for the necessary machinery required for an extensive nickel smelting plant, consisting of Hoffmann & Billings Corliss engines, Stirling boilers, water jacket furnaces, dryers, together with all the necessary machinery for a concentration mill, which will be erected on the property of the International Nickel Mining Company, at Riddles, Ore. Surveys and plans are also being made by the above company for the wire-rope tramway, contract for which has also been placed with them.

One of the most important projects of the United States engineers is the excavation of a ship channel 20 and 21 ft. deep in shallows of the connect-

ing waters of the great lakes between Chicago, Duluth and Buffalo. The work is divided into eight sections and must be begun by May 15, 1893, and finished within three working seasons, that is a period of 200 working days between May 15 and Nov. 30. The contracts will be awarded by sections. There is available for commencing the work the sum of \$375,000, while Congress has limited the cost of the channel to \$3,340,000.

An advance prospectus for private circulation offers for subscription at par, prior to the public subscription, 5,000 preferred shares of the Stilwell-Bierce & Smith-Vaile Company, of Dayton, O. The company is organized under the laws of New Jersey, with a capital stock of \$1,000,000, one-half in 8% cumulative preferred stock and the balance common, par being \$100. No bonds are to be issued. The vendors take the common stock. The new company succeeds to the business of the separate concerns, the manufacture of turbine water wheels, pumping machinery, cotton-seed presses, etc. Average net earnings of \$94,657 for the last three years are claimed.

A Pittsburg dispatch says that in the future the Carnegie Steel Company intends to treat with its employees as individuals. Each man employed is required to sign an agreement, in which he pledges himself to refrain from belonging to any labor organization, and to be governed entirely by the rules and regulations of the company. Each department superintendent is provided with these blanks, and no one can be employed unless he signs the agreement. Many of the men who have regained their old positions at the Carnegie Mills at Beaver Falls, Pa., have received notification that their wages would be reduced. The boiler men, who formerly received \$2.25 per day, must now work for \$1.80. The wages of the others are cut down in proportion.

It is stated that the Amalgamated Association is taking steps to provide for locked-out Homestead and Lawrenceville strikers as rapidly as possible. Of the Homestead men it is estimated that fully 300 cannot get back, owing to the active part they took in prosecuting the fight. Beside these there are a number who are held in Pittsburg by reason of suits yet pending. It is not thought the Association will have much difficulty in supplying these men with situations, as they are all skilled workmen. Ex-President Weibe, of the Amalgamated Association, is quoted as saying in connection with the Homestead, Pa., strike: "No other strike was so broad in its influence, and in no other strike were men so persecuted. On an estimate of \$1.40 per day for laborers and \$3 for skilled workmen the 7,300 strikers in the Homestead, Lawrenceville and Beaver Falls mills lost \$22,000 daily, or \$2,000,000 during the entire strike."

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 of goods of any kind.

Goods Wanted at Home.

2,830. Machinery for canning factory, for manufacturing excelsior, for making handles; also saw mill machinery. Georgia.

2831. A 60 H. P. 6-in. flue boiler, a nigger standard bar, a chain (9) live rolls, complete; a steam feed for cut-off saw; a slab slasher; 20 pair trucks, (with axles), 16-in wheels, journals on outside, for dry kiln, and cars. Mississippi.

2832. Mine cars, steel T rails, and wire ropes. Virginia.

2833. A small 4 side molder and matcher, 18-22 in. resaw, belting, 50 H. P. boiler and pump, and heater. Louisiana.

2,834. A 70-in x 40-in x 6 15-16. split iron pulley, heavy for 3 ply belt. Pennsylvania.

2,835. 165 tons of good steel T-rails, with angle splice bars. Virginia.

2,836. 50 mine cars (2 ft. gauge). Virginia.

2,837. A pair of hoisting drums, 10 ft. diameter, with engine. State age of machine, name of maker, probable weight, and price f. o. b. cars. Michigan.

2,838. 6, 8 and 12-lb. T-iron rails with spikes, switches, frogs, etc. Virginia.

GENERAL MINING NEWS.

A party of New York and Denver capitalists accompanied by placer experts and hydraulic engineers, were to leave Green River for the Colorado River placer mines on the 20th inst. A deal is stated to be on with these capitalists and it is probable that should they be satisfied with the country they will purchase a large amount of placer ground and raise water from the river to work them.

A dispatch from Salt Lake City announces that the mining congress which was to have been held in that city on December 26th, has been indefinitely postponed by the Executive Committee, upon the advice of W. F. James. The conclusion was reached that it would be impracticable to hold a convention of such importance at this season of the year and following so soon upon the campaign. The committee will decide upon a date for the meeting hereafter.

ARIZONA.

Pinal County.

Silver King Mining Company.—There has been received at this company's office in San Francisco \$3,244.68 in gold coin as the proceeds of the sale of 9½ tons of ore concentrates. The mine is reported to be looking well.

CALIFORNIA.

The California Miners' Convention at San Francisco, on the 16th inst., adopted a memorial to Congress requesting a modification of the mining laws, so as to enable the drift miners to obtain a title to claims more expeditiously than under the present law. The Convention also adopted resolutions which approve the Caminetti bill, recommend that efforts be made to obtain an appropriation of \$450,000 for the construction of restraining claims provided for in that bill, and recommend that the State Legislature make an appropriation to that effect. The resolutions also favor the passage of the free coinage of silver law. Congressman Geary delivered a brief address. Jacob H. Neff was re-elected president of the Miners' Association, W. C. Ralston, secretary.

(From our Special Correspondent.)

The suit brought by Martin White against G. C. Hickox, J. Spear, L. B. Stone, W. Stone and W. Tillinghast, which has been pending for some years, has at last been decided. The suit was brought to recover the value of 8,500 shares of stock held in trust for White by the banking firm of Hickox & Spear. In 1878 the firm failed and this stock was turned over with the other assets to the other defendants. This stock was sold later without the owner having been notified, and from this action sprang the suit. White alleged that Hickox held the stock in his private capacity and not as security against his overdrawn account. Upon the case being first tried \$19,000 damages was awarded White. A new trial was obtained and this week came up for second hearing. Much evidence was elicited and the jury returned a verdict for plaintiff, the defendants or their heirs or executors being ordered to pay the sum of \$21,864.79.

Amador County.

Inna Mining Company.—This company has erected hoisting works, air compressor, etc., and has started sinking with powerful drills. The sinking is being done in the old Pioneer shaft, where the ledge was said to have pinched out, but an 18-in. ledge was struck Tuesday which showed good ore. It assayed \$55 per ton, and carries from 12 to 15% of sulphurets which assay from \$50 to \$550 ton. The shaft is to be sunk 200 ft. on the ledge, which shows every indication of growing wider, but even if it should not, it is a small bonanza as it is.

Mono County.

(From our Special Correspondent.)

Bulwer Consolidated Mining Company, Bodie.—Some good grade ore is being extracted from the east cross-cut workings from the head of the flat upraise, on the 150-ft. level. In other parts of the mine extensions have been made without anything of importance having been uncovered.

Mono Mining Company, Bodie.—This week the putting in of the bob train at the 300 level east shaft, has been finished and the south drift, 550 level, has been extended 8 ft.

Summit Mining Company, Bodie.—The stoping out of ore on north and south of main incline, 200 level, has commenced, and the south drift, 200 ft. level, has been cleaned out for 35 ft.

Nevada County.

Brunswick Consolidated Gold Mining Company.—The superintendent writes under date of the 15th inst.: "The prospects at the mine show no change. The ledge in the east and west drifts are of the same width and show the same value, with signs of improvement in the west drift. The total depth of the shaft is now 676 ft. Total length of the east drift, 101 ft; west drift, 112 ft. The pumping machinery from the 600 level to the bottom of the shaft was changed from a 4 to a 6 in. plan, on account of an extra flow of water. I have laid off the contractors to give the water a chance to drain off. The pump cannot keep the bottom dry for sinking."

COLORADO.

Colorado Coal and Iron Company.—Mr. Thos. E. H. Curtis, secretary of this company, has issued the following statement to the stockholders: "The consolidation of the Colorado Coal and Iron Company with the Colorado Fuel Company having been perfected by the incorporation of the Colorado Fuel and Iron Company, stockholders are notified to send their stock for exchange to the Knickerbocker Trust Company, 18 Wall street, New York. The holders of the Colorado Coal and Iron Company stock will be entitled to four-tenths of one share of the common stock of the Colorado Fuel and Iron Company, and six-tenths of one share of the stock of the Colorado Coal and Iron Development Company, for each share of the Colorado Coal and Iron Company's stock. Arrangements have been made with the Knickerbocker Trust Company whereby they will purchase fractional parts of shares of the Colorado Fuel and Iron Company's stock, or the Colorado Coal and Iron Development Company's stock, to which stockholders would be entitled, at the closing 'bid' price for the stock on the New York Stock Exchange on the day that the stock is presented for exchange, less a commission of 5%. Application will be made to list the stock of the Colorado Fuel and Iron Company, and the Colorado Coal and Iron Development Company, on the New York Stock Exchange, but as the Governing Committee do not hold their next meeting until December 14th, 1892, which is the earliest date at which the stock can be listed, arrangements have been made through the committee on unlisted securities so that quotations and dealings can be made at once in the unlisted department. On and after November 26th, 1892, no further transfers of the Colorado Coal and Iron Company's stock will be made. Stock presented for transfer will be exchanged as provided in this notice."

Boulder County.

Native.—It is reported that this silver mine at Caribou is to be started up again with James Hutchinson, formerly inspector of metalliferous mines, as manager. The mine is owned by ex-Governor Curtin, of Pennsylvania, and has, in times past, produced well.

Scotia.—A strike is reported at this mine at Summerville. The vein is large and yields well in gold (tellurium) and silver. The vein is said to be 16 in. between walls and has a 7-in. smelting streak. This ore was encountered in a tunnel 385 ft. from the mouth. The mine is owned by William Beaman, John Hilton and James Connor, Sr.

Clear Creek County.

The following are the latest items of mining news from Idaho Springs: "The western portion of the Lake tunnel has been leased. The lessees are driving into Bellevue mountain. The tunnel is in about 110 ft. and the breast shows a large body of smelting ore worth from \$60 to \$150 per ton. The lessees made a shipment of high grade ore last week. Considerable work will be done on the Idaho tunnel this winter. The management has made arrangements to drive the tunnel, which is now over 1,500 ft. long, to intersect another vein. Three shifts are at work sinking the Solid Muldoon. The Mayflower mine has started up work again.

El Paso County.

The Denver "Times" states that arrangements have been made for the sale of the Midland branch from Hayden divide to the town of Midland to the Midland Terminal Railroad Company. The Colorado Midland Railroad first started the road. The entire line from Hayden to Cripple Creek will now be built narrow gauge, and part of the grading is already done. Favorable traffic arrangements, it is claimed, have been made with the Santa Fe Midland.

The following items of Cripple Creek mining news are clipped from local papers: The Deershorn No. 1 is shipping about 25 tons of high grade ore to the Kokomo smelter daily. This amount can be easily doubled as soon as the railroad is ready for business. Messrs. Roubush & Dunham are working the Deershorn No. 2 and are keeping 10 stamps of the Gold Geyser mill busy on ore from this property, and are sacking the high grade refractory ore from the same mine. The Plymouth Rock Company, which has been shut down for the past month, began shipments again last week. The Pharmacist is shipping 40 tons of ore each week, and as soon as the third level is opened up the shipment will be increased to 60 tons. The vein is widening with depth while the quality remains the same. All ores shipped from this mine to the present time have netted the company on an average over \$200 per ton, after freight and smelting charges have been deducted. The parties who have the Burns claim leased and bonded claim that they have struck the Pharmacist vein. Assays on the find run all the way from \$10 to \$300. The Matoa company is shipping regularly from the Raven lode, and the returns so far from the smelters are good. The Eclipse has made two car-load shipments which netted over \$240 to the ton. One hundred thousand dollars has been refused for the property.

Anacoda Mining Company.—This company has issued a circular calling for a contribution of 5c. per share, to pay an indebtedness of the company, and to allow the work to proceed, says the Colorado

Springs "Gazette." The circular states that low grade ore is plentiful and can be treated for \$4 or \$5 per ton. Eighty per cent. of the stockholders must respond to make the assessment legal.

Anacoda Mining Company.—G. de la Bouglise, representing a French syndicate, had an agreement signed on the 15th inst. by the Anacoda Mining Company, of Cripple Creek, to furnish him with 15,000 tons of milling ore as soon as a mill can be put in operation for its treatment. The milling company, says the Denver "Republican," agrees to put in mills and reduction works capable of handling 100 tons of ore a day, and the mill is to go into operation as soon as the machinery can be put in place. The articles of agreement were signed on the 15th inst. by D. H. Moffat, president of the Anacoda company, and by Mr. de la Bouglise on behalf of the French syndicate.

Gilpin County.

Justice.—Work on this mine has been resumed. The level at 200, 300 and 400 ft. are being driven, and stoping was commenced last week in the two lower ones on the west, where there are good-sized bodies of mill dirt and iron.

Phoenix.—The lessees on this property are drifting and stoping in the 200, 300, 400 and 500-ft. levels east and west. They average from 300 to 400 ft. in length and show bodies of mill dirt varying in width from 18 in. to 2½ ft. and streaks of smelting iron, yellow copper and sulphurets from 4 to 6 in. wide. Mill dirt returns show a value of from 2½ to 3½ oz. of gold to the cord, making 1,500 lbs. tailings to the cord, worth from \$10 to \$15 a ton. Shipments are about as usual."

Lake County.

(From our Special Correspondent.)

Crown Point Mining Company.—This property is now being worked entirely through the Carson-Blow lease and last month a total of 350 tons of high grade ore was shipped to local smelters. This work is going on through the old Wier shaft, from which a drift was recently run to connect with the ore body opened up several months ago to the south of the Crown Point.

Evening Star Consolidated Mining Company.—Eleven shafts of this property are now producing something over 100 tons daily of iron ore, besides a small quantity of higher grade lead ore. The amount of the latter, however, is insignificant, but in the McHarg shaft it is thought that the original shoot has been struck, which made the property famous in the early days. The Kitchen, Porter and Triangle shafts are to start up in a few days, making a total of fourteen different leases on this property.

Fanny Rawlings Mining Company.—A large amount of dead work has lately been done by this company at their property on Breece Hill, and not until the last few days has the work of developing the mine been resumed. Two raises were recently run from the 260-ft. level for the purpose of exploring the first contact, and resulted in opening up a fine body of copper ore, which apparently pitches with great abruptness to the south. Accordingly the level spoken of is being carried forward for the purpose of catching the shoot on its dip, when it is thought the mineral will have changed to a high grade copper sulphide similar to that found in the Little Johnnie in close proximity. A large body of lead carbonates also exists in the same channel, but this will not be developed until the copper ore is opened up to some further extent.

First National Mining Company.—The manager of this property is at present in Pueblo, conferring with the owners and stockholders in reference to resuming work in the lower levels, where a large shoot of ore is known to exist. Some ore is now being taken out at the upper levels, but the quality appears to be growing poorer and the only way now to place the property on a paying basis is to resume work where the best results can be obtained.

Flagstaff Mining Company.—The quality of the contact now being developed in this property is improving daily and a strike of good mineral is looked for at any time. The principal work is going on in a drift at the 500 ft. level, being driven to the southward, and, from former calculations, it has been estimated that the Humboldt shoot lies in the near vicinity. The old machinery has been thoroughly repaired and renovated and no trouble is being experienced from water, as the Humboldt pumping succeeds in draining that entire vicinity.

Ibex Mining Company.—From the Little Johnnie shaft on this property an average of 70 tons daily of very high grade ore is being shipped, consisting principally of a copper sulphide. Some lead and silver ores also exist at this point, although but little of this class of ore is now being shipped, owing to the low price of silver. Last month the Little Johnnie paid a dividend of \$20,000 to its stockholders.

Iron-Silver Mining Company.—For several days past rumors have been afloat to the effect that this great mine is soon again to resume work with its former vigor and that a large force of men would again be employed thereon within the next two weeks. No one here, however, appears to know anything the matter, but the fact that a number of men employed lately about the premises is cleaning up and apparently getting things in shape seems to verify the report to a great extent.

La Plata Mining Company.—This property is at present being worked by seven different sets of lessees and considerable good ore is being mined and shipped. On No. 2 Quinlan and Rundle are shipping about 175 tons monthly of very high grade carbonates and a similar amount is being taken out at No. 6. Considerable new work is going forward and the ground to the south end on the claim is being opened up in good shape.

Mahala Mining Company.—Sixty tons daily of iron sulphides constitutes the shipments from the Mahala, all of which goes to the local smelters. The shaft is now down 900 ft., although the ore is being mined from the 800-ft. level. The ore has opened up in an entirely satisfactory manner, dipping east and a little south. An additional force of men is now engaged in doing development work in order to catch the shoot on its dip, which will enable the operators to handle a much larger amount of ore and at a greatly reduced cost. As soon as this has been accomplished the output will be considerably increased and another force of men will be added. But little water is now being encountered, although two large pumps are kept in constant readiness in case of emergency.

Red Head Mining Company.—This well known property has again resumed work and a drift is going to the south for the purpose of catching one of the La Plata shoots on its dip to the southeast. This drift has now progressed about 90 ft. and will probably have to go 100 ft. further before its object is accomplished.

Small Hopes Mining Company.—Last month 3,000 tons of dry neutral ore were mined at this property and it is estimated that the same amount will be taken out this month. Most of this product comes from the Kerns and Cary shaft, which serves as a center for operations at that property. Some new ground is also being opened up near the Emmet shaft and shipments are made regularly. This latter shaft is down 800 ft. in the second contact and a force of 125 men is steadily employed in opening up the ground contiguous thereto. Last month the company paid a dividend of \$37,000 on its stock.

White Cap Mining Company.—A large portion of this property was recently leased to different parties and 30 tons of lead carbonates are now being shipped regularly. The company, however, have reserved to themselves the right of operating the lower portion of the ground and are doing considerable new work in that direction. Connections were recently made with the old workings of the Imes shaft, for the purpose of draining the ground in that locality. At the 500-ft. level a drift is being run toward the old Missouri workings and from that drift an upraise is being driven up through the second level into the intrusive gray porphyry, where so much high grade ore was found not long ago in the Minnie lines. The company is at present employing about 30 men, while the lessees are employing twice that number.

Wolcott Mining Company.—This property has succeeded in reaching the shoot formerly opened up by the Fardown shaft, a short distance to the north, and are shipping a large amount of good ore regularly. This is found in a drift run to the north from the 200 ft. level and consists of a 5-ft. body of fine sand carbonates. From the same level another drift is being driven to the southeast for the purpose of catching an extension of the famous Elk shoot on its trend northward.

Saguache County.

Creede continues to run a daily ore train carrying about 6,000 tons per month. A recent shipment of 10 cars from the Last Chance brought, it is said, \$90,000. More high grade ore has been opened in the Holy Moses. The Kreutzer Sonata and Yellow Jacket are opening new ore.

Winchester.—According to the Denver "Republican," a dispatch from Creede announces that a good strike has been made in this property owned by Walter D. Maud and C. E. Hawkins. The vein of the Amethyst, after months of hard work, has been cut, and the property lying to the northwest of the Last Chance is by this strike made valuable. These claims include the Eureka No. 2, of the 400 Acre Diamond Drill Company, the Happy Thought, the Stanhope of the White Star Mining Company and various other properties which lie in the vicinity of the Winchester. The strike also improves the value of the Dead Pine, the property of the Baltimore-Creede Mining Company.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending November 18th: Snuggler-Union, 418 tons; Sheridan Consolidated, 319 tons; Hector Mining Company, 11 tons; Montana, 11 tons; total, 759 tons. Total shipments since January 1st, 30,801 tons.

Belmont Consolidated Gold Mining Company.—Manager J. A. R. Waters has closed down the Belmont mine for the winter says the Telluride "Republican." There is as much ore out now as the mill can possibly treat before winter compels its being shut down. The mine is in first-class shape for stoping at any time.

GEORGIA.

Carroll County.

(From our Special Correspondent.)

During a recent visit to this county my attention was called to a well defined ledge of asbestos. The outcroppings appear through a district about

6 miles in length, with a width varying from 200 to 400 ft. It lies in a direction from northeast to southwest. From the point where the outcroppings first appear, a distance of two miles intervenes to the next point where the ledge can be traced by the surface indications. Here the outcroppings appear in immense boulders protruding from a few feet to 20 ft. above the surface, and covering an area of from 20 ft. to 40 ft. in width. The ledge can be easily followed from the boulders where first exposed across 300 acres; though such pronounced surface indications are but slight across the first 200 acres, yet, across the next 50 they are very pronounced, regular and continuous. Beyond the southwest corner of this the outcroppings disappear, but are encountered again in immense boulders 25 ft. high at the southwest corner of the 50 acres adjoining. This ledge, so far as can be ascertained from the small amount of prospect work at present performed, is of a vertical formation. The work consists of an excavation about 3 ft. deep and 8 ft. across near the southwest corner of the 50 acres on which the strongest surface prospects appear. This prospect hole is on the entrance east side of the ledge, and exposes a slightly decomposed vertical slate wall and to the east of this wall a vein of mica schist. Investigations showed that a vein of mica schist lay parallel with the ledge of asbestos, across the entire 50 acres, of a width equal to the ledge of asbestos; but whether of any value so far as the mica is concerned, I could not ascertain, as no prospect work had been performed. Signs of mica appear both in the soil of the adjoining land as well as on the public road; while at some points where the road has been graded, blocks of mica as large as 6 inches square, and as thick, have been found which can be readily split into sheets of extreme thinness. While the prospect work on the asbestos showed it to be of long and fine fiber, yet it was hadly stained with the surface clay, but at the bottom of the hole the stain became slighter, and would apparently disappear when greater depth was reached. Beyond the southwest corner of the last 50 acres mentioned, the outcroppings disappear and, so far as known at present, the next point where the mineral shows on the surface is 2 miles distant in a southwesterly direction. Rumor says that the same ledge can be traced by its outcroppings beyond this last mentioned point in a southwesterly direction into Hurd, the adjoining county to Carroll, but I have not yet proved this rumor to be a fact, though in the near future I purpose to ascertain by personal examination whether it is true or otherwise. So far as I could learn the ledge has so far only been encountered at the three points I have mentioned, but no prospecting of a thorough nature has been done. The lands in the vicinity are tilled by farmers whose knowledge of minerals is very limited and whose time is so fully occupied as to admit of but little opportunity to explore the mountainous timbered lands adjoining or in the vicinity of the farms.

Haralson County.

(From our Special Correspondent.)

The reorganization of the Georgia-Alabama Investment and Development Company, of Tallapoosa, is being carried to completion by the committee of which Mr. Osgood, of Wakefield, Mass., is the chairman. This gentleman has recently returned from a trip through the North and expresses himself as very sanguine of success. In the meantime the proposed route of the Georgia, Tennessee & Illinois R. R., which had been surveyed from Tallapoosa to Stevenson, Ala., on the Tennessee River, and was one of the enterprises the defunct company under the presidency of Ben Butler, of Mass., proposed to carry through, has been traveled by a Mr. Wheatcroft, an English engineer, who proposes to invite English capital to embark in the enterprise, accompanied by L. F. Ballinger, the locating engineer. The proposed route crosses ten lines of railroads and surveys for proposed roads, also two navigable streams, the Coosa and Tennessee rivers, between Tallapoosa and Stevenson, a distance of 120 miles. It traverses a heavily timbered country as well as the brown and a portion of the red iron ore districts of Alabama. If built, it is proposed to extend the road southward to Brunswick, Ga., and thus form a connecting link between the Atlantic Ocean and Tennessee River. There is no doubt but that gold exists in this section of Georgia, for two miles from Tallapoosa is located the Camille gold mine, which has been worked at regular intervals for the past 50 years. At present this mine is under bond, and no work other than pumping is being carried on. I did not visit it because the workings, except to a depth of about 60 ft., were still under water, but the holders of the bond propose working the pump continuously until the lowest workings, at a depth of about 200 ft., are pumped dry.

Corundum, it is affirmed, also exists somewhere in the mountains not so very far distant, but how far I cannot say from personal knowledge. I was shown some very fine samples of rose corundum at the office of a leading citizen of Tallapoosa, but the location of the discoveries is at present unknown except to a favored few, who state they have nothing to say for publication. If this mineral exists in this section of the south, I believe I am satisfied in promising the readers of the Engineering and Mining Journal the earliest information on the subject; at present though the only reliable information I can gain is that it has been discovered in the

Appalachian chain of mountains, between the Chesapeake and Alabama, which is anything but satisfactory.

IDAHO.

Alturas County.

Silver King.—It is stated that arrangements are completed to rebuild the Silver King mill and hoisting works as early as possible in the spring. Also, that the Atlanta Company, which operated in Eureka canyon, Sawtooth, some years ago, will resume development work on its group of three or four patented claims, with a working capital of \$25,000.

Boise County.

The 25 stamp mill of the Gold Hill Company has run through the year on ore from the Pioneer mine, and has yielded well. The main shaft is going down to open up another 150-ft. level, and it will be down and stopes opened up in the course of a few weeks. Work will then be resumed in the Gold Hill.

The Mountain Queen mill, at Grimes' Pass above Pioneer, has kept a portion of the stamps running since spring. The ore was sufficient to keep all 20 of them pounding away, but there was insufficient supply of water to run the turbine wheel up to its capacity. Steam power will be put in as early as possible next spring, so that all the stamps can be kept dropping. Near the Mountain Queen is the Muddy group, on which a shaft is down 228 ft. At the bottom of this shaft the ledge is 10 or 12 ft. wide and the ore will mill, it is said, \$15 per ton in free gold. William Sweet, the superintendent, is running a tunnel to tap at a depth of over 600 ft. This tunnel, which will be over 1,500 ft. long, is now in between 1,200 and 1,300 ft. The Muddy vein will be reached before January, and if the mines continue good at a depth a large mill will be erected.

Owyhee County.

De Lamar Mining Company, Limited.—The following is the manager's report for the month of October: Crushed during the month, 2,600 tons; bullion produced in the mill, \$67,235; estimated value of ore shipped to smelters, \$10,000; miscellaneous revenue, \$870; total produce, \$78,105; total expenses, \$37,300; \$40,805.

Shoshone County.

Coeur d'Alene Silver and Lead Mining Company.—The average weekly shipment of concentrates to the East Helena smelter is about 315 tons. The directors are pleased with the general outlook at the mine and expect to be soon again paying dividends.

Vienna and International.—Some time since Frank Esler bonded these two claims on Placer Creek, about 6 miles from Wallace. A contract was let to sink a 100-ft. shaft on the Vienna. The two claims are on parallel leads, both of the same character, showing heavy iron croppings. Work has been progressing since the bond was taken. The vein is from 9 to 15 ft. wide and is red hematite from wall to wall. A number of specimens of galena have been struck in the shaft at a depth of 35 ft.

Yellow Jacket.—This property on Yellow Jacket Creek, 60 miles northwest of Challis, has been purchased recently by Messrs. Thompson & Ingersoll, residents of Rico, Colo. The mill has 10 stamps and crushes 20 tons of ore per day, free milling. The plates save \$15 per ton in gold, leaving tailings carrying \$8 in gold. There is about 9,000 tons of tailings in the dump, and it is proposed to work these over. The mill is being repaired and new crushing machinery added, so as to run the capacity up to 45 tons per day. The mill is run by water power, and there is power enough in Yellow Jacket Creek to increase the capacity of reduction to 100 stamps. The mine can be drained to a depth of 1,200 ft., and the ore is in a ledge with walls 300 ft. apart. There is one place where it has been worked for over 100 ft. without reaching the walls. The vein shows croppings across the mountain for over 1,400 ft. and has been opened up a distance of 800 ft.

MICHIGAN.

Copper.

Centennial Mining Company.—Good reports are coming from the amygdaloid in No. 1 shaft.

Wolverine.—A new hoisting engine has been bought for the Wolverine, and a solid foundation for the stamp head is to be put in. When production commences, a good output is promised. It is expected that an assessment is to be levied in the near future.

Iron—Marquette.

Lake Superior.—The new compressing plant for the Section Sixteen portion of the Lake Superior Iron Company's workings, this city, was started up on the 15th November. The plant is the manufacture of the Rand Drill Company, New York. The Lake Superior has expended about one hundred thousand dollars in new equipment during the present year. The lake shaft of the Lake Superior Iron Company has closed down. It employed about ninety men, of whom all but about thirty have found employment at other portions of the company's property. The Lake Superior, at the beginning of this month, had 190,000 tons of ore unsold upon the docks of Lake Erie, and besides this there were about 80,000 tons unsold and which were in stockpile at the mine.

Iron—Menominee.

Aragon.—The Aragon Mine has shipped 168,000 tons of ore this season. Lake shipments for this year have ceased, but some more ore will go out by rail.

Chapin.—At this mine a large area has been added to the stockpile grounds at "D" and there is now room for several hundred thousands of tons. The new pump is nearing completion. The painters are busy at work in the engine room; the work in the shaft is nearly completed.

Hamilton and Ludington.—These mines are now employing about 50 men and active preparations are going on for the unwatering of the mines. The plan, as we understand it, says the Norway "Current," is to take out the water in Hamilton No. 2, which is down to about the same depth as three of the other shafts, then to drit toward Hamilton No. 1 as far as is considered safe—the difference to connect being known—then to use a diamond drill and bore a series of holes letting the water down from the other parts of the Hamilton and from the Ludington. This contemplates the taking of all the water out through the Hamilton No. 2 and holding it down by the use of the large boilers now in the shaft. As there are two other compartments in the shaft, the flat rope hoist from No. 1 shaft will be set up at No. 2. The foundations are now being laid and cages will be used in two other compartments to hoist the rock while the bailers keep the water down. These engines have a hoisting strength of more than four tons; as there will doubtless be a rush of water into No. 2 when the drill holes are made, two bailers of 52 in. diameter by 16 ft. long will be provided for attachment to the small engines instead of the cages. In addition to this everything is being made ready to haul through the Ludington shafts if found practicable and thus lessen the head of water at No. 2 Hamilton.

The Penn Iron Manufacturing Company.—This company closed their shipments on the 10th inst. with a total output of 353,142 tons for the season. This amount could have been made greater had it not been thought best by the management to stop shipments and begin to stock.

MINNESOTA.

Iron—Vermillion Range.

Preliminary surveys have just been completed by M. S. and W. H. Cook, civil engineers of Duluth, between Cashaway Falls and the Chandler, Pioneer and Zenith mines with a view of putting in an electric plant to be run by water power and to furnish electric power for the operation of the mines above named. Two claims were purchased some time ago by Mr. Silverman, of the Minnesota Iron Company, one from Louis Rouchleau, the consideration being \$19,000. These claims include all lands contiguous to the Cashaway water power, which is about four miles from Ely. It has been ascertained that at the season of lowest water, with turbine wheels, 4,800 H. P. is available, while at times it will be double that. It is intended to locate the dynamos at the Cashaway and the transformers at the mines. The mining companies are not interested in the venture, it being the plan of Mr. Silverman and his associates to put in the plant and furnish power to the companies at a stated figure. No contracts have yet been awarded to the Silverman syndicate, as the mining companies first want it demonstrated that the scheme is practical and would be profitable. It is understood that the preliminary surveys have proved highly satisfactory to the projectors and it is expected that encouraging contracts with the mining people will be effected soon and the feasibility of the scheme tested.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, Nov. 21.

The lead and zinc mines of the entire district are being operated with a vigor owing to the advance in the price of zinc ore. The market closed at \$23.50 to \$24 per ton. The lead market is now on the decline, and closed at \$21 per thousand. Following are the sales of ore from the different camps: Joplin mines, 1,973,700 lbs. zinc ore and 284,960 lead; value, \$28,388. Webb City mines, 608,820 lbs. zinc ore and 64,780 lead; value, \$8,037. Carterville mines, 1,573,310 lbs. zinc ore and 60,860 lead; value, \$8,950. Zincite mines, 115,890 lbs. zinc ore and 3,960 lead; value, \$1,350. Lehigh mines, 129,410 lbs. zinc ore and 970 lbs. lead; value, \$1,500. Oronogo mines, 54,000 lbs. of lead; value, \$1,081. Alva mines, 88,000 lbs. zinc ore; value, \$968. Carthage mines, 30,000 lbs. zinc ore; value, \$350. Galena (Kan.) mines, 999,730 lbs. of zinc ore and 300,480 lbs. lead; value, \$16,995. District's total value, \$77,619. Aurora, Lawrence County, mines, 451,550 lbs. zinc ore. 685,800 lbs. of silicate and 200,000 lbs. of lead; value, \$14,982.50. Lead and zinc belt's total value, \$92,401.50. Mr. W. S. Higham, of the Ruby Mining and Smelting Company, has returned from an Eastern trip and is now giving his entire attention to the development of a 40-acre tract of land just north of the Mubaska Mining Company, Limited. Mr. Higham organized a company, called the Blendville Mining Company, and secured a lease on this tract of undeveloped land, and now has five shafts in lead ore, but is still sinking to reach the zinc ore leads. Col. H. H. Gregg, our World's Fair commissioner, has sold 100 tons of zinc ore from his Scotia mines in Temyard and Garden Hollow district, four miles southwest of Joplin. This Scotia

mine has now men operating less than one year, and the Colonel informs us that he has mined and sold from one shaft 1,200 tons of zinc ore; in fact, the land was undeveloped one year ago. The Bell Boy mine, on the Rec. M. & S. Co.'s land, are making a steady run with their new concentrating mill, and producing from 20 to 25 tons of zinc ore per week. The Keller Mining Company on the same land have spent about two weeks in dead work, and to-day commence twisting ore.

MONTANA.

Beaverhead County.

Jay Hawk & Lone Pine.—The main shaft is down 85 ft. below the ninth level, showing a lode from 5 to 7 ft. thick of good ore. The bottom level is in 15 ft. from the shaft. The vein for this distance is from 4 to 8 ft. thick of very good ore. The surface tunnel is being ahead to unbottom Excelsior shaft. There is a lode of low grade ore from 5 to 10 ft. thick (occasionally showing rich pockets) for the entire length of the level. The greater part of the ore will remain untouched until the new mill is erected. The stopes throughout the mine are yielding good ore. The mill is running steadily with the usual results. The mine is looking as well now as at any time since purchased.

Jefferson County.

Elkhorn Mining Company.—During October the mill worked 30 days, and crushed 1,150 tons; bullion produced in the mill, \$35,045; 283 tons of smelting ore sold, \$24,192—total produce, \$59,237; total expenses, \$24,256; estimated profit for the month, \$34,981.

Silver Bow County.

Butte & Boston Mining Company.—It has been said of late that the Butte & Boston Mining Company had opened up a rich body of ore. In an interview to day, an officer of the company said: "It will be remembered that the Butte & Boston company, in cross-cutting the East Gray Rock from the 600-ft level, expected to cut the north vein, which was supposed to lie in that ground. This vein was cut about seven weeks ago, and was found to be very rich where it was first encountered. Since that they have drifted 116 ft. on the vein, and find that it averages from three to six ft. in width of high grade ore. A sample of this ore has just been forwarded, with the report of the mine development. This shows the ore body to be continuous. The vein is a very large, strong vein, and carries, in addition to this streak of high-grade ore, the usual amount of concentrating ore. The crosscut on the 700-ft. level to the same vein has just struck the vein and found it also rich, but not enough development work has yet been done at that level to demonstrate its full value. Mr. Palmer, however, reports that the mine has been doubled in value by the discovery of this new vein. The East Gray Rock is well equipped, having the largest hoist and engine in the camp, and will soon be in a position to become a large producer of copper. Development work at the Silver Bow No. 1 has been continued with rapidity, and they have now got the vein opened down to the 900-ft. level. The ore body from the 600 to the 900 ft. level has gained in length 250 ft., or, in other words, on the 900-ft. level they have a solid body of ore continuous for 1,000 ft. in length. The company is also crosscutting north for veins in the Silver Bow, which will take about three months to finish. It is also pushing shafts down to the 1,000-ft. level, and has ordered a pair of new cylinders for the present hoisting engine, which will enable them to sink 300 ft. more. The development work is in such a state that each month's work adds two months to its reserves. The product of the mine shows a steady increase in the value of silver in the ore. As an illustration of this, recently, out of 50 car-loads of matte from 42 to 45 cars contained upward of 30 oz. of silver to the ton. It sometimes runs as high as 38 oz. to the ton, but even when as high as 30 oz. the money received from the sale of silver will pay for the treating, and all silver above that and the copper is clear profit, as far as the treating is concerned. When it runs as high as 38 oz. to the ton, it will pay the company to refine it, but when less than 30 oz. it is lost. The stopes and ends of the drifts on all the levels are looking well."

NEVADA.

Savage Mining Company.—The latest official weekly letter says: "During the week have hoisted 445 cars of ore from the 800, 950, 1,100, 1,200, 1,400 and 1,450 levels. Shipped to the Nevada mill 450 tons and milled 450 tons. Average car sample assay \$22.63; average battery assay \$18.25. Bullion yield for the week \$5,746.50. Shipped to the United States Mint at Carson, November 14th, 371 lbs. of bullion. On the 1,100 level the upraise from the sill floor started at a point 300 ft. from our south boundary in ore which is being stope for pay. In the main south drift on this level, at a point 180 ft. from south boundary, we started west cross-cut 1 and advanced same 31 ft. West cross-cut 2, started 50 ft. north of No. 1, is advanced 27 ft. These cross-cuts are both in quartz and porphyry. The joint north drift with the Gould & Curry company on the Sctro tunnel was advanced 15 ft.; the men have been engaged in timbering part of the time, which delayed work in the faces."

Elko County.

The following Tuscarora mining companies have received the following amounts, being the proceeds of the sale of ore: Navajo, \$5,479.61; North Belle Isle, \$4,201.90; and Belle Isle, \$1,989.73.

(From our Special Correspondent.)

The following amounts, proceeds of the sale of ore, have been received by Tuscarora companies: Belle Isle, \$1,989.73; North Belle Isle, \$4,201.90, and Navajo, \$5,479.61.

Esmeralda County.

E. Storch, a metallurgist, has made a test of the cyanide process, and demonstrated to his satisfaction that it is a successful method of treating gold tailings, at Silver Peak, Esmeralda County. The concentrates treated consist of over 80% of hard, indissoluble lumps, while hardly 20% of the stuff will pass a No. 40 screen, and, as the whole was tested without separation, the following result was obtained: After 24 hours' filtering, 34% of gold from the fine stuff and only 2% from the lumps; after 51 hours' filtering, 58% of gold from the fine and 9% from the lumps was made with the John I. Blair tailings at the old Silver Peak Mill.

Eureka County.

(From our Special Correspondent.)

Eureka & Palisade Railroad Company.—During the month of October this company received 2,127 tons of ore for shipment to Salt Lake City and other points, as follows: From Eureka District, from the Diamond mine, 1,196 tons; Eureka Consolidated mine, 347 tons; Jackson mine, 93 tons; Phenix mine, 87 tons; Richmond mine, 81 tons; Bullwhacker mine 60 tons; Hamburg mine, 46 tons; Williamsburgh mine, 16 tons; Dunderberg mine, 14 tons, and Delaware mine, 22 tons. Total Eureka District, 1962 tons. From Union District, 14 tons; from White Pine County, 151 tons.

Storey County—Comstock Lode.

Belcher Mining Company.—The latest official weekly letter says: "The north drift on the 400 level has been advanced 25 ft. since last report, making its total length 188 ft. north of the raise. The face is in porphyry, with small seams of low-grade quartz through it. West cross-cut No. 2, on this level, has been advanced to a total length of 86 ft., through a porphyry formation. At this point it was stopped, and we are now preparing to raise vertically, from the west end of it. We are now engaged in putting in a chute in the north winze from the 300-ft. level preparatory to stoping on the ore on which the winze was sunk. Have commenced the extraction of ore from the fifteenth, sixteenth and seventeenth floors above the 400 ft. level through the raise. Have shipped to the Brunswick Mill for reduction 193 tons 1,870 lbs. of ore during the past week. The mill started too late in the week to permit of a report of the battery sample."

Crown Point Mining Company.—The latest official weekly letter from the superintendent of this company says: "Prospecting has been continued in the west stope on the 160-ft. level during the past week with no change worthy of note to report. In the south stope, on this level, we are opening out on a streak of ore on the track floor to the west. It is about 3 ft. in width, and is of fair milling grade. Have shipped to the Carson Mint 501 lbs. of bullion, the coin value of which was \$10,021.92."

Justice Mining Company.—The latest official letter from this mine says: "The south drift from the north stope on the 822 level has been advanced 8 ft. during the week; total length, 44 ft. The face is in ore that assays from \$20 to \$25 per ton. The raise on this level, 150 ft. south of the north stope, is up 56 ft., having been advanced 5 ft. during the past week. The top is in low grade quartz. Have shipped to the Washoe mill for reduction during the past week 113 tons 640 lbs. of ore, the average battery sample of which is \$25.15."

Kentuck Consolidated Mining Company.—The latest official weekly letter says: "The raise above the 160 ft. level has been continued and we are now opening the seventh floor, following the ore streak, which is from 2 to 3 ft. wide, of fair milling rock. The second floor stope on this level presents no change worthy of note for the week."

(From our Special Correspondent.)

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

Mine.	Tons hoisted.	Av. car & bat. assay.	Tons milled.	Av. battery assay.	Bullion product for week.	Bullion shipped.
Belcher.....	991	25.69	989	21.03	.....	116,460.85
Con. Cal. & Va.....	.....	.....	.....	.....	.....	2501 lbs.
Crown Point.....	.....	.....	113	25.15	.....	.....
Justice.....	57	26.20	.....	.....	.....	.....
Ophir.....	.....	.....	.....	.....	.....	4,309.00
Overman.....	309	27.57	300	22.08	.....	.....
Potosi.....	445	22.63	450	18.25	5,746.50	371 lbs.
Savage.....	.....	.....	.....	.....	.....	.....

¹First shipment on November account. ²Crude bullion valued at \$10,021.92. ³Bullion received at office in San Francisco. ⁴Cars. ⁵Crude bullion.

Hale & Norcross Silver Mining Company.—Early in the week testimony was taken before the Deputy County Clerk as to the sufficiency of the bond on appeal furnished by the defendants in the suit of M. W. Fox vs. A. Hayward and others, curiously illustrating the laxity of the law in this State (California) in such matters, was the statement of Insurance Commissioner J. N. E. Wilson. He asserted that he

had accorded to the Western Surety & Guarantee Company the privilege of doing business on the showing that all the stock subscribed had been paid for, and be thought the company had a right to assume a risk of over \$1,000,000, albeit the capital stock of the corporation was only \$100,000, with actual assets of only a fifth of that amount. The law makes no limitation as to the amount of business that may be done by any duly incorporated company.

Secretary F. S. Butler was made to explain the inside working of this company. It was formed a few months ago, and has no office, the amount of business done to date, having been confined to Hayward and his friends, not having warranted the opening of office premises. From these gentlemen \$15,225 has been collected by the company, it being the first installment for going on the bond the validity of which is in dispute. Hayward signed the check for the amount.

Ramon Wilson, guardian for the Hobart minors, collected the \$100,000 capital stock from the stockholders, and distributed the certificates to them. Attorney Baggett tried to show that Wilson had collected them shortly afterwards to hold as security, this being in consonance with the theory that Hayward was really the proprietor of the company, his friends simply acting in their several positions as "dummies."

Upon examination it was found that the certificates of stock were indorsed on the back, but the several witnesses examined strenuously denied that this was for the purpose of re-transferring the stock to Hayward. While each of the directors of the company explained that he had taken up stock as a matter of friendliness, C. D. Lane, who with Hayward and the Hobart estate owns the Utica mine, Angels Camp, gave some interesting information regarding that property. He gave it as his opinion that the mine was worth \$1,000,000, and during the past year had yielded a monthly profit of from \$10,000 to \$24,000. In common with the other witnesses Mr. Lane refused to explain how he came to be induced to take stock in the company.

Alvinaz Hayward's counsel brought out the information that Lane, Cornwall and other of the stockholders were worth, personally, over \$1,000,000 and consequently would be individually responsible for the judgment should the appeal go against the Surety Company. Upon being asked, however, why in such case they did not go on the bond personally the attorney failed to give any answer whatever.

The evidence all being in the further consideration of the case was submitted.

Yesterday (Thursday) the Deputy County Clerk gave his opinion as follows: " . . . The clerk cannot construe the law other than it reads, nor can he as a ministerial officer determine the justice or injustice of the section of the code which places no limitations on corporations of this character as to the amount they can become surety on any undertaking. He is only prohibited from accepting such corporation as surety when the liabilities of the corporation exceed its assets. In this case the officers of the corporation testify that there are no liabilities, and that the full amount of capital stock is paid in. This was substantiated by the testimony of J. N. E. Wilson, Insurance Commissioner, whose duty it is and was to ascertain the exact condition of corporations of this character. The question as to whether or not the Western Surety and Guarantee Company is a bona fide corporation is not within the province of the clerk to decide, but should be left to the courts. The fact that the corporation has a certificate from the Secretary of State and one from the Insurance Commissioner authorizing it to do business in this State must be accepted by the clerk as prima facie evidence of its existence. The rejection of the bond is a very serious question, for if the clerk rejected said bond an execution must issue to satisfy the judgment, without any further proceedings of court; and as the clerk is the officer upon whom the duty of issuing said execution would devolve, as well as the officer before whom the justification is taken, it is a question whether or not he would be liable for the damages to the defendants caused by the levy upon their property should the Supreme Court reverse the judgment. However, these are questions for the court and not for the clerk to decide. The only question is, was the corporation justified upon this undertaking within the meaning of the law? After reading the testimony, and in view of the fact that section 1,054 of the Code of Civil Procedure has placed no limitation upon corporations of this kind as to the amount they can become surety for, but says that they shall be accepted as "sole and sufficient surety," I think it is the duty of the clerk to accept the bond until otherwise directed by the court.

Under this decision the appeal bond stands accepted, but the attorneys of Mr. Fox will seek relief in the court, as at present if the judgment of the lower court happens to be approved by the Supreme Court the stockholders of the Surety Company would, in all probability have to be personally sued to satisfy the judgment and a fresh tangle of legal difficulties have to be encountered.

This afternoon (Friday) Mr. Fox's attorneys served on the defendants in the Hale & Norcross suit notice of motion for leave to proceed on judgment. Next Friday counsel will move the Court for leave to proceed on the judgments rendered in the above action, notwithstanding the undertaking on appeal. The ground for the motion will be that the undertaking is insufficient to stay the execution of judgment and that the surety on the undertaking has

not sufficient property to justify on the undertaking and has failed to justify as required by law.

Last week several heavy drafts of men were laid off. Belcher dropped 11 men; Alpha, 10; Occidental, 30 and Yellow Jacket, 60 men. It is reported the Occidental mill will soon close down entirely. In the Yellow Jacket mine all work is being confined to the levels above the 400 and probably a further draft of men will be made. The elections are now over!

White Pine County.

(From our Special Correspondent.)

White Pine District.—During the month of October 151 tons of ore were shipped from this district, via Eureka and Palisade to Salt Lake and California, as follows, From Rocko Kragpazo's mine, 53 tons; C. A. Mathewson, 48 tons; Tom Cornell's mine, 30 tons, and J. B. Mathewson, 20 tons.

Frederick Franks has bonded the Cornell, Diebolder and Ross & Siri mines, situated upon White Pine Mountain, in the interest of Montana capitalists. Bonds expire February 24th, 1893.

NEW MEXICO.

RATON, Nov. 25.—The Blossburg coal mines are on fire. There are 100 men in the lower workings. It is thought that most of them will be lost. Three hundred families are affected.

Pacific Gold Mining Company.—This company, it is reported, is mining and milling 45 tons of ore daily. The output of the mine could be doubled, but the mill is being worked to its full capacity. There is water enough there now to supply the Pacific mill, but when the company commenced operations in the Mountain Key mill some of the machinery was taken out of the mill here and removed to Pinos Altos, and new machinery would have to be purchased before the Pacific mill could be started again.

Grant County.

According to the Silver City correspondent of the New York "Sun," there are now more than 40 men at work in the placers in the Pinos Altos district, and they are all making good wages. Owing to the extreme dryness of the season there has not been so much doing in the placers there this year as usual, but the production of gold dust has been increasing for the past month, and most of the placer ground is now being worked.

The Silver City correspondent of the New York "Sun" reports considerable development going on in the Carpenter district in the eastern part of this county. The mines in this district are difficult of access, he says, and consequently have never been worked to any great extent. There are deposits of copper, zinc, and iron ore in the district, and mining could be carried on profitably if the ore could be shipped out at a reasonable rate. There is a good prospect that a road will be built into the district within a few months.

Over \$15,000 in gold and silver bullion have been shipped from the Maud S. mill since it was put into operation a few weeks ago, says the New York "Sun." The Maud S. mine has been considered one of the best in the Silver Creek district for a number of years, but as long as the ore had to be treated in the old mill, which had a capacity of less than 10 tons of ore a day, the output was small. The ore is now treated in two Huntington mills, which have a capacity of about 35 tons of ore a day. The mine now producing more bullion than all the other mines in the district combined.

Mimbres Consolidated Mining Company.—The manager of this company has decided not to give any more leases on the company's property, so that when the present leases expire there will be nothing doing. The mill was closed down and the men employed by the company in the mines were discharged several weeks ago. There are about 70 men at work under leases in the mine.

Quien Sabe.—It is reported that an 18-in. vein of \$100-ore has been struck in this mine in Rich Gulch, in the Pinos Altos district. The mine is between the town of Pinos Altos and the Mountain Key mill, and has been worked in a small way for two or three years. The strike was made by Bell & Burch, who are working the mine under a lease.

NORTH CAROLINA.

Randolph County.

Hoover Hill Gold Mine.—This mine is located in Randolph County, about 14 miles southeast of Thomasville. For some years past it has been worked in a petty way, but it was only about 12 years ago that systematic work was begun by the Hoover Hill Gold Mining Company, Limited. Mr. Josiah Remfry was sent out to take charge and was soon succeeded by Mr. William Frecheville. It was during this latter management that the mine was most prosperous. Toward the latter part of 1885, however, the ore body (Briol's shoot) showed signs of pinching out and became poorer. Just at this time the company had plenty of money on hand and instead of keeping it for a working capital to open up new ore bodies to take the place of the waning Briol's shoot, some genius proposed that it be divided among the shareholders, which was done. Capt. J. Parkin, the present manager, now succeeded Mr. Frecheville, and up to three or four years ago he worked the mine at a small profit. Since then, however, the mine has only been able to pay expenses. Considerable development work has been done, and until recently with indifferent success.

The formation here is a highly metamorphosed schist, originally chloritic and talcose in character. It is very hard and compact, having much the appearance of being an eruptive rock. There are several distinct belts, the general strike of which is northeast and southwest. The main dependence of the mine has been the Briol's shoot, which is typical of the group; it is indicated by an abundance of quartz seams ramifying the "slate" in all directions. The quartz is mostly white and opaque, but in the richest ore it is a characteristic transparent bluish green. While the quartz seams are invariably present in the ore, they do not always indicate a "paying ore." There is a small percentage of pyrite in it, approximating 1%.

There are many old workings on the property, by which the rich outcropping ore was recovered. When systematic effort was made to get at the hard ores, the Briol's, Gallimore and Provost shafts were put down. The two former which merge into one near the 300 ft. level (and now called the main shaft) enter the Briol's shoot. It is about 350 ft. deep, with levels at 70, 130, 170, 230, 300 and 350 ft. What remains standing of the Briol's ore body is between the 300 and 350 ft. levels. It is sufficient to supply the mill running only about half time.

At the 130 ft. level, however, cross-cutting for about 200 ft. has partially opened up a new supply, which appears to be the old Provost shoot, it having been abruptly thrown from its old course by a greenstone dike. It now appears to be of better grade than the old Provost ore body. It has been followed a little over 50 ft. in length and explored vertically about 65 ft. It was cut within about 10 ft. of its capping, which is being stoped out. A winze (55 ft. deep now) is being put down to connect with the 230 ft. level. The ore as milled is about 25 to 30 in. wide, though the quartz seams aggregate only about 16 or 18 in. From tests of it, Captain Parkin estimates it at \$8 to \$10 per ton. It will take about three months to explore this body sufficiently to warrant an estimate as to its extent; but it already shows a couple of months' run at full capacity with good profit.

The property is well equipped with a mining and milling plant. The main shaft (Briol's) is provided with an excellent Cornish pump and steam hoisting plant. It is also well timbered and in good repair. When the ore is hoisted from the mine it is thrown upon a platform and sorted by boys about 12 years of age, who quickly throw out the barren slate. It is then trammed to the 20-stamp mill. The sulphurets are concentrated on blankets and treated, without roasting, in a pan which it is claimed amalgamates all the gold from the finely ground pulp.

The mine is one of the few English properties that has been able to pay expenses in this section; and, while it is largely due to the ore, it is to no small extent due to the management both at the mine and the home office. It is not loaded down with an expensive staff, and has been able to survive its period of depression, which would otherwise have closed it down.

OREGON.

Douglas County.

International Nickel Mining Company.—The company's property is located at Riddles in the above county, being some 226 miles south of Portland on the Southern Pacific Railroad. The company's property covers some 447 acres, 385 acres being the area of the mine proper; and adjacent to this on the same property which the company owns there is about 40 acres of limestone quarry land sufficient for all fluxing purposes. The land is well covered with heavy timber, both pine and fir. The property throughout is well watered, thus giving a plentiful supply for all purposes of smelting. This property is under control of a few wealthy capitalists who are principally located in Chicago. A large amount of development work has been done preparatory to the erection of a 200 ton smelting plant. The company has lately erected a saw-mill for the purpose of preparing such necessary lumber in connection with the erection of the smelting and concentrating mill buildings, the erection for which preparations are being energetically pushed. For operating the saw-mill, smelter and concentrating mill a 250 H. P. Corliss engine has been put in, together with ample boiler power to provide steam for a duplicate engine which will be put in in the future. The development of the mine has progressed so far that there is about 4,000 tons ready for treatment.

The ore is absolutely free and easily reduced, nature having greatly accelerated the work that machinery would have been called upon to accomplish, thereby reducing the cost of producing the marketable oxide to a minimum. The average assays that have been made out of some hundred tests show from 18 to 27% metallic nickel, and in some cases have run as high as 40%, which, if these results are further carried out as development increases, the company can justly claim that this property will be the most valuable and largest nickel producer in the world. The extensive smelting plant is now in course of construction, which will be followed up by further machinery to treat the low grade ore, of which there is a great abundance, several assays showing from 5 to 11% nickel. The machinery for the preliminary plant that has been ordered will be capable of producing 20 tons of nickel per day. This machinery contracted for will be furnished by the Colorado Iron Works of Denver, consisting of their well known water jacket furnaces (as used by the Omaha & Grant and other large smelting companies), together with crushers, revolving dryers, calcining retorts and all other neces-

sary machinery. A wire rope tramway is in course of construction, which will also be furnished by the above company.

PENNSYLVANIA.

Coal.

A cave-in occurred on the 19th inst. at the Hazel Dell colliery at Centralia, operated by L. A. Riley & Co., whereby eight men were imprisoned in the mine and two others were taken out very much injured. One of these died later of his injuries. The cave-in was caused by the robbing of a pillar. The men were all rescued.

The five Packer collieries and the William Penn colliery at Shenandoah, which have been idle the past two weeks on account of the drought, resumed operations on the 21st inst., the dams and tanks having been sufficiently replenished by the recent rain. This resumption will put upward of 2,400 men and boys to work again.

It is rumored at Wilkes Barre that the Wilkes Barre & Eastern Railroad Company has purchased the Pine Ridge Colliery for \$250,000. This colliery has been operated for years past by the Delaware & Hudson Coal Company under a lease which expires April 1st, 1893.

Lackawanna Iron and Steel Company.—The miners of the Pine Brook and Capose shaft of this company at Scranton, numbering 600 were given an increase of 10% on the 24th inst., in wages for mining coal, and for cutting cross headings they were increased from 50 cents per yard to \$1.41. Laborers and all other employees about the mines and breaker of the company were also given increases of from 10 to 30 cents per day.

SOUTH DAKOTA.

Glendale Mining Company.—It is reported that a rich strike of gold ore has been made on the ground of this company in the Southern Hills. The vein is said to be 30 ft. wide and to carry \$7 a ton. It is supposed to be an extension of the Keystone vein.

Lawrence County.

The Bleichert tramway ordered for the Hawkeye Gold Mining Company is now under construction. The distance from the mine to the mill is 4,000 ft. The guaranteed capacity of the tramway is 150 tons per day, and can be increased to 200 tons if necessary.

Black Hills Milling and Smelting Company.—The third roasting furnace was finally put in place and began reduction on Wednesday and the fourth is now en route from Chicago. The company is employing more men and making other preparations to run this successful chlorination plant at full capacity, something more than 200 tons per day. The company though often referred to as "The Welcome Chlorination Plant" from the fact that it is reducing ores from the Welcome mine, has no connection with the latter company. Mr. Chas. Waite, of New York, is supposed to be at the head of the new company.

UTAH.

Beaver County.

The mines in the vicinity of Iron City are now being investigated. The Blair mine for some time past has worked the best silver ore in Southern Utah.

Horn Silver Mining Company.—The financial statement for the quarter ending September 30th has just been issued. On July 1st the balance per last quarterly report was \$274,657.76. Since then the receipts have been as follows: Sales of ore: July, \$13,837.02; August, \$18,340.76; September, \$37,489.09; royalty on cave ore, \$22,560.83; a total of \$92,227.70. Interest account: United States Trust Company, \$3,055.62; sundry amounts, \$493.83; total, \$3,549.45. Smelter expenses, house rents, \$68.00. The disbursements were as follows: Mining: Labor, supplies, timber and dead wood, \$41,667.34. General expenses: Salaries, Frisco and Salt Lake City, \$2,924.24. New York office, \$3,969.65. Dividend No. 27, \$50,000.00. Balance cash on hand: United States Trust Company, \$210,000.00; First National Bank, \$69,641.12; Deseret National Bank, \$1,284.94; petty cash, \$15.62; total \$271,941.63.

Juab County.

Bullion-Beck Mining Company.—A body of ore has been encountered on the 700 ft. level and the width has been demonstrated to be over 60 ft. The character of the ore is similar to that always found in the Beck, but is of much richer grade.

Salt Lake County.

Emma Company, Limited.—At present the chief work of the company is in ground tapped by the Illinois tunnel some 500 or 600 ft. higher than the Bay City tunnel level. This tunnel struck ore 100 ft. under the hanging wall in a pocket, from which 125 tons were shipped, and there is still more ore to extract. This ore went 47% lead and 42 oz. silver. There is also ore in a winze below the tunnel, and which is some 60 or 70 ft. only from the old Emma bonanza and toward the North Star mine, which is on the same line. This ore is probably part of the old bonanza. They are going down on this and it is looking still better. The company worked 35 men up to the first of this month and then dropped down to 22 for the winter campaign.

About November 1st the Emma Company purchased the Grizzly mine, which is further up the gulch, near the City Rocks, and about 700 ft. higher than the Bay City tunnel. Some leases were worked this mine at the time of the purchase and had

taken out and shipped 75 tons of ore. The purchasers have sent out 100 tons of ore. There is much ore uncovered, it is stated, but it will not be stoped till spring, as it cannot be sent to market. The ore bodies are quite large and run 27% lead and 29 oz. silver. The price paid for the property is understood to have been \$45,000.

McKay.—This property, located above the Emma, is showing much improvement lately. The season was spent in stoping and developing. Something near 300 tons of ore was sent to market. This ore run about 38 oz. silver, 43% lead, 18% iron and some little gold. The tunnel is in 700 ft. with a shaft at its face 100 ft. down, from which two levels have been run northward, one 50 and the other 120 ft., both on the ledge and in fine ore. Then from the inner end of the tunnel a drift was run eastward 40 ft., a winze sunk there 50 ft., then a level run 100 ft., and now a winze is going down at the inner end, and all this in good stoping ground. The ledge is in decomposed lime, with the ore in piles of irregular size and form and dipping to the north. About a dozen men worked during the season, and this force has been cut down one-half for the winter development work.

Sevier County.

Sevier Mining Company.—The directors of this company have levied an assessment of 4 cents per share for the purpose of raising \$10,000 for development work and for adding some improvements to their mill. During the past season the mill was run about 20 days, and gold bullion to the amount of \$3,000 was turned out. The mine needs development by running in their tunnel so as to cross-cut the four veins which they have in their four parallel claims. It is proposed to do this work during this winter, and add two Frue vanners to the mill.

Summit County.

Crescent Mining Company.—The Crescent Company had decided, it is stated, to drive the drain tunnel, which will tap its vein at a depth of 1,800 feet. The tunnel will cut through a large scope of country that has really never been prospected to any depth and which is classed as mineral bearing ground by all men who claim to be posted. If the tunnel is run it may uncover some very rich mineral veins.

Ontario Mining Company.—Some farmers near Park City have entered suit against the Ontario, Daly, Anchor and Crescent Mining companies, for damages to the extent of \$3,000, claiming that the tailings and poisonous chemicals from their reduction works have poisoned the waters on plaintiffs' land, injured crops and killed their stock. They also pray that defendants be restrained from further befouling and poisoning the waters. The farmers do this periodically. In fact they expect a greater revenue from the mining companies than from their crops. The Ontario Company, in particular, has behaved very liberally toward them, purchasing large tracts of land as well as compounding its tailings.

Tooele County.

The Yellow Jacket, at Dugway, is working five men. The shaft is now 195 ft. deep, and they have a large amount of ore which will average 40% lead, 20 oz. silver, and \$4 per ton in gold. The shaft will be sunk a short distance deeper and then cross-cuts will be run to tap other bodies of ore known to exist there.

Honorine.—A short time ago Colonel Wall took a lease of the old Honorine mill in Stockton, including the old tailings dump, and he has been running the mill on these tailings, besides which he has run through some custom ores, but not to any great extent. This tailings dump is estimated to amount to about 150,000 tons. The mill is now arranged will handle 60 tons per day, from which about 2½ tons of concentrates are obtained, running about 50% lead, 20 oz. silver and 8% iron, making a good ore for smelting. This mill employs five men. It will soon close down and will be somewhat remedied, so as to handle the tailings much faster and cheaper.

Ophir Hill Mining Company.—This company some two or three years ago erected a mill to concentrate the ores from their mines. They have two eight-ft. Pelton wheels operated by pressure of a 100-ft. vertical column of water. Part of the year both wheels are run, one to operate the mill and the other to furnish power through compressed air to operate the power drills and run the hoist at the mine, 3,500 to 5,000 ft. away. When the water is low the air compressor only is run by water, while the mill is propelled by steam power with a 40 H. P. boiler and a 20 H. P. engine.

The mine is a low grade proposition. It is a contact vein between limestone and quartzite, and from 35 to 60 ft. thick. At one point it has been opened to a depth on the incline of 600 ft., and at another place for 250 ft. The ore is iron pyrites with small per cent. of lead. This ore after being hoisted from the mine is run about 2,000 ft. on a nearly level tramway, then on an incline let down about 600 ft. vertically by means of an inclined tram 2,100 ft. long.

The mill has one Dodge crusher, two sets Wall's rolls and eight jigs. At present 120 tons of raw ore is mined and run through the mill in 12 hours, day shifts only being run. To do this there are employed 21 men. It costs only 80 cents per ton to mine and deliver the ore to the mill, and less than \$1 per ton of raw ore to mine and mill. The mill reduces 2½ tons of raw to one of concentrates, which assays about 8% lead, 15 ounces silver, 28% iron, 50 cents in gold, 3% sulphur, 4% silica only, and 3 to 4% zinc.

Weber County.

Samuel Linton, a witness in a suit brought to determine whether the land on which the La Plata mines are situated was mineral in character and subject to location, stated that he is a mining man and has been since 1870. He was superintendent of the La Plata and Sundown mines in October, 1891, and continued in that position until April 20th, 1892. During that time he was over the section pretty thoroughly. There never was a vein of ore discovered in either of the mines. Neither of the mines ever paid. He estimated the amount of ore taken from the Sunrise mine at 50 tons. He had also been in the lumber business, and on the section he saw some very good timber. Taking the mineral and timber into consideration, he thought the land is the more valuable for the timber.

WEST VIRGINIA.

Brooke County.

A powder explosion occurred on the 21st inst. at the Blanch coal mine. Twenty-five kegs of powder exploded, causing the instant death of three miners and the serious wounding of eight others, three of whom will probably die. It is supposed that the explosion was caused by a piece of fuse which became lighted in some manner and conveyed the fatal spark to the boxes in which powder cans were kept. The mine belongs to H. C. Smith, of New Cumberland, W. Va., and William Smith and John McNutt, of Wellsville.

WYOMING.

It is stated that the smelter at Cheyenne, for the construction of which a bonus of \$200,000 was offered by the citizens, will never be built, as it is feared that Blanchard, the promoter who had achieved considerable notoriety in connection with Hutchinson, Kan., land booms, is unreliable.

FOREIGN MINING NEWS.

DOMINION OF CANADA.

Province of Nova Scotia.

A press dispatch from Montreal states that a report was current there that a syndicate of wealthy men from the United States had got control of the output of the Nova Scotia coal mines. According to the story the syndicate, the heads of which were William C. Whitney and Horace Whitney, began negotiations with the mine owners of Nova Scotia several months ago and recently completed a deal by which the combination obtained control of the entire yield of the Province. A deposit of \$100,000 was made, it was said, and the syndicate agreed to pay \$500,000 in cash on completing the bargain.

MEXICO.

The new plant of the Hidalgo Smelting Company, at Saltepec, recently completed, was put in operation on the 1st instant. The main building is of stone, two stories high, and is 50 x 75 ft.; the full length of the building is 212 ft. and contains blowers, furnaces, cupels and refining rooms. On the second floor are the sampling, ore and charcoal rooms and charge floor, with two shed-covered and terraced patios above for the receiving and roasting of ores. A condensing chamber extends throughout the full length of the building and 150 ft. beyond, giving a total length of 375 ft. The machinery consists of 1 Leffel turbine, 13 in. diameter, under 95 head and developing 105 H. P.; 2 Baker blowers; 2 40-ton water jacket smelters complete with all connections and furnished by the Colorado Iron Works, of Denver, Colo.; 2 improved cupelling furnaces. The whole arrangement forms one of the most complete plants in the Republic. In the immediate vicinity an abundance of lead and iron ores is found, as well as lime for fluxing purposes. The richer silver ores are brought from a distance of from one to eight days' journey, and it is expected that with the works now in operation, which afford a market for all ores offered, a great many additional mines will be opened up during the coming dry season.

San Juan Quebradillas Mining Company.—This company announces its first dividend of \$1,000 per barra, equivalent to one twenty-fourth share of the mine, payable on and after the 1st of December at the company's office in this city. The property is in the Temascaltepec district.

Durango.

The report that C. P. Huntington was to buy the Cerro Mercado Iron mines is now denied.

Lower California.

The company working the salt deposits in the Carmen Island appear to be following up their idea of developing this business on a large scale. It is managed by Mr. Conrad Embeck, ever since the company bought it last year for \$500,000 gold from the late owner, Mr. Santiago Viosca. Recently Mr. Chas. E. Schaeffer, Secretary and Treasurer of the Carmen Island Salt Deposits Company, came from Chicago to La Paz to make the second payment (\$100,000 in gold it is said) on account of the sale. Mr. Schaeffer then went in the company's steamer "Carmen" to visit the island and to inspect the work done, as well as the various arrangements made for the extraction and rapid and economical shipment of the rich deposits.

Oaxaca.

A mining deal of great interest to Americans has been nearly consummated. Two American capitalists, through R. S. Bartley, of this city, are to buy the celebrated onyx deposits in the State of Oaxaca, in the southern part of Mexico. The price is \$500,000. The mines are owned by Periz Mariz, formerly Minister of Finance of Mexico, and P. A. Fencobio, who is a senator from the State of Oaxaca. They are situated near the border line of Guatemala and cover 12 acres. They show a depth of 12 feet and have been opened in five places. Mr. Bartley visited the mines and made a personal inspection. He obtained a \$200,000 bond. The men who are to purchase the mines are Colgate Hoyt, of the Northern Pacific Railroad Company, it is said, and President Fairbaird, of the Cambria Iron Works, of Johnstown, Pa.

NOVA SCOTIA.

A mining deal embracing all the coal and iron mines of Cumberland County has been consummated. It is reported the syndicate is composed of Montreal and New York men. The new company is to be known as the Canada Mines and Coal Company, with a capital of \$1,500,000.

SOUTH AFRICA.

The total output of gold in the Witwatersrand district during October amounted to 112,167 oz., as against 107,850 oz. in September last, and 73,000 oz. in October 1891.

It is announced that a vein of silver containing a high percentage of uranium has been discovered in South Africa, on a farm belonging to the White Bank Silver Syndicate.

A rather remarkable statement regarding the cost at which gold may be won at Mashonaland has been published at Johannesburg, on the authority of Mr. Borrow, whose name carries considerable weight on such a point. At Hartley, he says, the gold has been worked at a cost of 25s. 6d. per ton of quartz—which means that any yield over 8 dwt. to the ton would leave a profit. Just now the yield averages about 20 dwt.; so that, on Mr. Borrow's basis, gold mining in Mashonaland has already justified itself. But it is hardly possible to believe that mining in such a remote locality should cost only 11s. per ton, explosives 3s. 6d., fuel 2s., carting 1s., and milling 8s. per ton. It is reported, moreover, that the American engineers who recently examined properties in this district came to unfavorable conclusions concerning them, considering them partially, if not entirely, exhausted by previous mining, the present workings in several instances having encountered, at a considerable depth, the tunnels of previous workers.

The London "Star" prints the following news: "The discovery of the auriferous antimony lode on the Gravelotte claims near Leydsdorp, Murchison Range, is believed to be one of the richest finds ever made in South Africa. The vein, which has a thickness of 3 ft., and has been traced for 500 ft., consists of an admixture of quartz sulphide and oxide of antimony, with traces of copper, zinc and galena. Both the quartz and the ores are completely permeated with coarse and fine gold, in nuggets, plates and thread-like forms, and of great richness. The gold is not confined to fissures or laminations, but is distributed throughout the solid ore. At the surface the mineral is principally oxide of antimony. The presence of galena, zincblende and decomposed copper sulphides is an extremely favorable indication of a strong fissure vein. Antimonious gold bearing ores occurring in proved auriferous ores are usually both permanent and rich. The property consists of 54 claims, and some few years ago favorable reports were obtained from Messrs. Klinke and Furlonge. The original gravel of the reef is proved by a drive to a depth of 150 ft., and is 5 ft. thick, showing good prospects of gold." A later telegram states that the lode is getting richer and wider as depth is gained.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 526 and 528.]

NEW YORK, Friday Evening, Nov. 25, 1892.

The mining market during the past week has been very quiet and somewhat depressed by the Thanksgiving holiday yesterday. A few of the stocks have been in fair demand, but altogether the outlook for an active market in the near future is not very promising.

The Comstocks have been very quiet, and, with but few exceptions, are lower in price than a week ago. We note the following sales: 100 shares of Best & Belcher at \$1.75; 125 shares of Potosi at \$1.90; 100 shares of Crown Point at \$1.25; 200 shares of Gould & Curry at \$1.10; 300 shares of Hale & Norcross at \$1.55@1.80, the first being the ruling price at the close; 200 shares of Ophir at \$2.90; 300 shares of Yellow Jacket at 85c.@1.15; the former was the closing price.

During the week sales of Consolidated California & Virginia amounted to 350 shares at \$2.90@3.10. The San Francisco Report of a late date says: "Desperate efforts are being made by a Pine Street clique to get up a bull movement in Consolidated California & Virginia and Ophir. The movement lacks the assistance of the wealthy people who control the mines, yet their names are being freely used

to help along the operations of the clique. Points to buy these stocks have been well distributed on the race track and elsewhere, and in fact they are all over town. There is no merit whatever behind the movement. The facts are that by December 1st the Consolidated, California & Virginia Mining Company will be at least \$40,000 in debt, and an assessment will soon follow. The west cross-cut on the 1,100-ft. level of the mine, 315 ft. north of the old Con. Virginia shaft, will, in a short time, reach the west wall of the lode, and that will practically end the exploration of that well-prospected level and involve the laying off of many miners. The reported ore development on the 1,565 ft. level of the Ophir, which is daily advertised in a morning paper, consists of a few small bunches of fair grade ore found in a wide quartz formation, the sorting and extracting of the ore costing more than double the expense of taking it out."

Of the California stocks Plymouth shows a sale of 150 shares at 75c. Standard Consolidated was in some demand and 700 shares changed hands at \$1.40 @ 1.50. The Standard Consolidated Mining Company has declared a dividend of 10c. a share, payable December 23d. This Christmas present is so much relished by the stockholders that we urge more of mining companies listed on this Exchange to follow the example of the Standard.

Of the Colorado stocks Leadville Consolidated was most active; during the week 4,590 shares were sold at 17@16c. Small Hopes shows transactions of 600 shares at 90c.@\$1. Of Chrysolite, 1,500 shares changed hands at 18@19c. Lacrosse is officially reported to have been dealt in to the extent of 1,000 shares at 3@4c.

During the week a number of ugly rumors concerning the Ontario Mining Company has been afloat in Wall street. A representative of the ENGINEERING AND MINING JOURNAL called at the office of this company to-day. It was learned there that on October 1st, 1892, the surplus cash on hand amounted only to about \$28,000. There were bills receivable from other sources, as for instance, one of about \$40,000 from the Daly Mining Company, which swelled the surplus somewhat, although even then it was unexceptionally small. This news will doubtless surprise many people. The fact which puzzles Wall Street the most is that after October 1st Ontario stock was sold at about \$40 a share. It is alleged that "instigators" did the selling, and that they so manipulated the stock as to keep up this unwarranted high price. Of course it is impossible to ascertain how much truth there is in the latter report. During the past week sales were heavier than for many years, amounting in all to 1,325 shares, at prices ranging from \$14@ \$22. Mr. R. C. Chambers, superintendent of this company, will arrive in this city within a few days and in our next issue we shall publish full particulars.

Of El Cristo sales this week amounted to 1,800 shares at 18@22c.

Phoenix of Arizona continues the favorite stock on the Mining Exchange. During the week 7,500 shares were sold at 52@56.

No sales of Horn Silver are reported this week. In another column will be found the quarterly financial statement of this company, showing that the surplus has been kept up about as usual. The issue of these quarterly financial statements is highly to be commended, as it enables stockholders to see just how the financial condition of the company is.

Boston. Nov. 23.

(From our Special Correspondent.)

The market this week has been fairly active for the leading copper stocks and prices continue to show a stiffening tendency. The Montana stocks continue to take the lead in speculation and the transactions are largely in these specialties. There is said to be a large short interest in Boston & Montana, some portion of which has been covered this week, causing an advance from \$33 to \$35, and the stock is quite strong within a fraction of this point.

Butte & Boston advanced upon the report that the company had opened up a rich body of ore, a sample of which has been forwarded with a report of the progress of development, showing the ore body to be continuous. The stock has been selling for some time past at \$9 to \$9½. Early in the week it sold at \$10, and has steadily advanced on good buying orders, as well as to cover short sales, to \$12, selling at that price to day, reacting to \$11½ on final sales. The advance in these two specialties stimulated the demand for the Lake Superior stocks, all of which show slightly better prices than were noted last week.

Tamarack advanced from \$160 to \$165, and Tamarack Jr., from \$24 to \$26½ with later sales at \$26. The reports from the latter mine still continue of a favorable character and much higher prices are predicted.

Calumet & Hecla sold at \$200, ex-dividend (\$5), same as last week dividend still on. Quincy has been dull, but steady, at \$139 and \$139½.

Osecola sold ex-dividend this week at \$35 and advanced to \$36. This stock is steadily growing in favor with the investing public and at the present price is considered one of the best purchases on the list.

Kearsage looks better and there is a growing demand for it by those who believe in its ultimate success.—Sales at \$12½ to \$12½.

Centennial has shown no special strength, but keeps quite steady at \$8, with moderate sales.

Franklin sold at \$14½ and is fairly strong at this price.

Atlantic advanced from \$10¼ to \$11½. Santa Fe sold at 8c. and Wolverine at \$2. It is reported that an assessment is probable on this stock in the near future.

Alleuz and Arnold sold at \$1. The latter mine is said to be closed for the winter.

Napa quicksilver sold at \$6½, an advance of one-half over last sale.

3 P. M.—There was very little doing after the noon hour, members being mostly engaged in holiday exercises. Boston & Montana sold at \$34¼@%. Butte at \$11½. Osecola at \$35½. Tamarack at \$164, and Calumet at \$200. Centennial was a fraction higher, selling at \$8½ and closing at \$8½.

San Francisco. Nov. 12.

(From our Special Correspondent.)

This having been election week business in the Stock Exchanges has been limited in volume, albeit prices have been stronger, as a rule, than a week ago.

The mining assessments falling delinquent during the current month aggregate \$234,210, distributed as follows: California, \$22,000; Nevada, \$202,210, and Mexican, \$10,000. It seems safe to say that in the present state of the market these sums will not be collected in full.

The North End Comstocks have ruled strong during the week. Consolidated California & Virginia selling to \$3.20 to-day, an increase of 40 cents since the same day a week ago. Ophir at \$2.85, Mexican at \$1.35, Sierra Nevada at \$1.20 and Union Consolidated at \$1.15. All showed gains ranging from 10@30c. per share.

The middle group of Comstocks, led by Hale & Norcross, have also developed strength, but not so much as might have been anticipated. The apparently never-ending suit in court has, without doubt, an influence on the price of the stock. A restraining order has issued from the Superior Court preventing Alvinza Hayward and the other defendants in the suit from selling, transferring or disposing of their property until the further order of the Court. This order was granted by Judge Hebbard upon the petition of M. W. Fox and J. J. Groom, receiver in the same action. As will be remembered when the defendant offered bonds, in the first instance, objections was made to the Western Surety & Guarantee Company as the only surety. Full particulars of that corporation have already been given, but it has been lately developed that the defendants in the Hale and Norcross suit have arranged to form a corporation as soon as the bond is justified, they were intending to turn over their real estate to the corporation, each member getting credit for his property, but such property being actually in the name of the corporations. By this means, as Messrs Fox and Gloom allege, it will be impossible to collect judgment by levying upon the property, and the bond being worthless cannot be collected upon either. In this way the payment of all save an insignificant percentage of the judgment may be evaded. For this reason, pending the justification of bond, the restraining order has issued. It may be stated that the Hale & Norcross Company was asked to become a plaintiff in the suit, but it refused, and was, therefore, put in as a defendant in complaint filed by the two defendants.

In the light of such Machiavelian devices, it can scarcely be wondered at that the stock market fails to flourish, and that the stock most closely concerned is viewed askance. To-day it sold for \$1.45, and Jones & Curry, for 85c.; Chollar, 85c.; Best & Belcher, for \$1.60; Potosi, for \$1.20, and Savage, for \$1.30.

The South End and Good Will stocks have been in light demand and prices have ruled lower than during last week. Ore is being shipped daily from the Imperial, Confidence and Challenge mines, but particulars are not furnished the public and the prices remain unaffected. Belcher has been the stock, that sold most freely, the ruling value being \$1.45, as compared with \$2.05 a week ago. Bullion sold to-day for 45 cents; Imperial, 5 cents; Crown Point, \$1.05; Justice, 6 cents; Overman, 60 cents; Silver Hill, 8 cents, and Yellow Jacket, 80 cents.

No interest whatever has been displayed in outside stocks and sales have been practically nil.

San Francisco. Nov. 18.

(From our Special Correspondent.)

Prices of mining stocks have fluctuated rather widely during the past week, and, with the exception of certain of the middle group of Comstocks, have not ruled so strong as a week ago. It looks as if an effort were being made to boom the North End Comstocks, but as Consolidated California & Virginia is getting into debt deeper than ever, and in all probability an assessment will shortly be in order rather than a dividend, it is scarcely possible that the attempted stimulation of prices will be other than a mere flash in the pan. The small amount of ore being extracted from Ophir is being found in bunches and should cut no figure in the value of the stock.

To-day California & Virginia sold for \$235, a 10 cent advance on the previous figures this week, but 20 cents less than the highest rate last week. Mexican sold for \$1.75; Ophir for \$2.80; Sierra Nevada for \$1.30, and Union Consolidated for \$1.40.

The Middle Group stocks have all shown up stronger, with Potosi leading. The reason of this stock enjoys so much attention has been the ore streak being raised upon from the 1,100 level and

which has promised to develop into something important. This morning the stock sold for \$1.80, with 8,000 shares sold in both Boards. During the day news was received that the ore streak in the mine had become broken and of poor grade, and at once there was a rush to sell. The break, however, was not considerable, the stock closing at 10 cents off the ruling rate. Hale & Norcross sold to \$1.75, Best & Belcher for \$1.65, Chollar for \$1.00, Gould & Curry for \$1.00 and Savage for \$1.40.

Dealings in the South End and Gold Hill stocks have not been heavy and the public have generally posed as sellers, albeit values have been well sustained. Large orders from Virginia and elsewhere have been received the last day or two to sell, and what this may betide remains yet to be seen. This afternoon Alpha sold down to 25 cents. Belcher to \$1.95, a better price, however, than last week when \$1.55 was the highest point touched. Bellelne sold for 50 cents; Caledonia for 25 cents; Challenge Con. for 60 cents; Confidence for \$2.00; Crown Point \$1.10; Exchequer for 15 cents; Justice for 25 cents; Kentuck for 20 cents; Lady Washington for 10 cents; Occidental for 15 cents; Overman for 70 cents; Seg. Belcher for 40 cents, and Yellow Jacket for 95 cents.

Of the outside stocks Bodie sold for 20 cents; Bulwer Con. for 15 cents and Mono 30 cents asked.

In the Tuscarora group sales were almost nil the quotations ruling being Belle Isle, —, Commonwealth, Del Monte, Grand Prize, North Belle Isle, North Commonwealth and Nevada Queen, each 5 cents, and Navajo 15 cents asked.

The Quijotoas have been also stagnant, Central Crocker and Peerless being quoted at 10 cents asked. Locomotive at 5 cents, Pevco at 20 cents, and Silver King at 45 cents.

Small lots of miscellaneous stock have changed hands, Eureka Con. at \$2.00, and Mount Diablo at \$1.00.

SAN FRANCISCO, Nov. 25.—(By Telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$1.50; Bodie, 10c.; Belle Isle, 5c.; Bulwer, 15c.; Chollar, 80c.; Consolidated California & Virginia, \$2.70; Eureka Consolidated, \$2; Gould & Curry, 80c.; Hale & Norcross, \$1.45; Mexican, \$1.60; Mono, 15c.; Navajo, 5c.; Ophir, \$2.60; Savage, \$1.80; Sierra Nevada, \$1.15; Union Consolidated, \$1.25; Yellow Jacket, 85c.

MEETINGS.

Continental Silver Mining Company, of Nevada, at the office of the company, in New York City, November 26th, at 4 P. M.

Sloss Iron and Steel Company, at the office of the company, in Birmingham, Ala., December 10th, at 12 o'clock noon. Transfer books close November 28th, and reopen December 12th.

DIVIDENDS.

Delay Mining Company, dividend of \$1 per share, payable December 20th, at the office of the company in Boston, Mass. Transfer books close November 18th and reopen December 21st.

Lehigh Coal and Navigation Company, dividend of \$3 per share, payable November 25th at the office of the company in Philadelphia, Pa.

Moulton Mining Company paid November 21st dividend No. 13 of 7½ cents per share, \$30,000, at the office of the company, New York City.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'ing't in office.	Day of sale.	Amt per share.
Bullion, Nev.....	40	Oct. 20	Nov. 25	Dec. 14	.25
Carra, Cal.....	9	Sept. 28	Nov. 25	Dec. 28	1.60
Con. N. York, Nev.	9	Nov. 2	Dec. 5	Dec. 28	.10
Con. St. Gotthard, Cal.	6	Oct. 13	Nov. 17	Dec. 7	.05
Dalton, Utah.....	3	Oct. 7	Nov. 3	Nov. 29	.01
El Leopoldo, Mex....	1	Nov. 11	Dec. 14	Jan. 2	.10
Exchequer, Nev.....	34	Oct. 28	Nov. 30	Dec. 20	.10
Golden Fleece, Cal..	18	Oct. 10	Nov. 16	Dec. 7	.800
Indian Creek, Cal..	3	Nov. 4	Dec. 14	Jan. 6	.10
Justice, Nev.....	52	Oct. 14	Nov. 18	Dec. 8	.15
Kentuck Con.....	5	Oct. 5	Nov. 8	Nov. 29	.10
Mexican, Nev.....	46	Oct. 13	Nov. 17	Dec. 7	.25
North Belle I., Nev.	21	Nov. 14	Dec. 20	Jan. 17	.10
Occidental, Con., Nev.....	11	Oct. 25	Nov. 30	Dec. 21	.25
Overman, Nev.....	65	Oct. 5	Nov. 10	Nov. 30	.30
Russell, Cal.....	8	Nov. 14	Dec. 19	Jan. 16	.01
Savage, Nev.....	79	Oct. 7	Nov. 9	Nov. 29	.60
Sierra Nevada, Nev.	103	Nov. 9	Dec. 14	Jan. 3	.25
South Eureka, Cal.	1	Nov. 2	Dec. 9	Dec. 31	.02
Teresa, Mex.....	9	Oct. 25	Nov. 29	Dec. 16	.10
Therakoff, Cal.....	9	Oct. 11	Nov. 11	Dec. 20	.02

METAL MARKET.

NEW YORK, Friday Evening, Nov. 25, 1892.

Prices of Silver per Ounce Troy.

Nov.	Sterling Exch'ge.	London.	Pence.	N. Y. Cents.	Value of sil. in \$.	Nov.	Sterling Exch'ge.	London.	Pence.	N. Y. Cents.	Value of sil. in \$.
19	487	33¾	84½	23	487¼	39½	85@85¼				
21	487	33¾	84½	24	487¼	39	84½				
22	487¼	33¾	84½	25	487¼	33¾	84½				

The quiet tenor of silver was upset on Wednesday by an unexpected tender for council bills, appar-

ently from a speculative source, above the market. Merchants and bankers were consequently keen buyers of silver, but under heavy supplies prices receded, and the market is now hanging on the deliberations of the Brussels Conference.

There were sold during the week ending Friday, November 25th, 108,000 ounces in silver bullion certificates, at from 84 1/4 to 86 cents per ounce.

The United States Assay Office at New York reports the total receipts of silver for the week to be 85,000 ounces.

Government Silver Purchases.

The Government has purchased during the week the following quantities of fine silver at the accompanying prices per fine ounce:

November 21st, 350,000 oz. at 84.75c. to 84.8c.
November 23rd, 274,000 oz. at 85.45c. to 85.58c.

Gold and Silver Exports and Imports at New York for Week Ending November 19th, 1892, and for Years from January 1st, 1892, 1891.

Week.	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1892.....	\$106,000	\$22,967	\$725,300	\$10,232	\$768,07
1891.....	59,478,037	7,762,129	19,229,160	2,877,793	68,045,403
1891.....	75,808,377	28,020,970	17,961,420	2,510,299	63,235,585

During the week ending November 26th, the exports and imports, so far as ascertained, have been as follows: Exports gold, \$49,000; silver, \$364,950. Imports gold, \$42,196; silver, \$58,212. The gold exported went to the West Indies and South America, the silver, of which 350,727 oz. was American, went to Great Britain. It is now rumored that gold will shortly be exported to Europe.

On Wednesday, the Fourth National Bank withdrew \$600,000 in gold from the Sub-Treasury and it is said that it was taken by the bank for a firm which has made large shipments of the yellow metal during the past summer. As yet this sum has not been entered for export at the Custom House, and as it is possible that the rate of exchange may change, for the better, the shipment may not be made.

For many years, exchange on London has not been as high at this season of the year as at present. That this is so is due to our decreased exports of provisions and cotton.

High as it is, the present rate of exchange hardly admits of a profit on gold shipments, unless a premium is offered by European banks. Gold has, however, been shipped when exchange was fully one cent lower than it is now. In July, 1891, when exchange ruled at \$4.86 1/4, with call money at 1 1/2% in New York, and the London rate of discount at 1 1/2%, \$2,000,000 were exported.

On February 13th, 1891, with money on call in New York at 2% and in London at 1 1/2%, demand exchange was at \$4.88 1/4, and \$1,750,000 were exported. These are, of course, exceptional cases. It is more than probable that exports may be checked for a while by the quality of the metal furnished by the Sub-Treasury. As is well known, coin only is given out, no bullion having been paid out for some time.

Of the coins paid out, 45% are double eagles, 15% eagles and 40% half eagles. As many of the eagles and half eagles are from San Francisco where they were subjected to much wear and consequent abrasion, they are light, and when exported suffer some loss in value. This is not much, as the Treasury does not accept coin which have lost more than 1/2% of 1%, but it is sufficient to prevent exports until the rate of exchange increases 1/4 to 1/2%.

NOTES OF THE WEEK.

The International Monetary Conference which began its meeting at Brussels, November 22d, agreed to meet every other day.

Besides the delegates already named the following will take part: Signor Lemonelli and Signor Lappa, for Italy; Count Khevenhueller Mettsch, for Austria; Prince Ourchoff, the Russian Minister to Belgium, and M. Roffalovich, a well known economist, for Russia.

At the opening, Herr N. Beemsert, Belgian Minister of Finance, presided. Senator Montefiore Levi has been chosen as the permanent presiding officer.

Regarding the work of the conference, a cable, dated Paris, November 24th, states that M. Paul Leroy-Beaulieu, editor of the *Economiste Francaise* and Professor of Political Economy in the College of France, said in a recent interview.

"I do not think that anything will result from the conference except to make plainer to everybody that rich and prosperous nations ought to cling to the gold standard, and that the establishment of a fixed relation between gold and silver is impossible."

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars.....	\$.66 1/4	\$.67
Peruvian soles and Chilean pesos.....	.60 1/4	.62
Victoria sovereigns.....	4.86	4.90
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.78	4.81

Copper.—In the beginning of the week, things were rather unsettled, and, if anything, a trifle easier, as no one knew exactly what to do. Later on when there was a hardening of the London speculative market, new life was infused into ours, and while

during the last eight or ten days the Calumet & Hecla Company have sold heavily at 12c they have now advanced their limit to 12 1/2c. While the other companies have been willing to sell at 12c. or the parity thereof, it is to be presumed that now their price is also 12 1/2c. With second hands hardly anything has been done.

For casting copper the price has been advanced to 11 1/4c., and for Arizona pig copper, 96% to 10%, though some contracts for European consumption were lately closed for material of this description at somewhat lower prices. The tendency of the market at the close is very firm.

It is stated that 10,000,000 lbs. of Lake copper have been sold here within 10 days, mostly by the Calumet & Hecla, which is now said to be sold up.

The Anaconda company has closed the Chambers Syndicate mining, and Mr. Haggin says the smelting works will be closed after December 15th, when the question will be decided whether Anaconda or Helena is to be the capital of the State.

In Europe business was more or less confined to the speculative brands and Chili bars close at the best, spot at £47 10s., and three months at £48, but in Tough and Best Selected the business has been rather restricted as consumers are in no hurry at all to buy at the higher prices, the asking of which actually checks business. On the other hand, the rise in silver has brought in some inquiries for Yellow Metal for Indian, but at the time of writing no business has been reported.

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

To	Copper Matte.	Lbs.	Value.
S. S. Auranian.....	2,305 bags.	250,910	\$12,000
Naronic.....	2,126	242,187	11,000
To Bordeaux.....	Copper.	Lbs.	
S. S. Chateau Lafitte.....	697 pigs.	209,869	\$21,000
To Hamburg.....	Copper.	Lbs.	
S. S. Cremon.....	14 pkgs.	804	\$57

Tin.—The market is rather flat and sales have been made here at 20.25 and 20.35 for spot and nearby delivery, but for futures 20 1/2 and 20 3/4 is asked. Great uncertainty exists regarding the matter of duty and the opinions expressed are most divergent.

Through all this the Eastern markets have remained very steady, and no tin can be imported at a net cost, ex-ship New York, of less than 20.60. If this continues to be the case, our market must soon readjust itself. Consumption is very good, and the closing prices in London are £93 17s 6d. for spot, and £94 for three months.

Lead is again cheaper, and still offered at declining prices, with heavy sellers all over. Large contracts have been closed at \$3.80 New York and one at even less—\$3.75—which is a very low price.

From the west we hear that in Colorado the production of silver lead ores is diminishing, but this seems to be offset by the facts that the imports of Mexican ores, mostly via El Paso, are very heavy.

The foreign market, after being firm through last week, has now declined, and Spanish lead is quoted in London at £10 and English lead at £10 2s. 6d.

Chicago Lead Market.—The Post-Boynton-Strong Company telegraph us as follows: "Market is quiet and dull, with 3 1/2% asked, with only small sales and buyers totally indifferent."

Spelter also has eased off somewhat, as the consumptive demand has not been as good as heretofore. We must quote the price as 4.425@4.45c. New York.

In England, prices have given way, good ordinaries now being quoted at £18 15s., and specials at £19.

Antimony has been a little dull, the business doing being for retail quantities only, Cookson's commanding 11 1/2 @ 12c., L. X. 11 1/4 and Hallet's 10 1/2c.

Nickel.—We do not hear of any business, and the market must be reported as nominal, at from 53 @ 55c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 25, 1892.

Pig Iron Production.—The following table gives the number of furnaces in blast and the estimated production of pig iron in the United States during the week ending Saturday, November 19th, 1892, and for the corresponding week ending Saturday, November 21st, 1891. Also the total estimated production from January 1st of each year to these dates. This table has been corrected by the official returns of the American Iron and Steel Association for the first six months of this year. The figures are in gross tons:

Pig Iron Production During Weeks Ending November 14th, 1891, and November 12th, 1892, and During Both Years to These Dates.

Fuel used.	Week ending				From Jan., '91.	From Jan., '92.
	Nov. 21, '91.	Nov. 19, '92.	F'cs.	Tons.		
Anthracite..	87	34,360	69	31,000	1,649,380	1,537,796
Coke.....	162	142,870	133	130,000	5,007,810	6,064,700
Charcoal....	57	12,460	42	9,500	495,307	471,025
Total.....	306	190,190	244	170,500	7,143,497	8,073,521

Prices here are as last week. Southern, ex-steamer, No. 1 F., \$15.25; No. 2 F., \$14.26; No. 3 F., \$13.76; Gray Forge, \$13.01; Northern, tide-water, No. 1X, \$15; No. 2X, \$14; No. 2 plain, \$13.50; Gray Forge,

\$13. Southern irons are quoted, nominally, 26c. higher than Northern. No apparent change is to be recorded. The market is quiet and featureless.

Spiegeleisen and Ferromanganese.—Fero 80% has been sold at something above \$61.00 and is firm. Spiegel, \$26.50, with no special movement.

Steel Rails.—The market is dull at \$30.00. The reduction spoken of has not yet been announced.

Rail Fastenings.—Prices rule as follows: Fish and angle plates, 1.55@1.65c. at mill; spikes, 1.90@2c.; bolts and square nuts, 2.40@2.70c.; hexagonal nuts, 2.70@2.80c., delivered.

Merchant Iron and Steel.—Prices stand: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6 1/4 @ 7 1/2c.; special grades, 13@18c.; crucible machinery steel, 4.75c.; crucible spring, 3.75c.; open hearth machinery, 2.25c.; open hearth spring, 2.30c.; tire steel, 2.25c.; toe calks, 2.25@2.50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Iron and Steel.—We quote: Beams, 2.3@2.55c., except for 20-in. beams which are 2.75c.; angles, 1.95@2.15c.; sheared plates, 1.90@2.10c.; tees, 2.30@2.60c.; channels, 2.35@2.50c.; universal plates, 2@2.10c.; bridge plates, 2@2.10c.; steel hoops, 1.90@2c. All on dock.

Buffalo. Nov. 23.

(Special Report by Rogers, Brown & Co.)

The market continues strong with a large volume of business doing. Iron is apparently going into consumption more rapidly than its users anticipated, if it is fair to draw this conclusion from the numerous requests to ship in advance of contract deliveries. There has been no further advance made in Southern iron, whose prices stand now in line with full Northern brands figures. The movement in Lake Superior charcoal iron has been stimulated by the approaching close of lake and canal navigation. The early close of the Lake season has cut off the shipment of a number of charcoal iron cargoes from upper ports, leaving the stocks at this end of the lakes rather less than shippers intended. Our quotations below are on the cash basis, f. o. b. cars at Buffalo: No. 1 X. Foundry strong coke iron Lake Superior ore, \$15.25; No. 2 X. Foundry strong coke iron Lake Superior ore, \$14.50; Ohio strong softener, No. 1, \$15.50; Ohio strong softener, No. 2, \$14.50; Jackson County silvery, No. 1, \$17.30; Jackson County silvery, No. 2, \$16.80; Lake Superior charcoal, \$17.00; Tennessee charcoal, \$18.00; Southern soft, No. 1, \$14.40; Alabama car wheel, \$19; Hanging Rock charcoal, \$20.50.

Chicago. Nov. 24.

(From our Special Correspondent.)

With but few exceptions all lines of manufacturing industries into which iron and steel enter, both crude and finished, are actively employed in and around Chicago. The notable exceptions are some of the architectural and jobbing foundries, which report a falling off in orders. The City Council have had a new ordinance draughted by which all future buildings will be limited to 12 stories in height. The desirability of the new ordinance is variously commented upon by architects and property owners, but is generally satisfactory. In a general way the market for crude iron has resumed its normal condition; orders are sufficiently numerous to aggregate a fair tonnage, but the activity so notable at the latter end of last month is absent. In all other respects, as regards price and strength, the situation is unchanged. Manufactured iron and steel in their various forms are also quieter, not particularly on account of the revulsion in the political status, but because lake navigation is drawing to a close and with it the end of the year, when mill orders are usually lighter. Railroad demand for supplies in the way of rolling stock and track material is also quiet.

Pig Iron.—The Illinois Steel Company will blow in one of its furnaces on coke iron at North Chicago December 1st on account of the large sales made of foundry grades during the past few months. Their two furnaces in blast at Bay View, Milwaukee, Wis., are insufficient to meet the demands of their sales. Coke iron of local make is in fair demand in carloads and up to several hundred tons. The largest order booked last week was 1,000 tons for delivery during the next few months. The large reduction in Northern and Southern stocks of iron as indicated by the official report has added its quota of strength to the market. Southern coke iron is in moderate demand and some of the larger furnace companies are well sold up on Nos. 1 and 2 Soft and No. 2 Foundry; a few of them being unable to enter further orders for several months. With the exceptions previously noted consumption in all lines is heavy. Lake Superior charcoal iron is dull, but it has lost none of its strength as stock is being largely withdrawn.

Quotations per gross ton f. o. b. Chicago, are Lake Superior charcoal, \$16.07@17.25. Lake Superior coke, No. 1, \$14.25@14.75; No. 2, \$13.75@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$15.50; Lake Superior Scotch, \$15@15.50; American Scotch, \$16.50@17; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.10; No. 3, \$12.85; Southern coke soft, No. 1, \$13.85; No. 2, \$13.10; Ohio silvers, 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@22.

Steel Billets and Rods.—Small orders only can be accepted by local mills as their output is nearly all contracted. Steel billets are \$26 and rods \$35.

Structural Iron and Steel.—Demand is fair

though inquiry is easing up for architectural structural work. Bridge work is still active, but competition is sharp on all specifications offering. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$2@ \$2.20; tees, \$2.35@ \$2.45; universal plates, \$1.95@ \$2; sheared plates, \$1.95@ \$2; beams and channels, \$2.35@ \$2.50.

Plates are not quite so active from mill and warehouse, but no uneasiness is felt as it is incidental to the season. Prices on the whole are easier. Steel sheets, 10 to 14, \$2.30@ \$2.40; iron sheets, 10 to 14, \$2.20@ \$2.30; tank iron or steel, \$2.05@ \$2.15; shell iron or steel, \$2.50@ \$2.75; firebox steel, \$1.25@ \$1.50; flange steel, \$2.75@ \$3.00; boiler rivets, \$4.00@ \$4.15; boiler tubes, all sizes 65% and firm.

Merchant Steel.—Some mills in this vicinity all well sold upon soft steels for implement purposes up to end of June, and only light supplementary orders can be taken. Demand has been unprecedented. 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.—Demand has fallen off considerably and agents' warehouses are accumulating stock. Mill business is fair and shipments more regular. Discounts remain unchanged at 70% and 10% off on Juniata and 70@10% and off on charcoal, and jobbing quantities at 10%@5% off on the former and 70% and 10% off on the latter.

Black Sheet Iron.—Best grades of smooth-rolled and planished iron are scarce and in good demand by jobbers and consumers. Common sheets are still active at 20c. for No. 27, common; steel sheets are 3c. Jobbers quote 3@3-10c. for iron and 3-10@3-15c. for steel, same gauge.

Bar Iron.—Business, both for car iron and miscellaneous jobbing and consumptive purposes, is becoming quieter, and the market generally weaker. Ordinary specifications are quoted 160c. half extra, though some mills are shading those figures. Jobbers quote 175@185c., rates from warehouse according to size of order.

Nails.—Steel cut nails are weaker, as pressure to sell by outside mills is quite marked, and 1400@162 1/2c., 30c. average, are regular quotations. Jobbing price is 165@170c. from stock. Wire nails are fairly active at 175c. leave Chicago in mill lots. Jobbers quote 175c. in less than car loads.

Steel Rails.—It is very apparent that railroads intend to continue their buying for current requirements only for some time. It has been usual for a few managements to give out at least a portion of their summer requisitions to the mills for railing during the winter. Up to the present writing nothing of this kind has been done. Orders are for small amounts and quotations unchanged at \$31@32 mill. Repair material for track work is in light demand. 170c. for iron or steel splice bars; spikes, \$2.05@ \$2.15 for 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

Scrap.—Demand is very light for all grades, and quotations, though unchanged, are easy. No. 1 railroad, \$15.50; No. 1 forge, \$15.00; No. 1 mill, \$9.50; fish plates, \$16.50; axles, \$19; horseshoes, \$16; pipes and flues, \$7; cast borings, \$6; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10.50; coil steel, \$15; leaf steel, \$15.50; tires, \$14.50.

Old Material.—Iron rails are in better demand as railroad managers will be less inclined to disturb their roadbeds and mills must lay in stock for winter's consumption. Sales have been made at \$19.10 @ \$19.25, mill delivery this State. Steel rails are irregular in demand and price is \$12.50@ \$15, as to condition and length. Old cast wheels are quiet at \$14.75@ \$15 in small lots.

Louisville. Nov. 19.
(Special Report by Hall Bros. & Co.)

Pig iron has been less active during the week under review than for some weeks previous. There appears to be some hesitancy on the part of buyers about placing large contracts so soon after the election, and some are even inclined to believe that prices will be but little if any higher in the near future, and possibly may be lower. We think as a general thing the trade is not apprehensive of the tariff question, and realize that there are good reasons for a strong iron market. It is natural there should be some lethargy in the market just at this time, but prices remain firm.

Hot Blast Foundry Irons.—Southern coke No. 1, \$13.50@ \$13.75; Southern coke No. 2, \$12.50@ \$12.75; Southern coke No. 3, \$12@ \$12.25; Southern charcoal No. 1, \$16@ \$17; Southern charcoal No. 2, \$15.50@ \$16.

Forge Irons.—Neutral coke, \$11.60@ \$12.00; mottled, \$11@ \$11.25.

Car Wheel and Malleable Irons.—Southern (standard brands), \$20@ \$21; Southern (other brands), \$18.50@ \$19.50; Lake Superior, \$19.50@ \$20.50.

Philadelphia. Nov. 25.
(From our Special Correspondent)

Pig Iron.—No change is apparent. Buyers feel perfectly safe in carrying moderate stocks. Foundries are all quite busy in this section and in New England, but they do not buy iron much faster than usual. No. 1 is quoted at \$15@ \$15.50; No. 2, \$14@ \$14.75; forge, \$13@ \$15.50. Special makes are not quite

so readily had as a month ago. Bessemer has improved a little more.

Muck Bars.—Three good sized sales were made a few days ago to keep stocks up. All mills are fairly employed. Prices are not strong. Price \$25.50.

Steel Billets.—In a small way a good many billets are selling for early delivery. The expectation on part of buyers for better terms later in the winter prevents the placing of more or less business, but consumption is heavy and probably is increasing. Prices run from \$26 to \$27.

Merchant Iron.—A fair business at lower prices is the sum and substance of the bar iron situation this week. Selling at \$1.60@ \$1.75, according to quality. Manufacturers would like more business on their order books.

Nails.—Store demand has subsided, but production continues uncomfortably heavy. There will be large stocks to carry over winter.

Sheet Iron.—All kinds of sheet iron are in good demand, the only difference between now and a month ago is that smaller lots are taken. The mill stocks are also larger, but manufacturers do not expect to restrict.

Skelp.—A fair business is being done but at prices that show the presence of anxiety among mill men for late deliveries. Price \$1.60.

Wrought Iron Pipe.—Business is of moderate proportions, and a further decline seems at hand though lower prices are not promised. Discount on 3 in. and over tubes 67 1/2%.

Plate and Tank.—A quiet week. A few orders came, but some large ones are delayed, not cancelled as erroneously stated in some daily papers. Tanks, 1 1/2; shell, 2.20; flange, 2.50@ \$2.75; fire-box, 2.75 @3c.

Structural Material.—Very little new business for the week, but a vast amount of business is looming up. Beams, tees and channels, \$2.20.

Steel Rails.—Unsatisfactory reports. Quotations, \$30.

Old Rails.—Old iron rails, \$18; steel, \$15.

Scrap.—No special activity. Railroad is worth \$16.

Pittsburg. Nov. 24.
(From our Special Correspondent.)

Raw Iron and Steel.—The wide publication of the facts, in connection with the improvement in the iron trade, has induced buyers to examine their ground carefully, with the result that many pig iron consumers have made provisions for all the iron they will need for some time. There is still, however, a large consumption uncovered, and on many purchases the price is to be raised in January if the market continues to hold. It is difficult to persuade many in the trade that the tendency of prices can be changed from downward to upward, and these continue to buy in limited amounts only, preferring to take the chances of the market. Southern furnacemen say that they have no unsold iron at their works or at the North, and that the output of the furnaces is sold up to several months in the New Year. At Chicago the mills on plate and structural material have been taking heavy orders extending for some time, and that specifications are in sight for still larger business.

The present conditions prevailing in the iron business are certainly very encouraging, because they demonstrate that the progress toward improvement is too well set in its way and too strong to hold back or be frustrated by mere sentimental influences. An admonition to proceed discreetly, which means slowly and continually, has undoubtedly been administered, but this is not discouraging; on the contrary it should be considered assuring, because it implies that the tendency toward an improvement of conditions has not only sufficient warrant to merit confidence but also strength to develop into a season of very fair prosperity if it is handled temperately. Reports from the iron men of the Shenango and Mahoning Valleys continue very favorable for iron and steel workers; in fact most of them are well sold up, their sales extending several months in the new year. Bessemer is beyond doubt the favorable metal at present; the Valley sales alone, within a short time, exceed 20,000 tons for delivery during the next six months. The rates f. o. b. at turnace \$13.75@ \$13.80; this would be equal to \$14.35@ \$14.40 Pittsburg.

Johnstown has been a very liberal purchaser. Notwithstanding the favorable outlook, there is still a wide difference of opinion among dealers; while some are disposed to purchase liberally, there are others who hold an entirely different opinion. The reports from all points show a healthy condition of affairs, so far as the iron and steel business is concerned. All signs point to a heavy business the coming year in iron and steel. The unusually large number of big buildings to be erected in Pittsburg in 1893 calls for an immense amount of raw material. Every new building erected consumes a larger amount of that description of material than the preceding one.

Coke Smelted Lake and Native Ore.
4,500 Tons Bessemer, January, February, 1893, \$14.15 cash.
3,500 Tons Bessemer, first three months 1893, 14.00 cash.
2,000 Tons Bessemer, 14.00 cash.
2,000 Tons Bessemer, 14.00 cash.
1,000 Tons Bessemer December, 14.10 cash.
1,000 Tons Grey Forge, January, 1893, 12.60 cash.
1,000 Tons Grey Forge, 12.55 cash.
1,000 Tons Grey Forge, 12.50 cash.
800 Tons off Bessemer, spot, 14.25 cash.

500 Tons Grey Forge, December, 12.50 cash.
500 Tons Bessemer, Valley Furnace, January 13.80 cash.
500 Tons No. 2 Foundry, 13.50 cash.
250 Tons No. 1 Foundry, 14.50 cash.
250 Tons No. 1 Silvering, 16.50 cash.
200 Tons No. 2 Foundry, all ore, 13.75 cash.
20 Tons No. 1 Foundry, all ore, 15.00 cash.

Charcoal.
120 Tons Cold Blast, 26.50 cash.
75 Tons Warm Blast, 18.50 cash.
75 Tons No. 2 Foundry, 19.00 cash.
50 Tons No. 2 Foundry, 18.90 cash.
50 Tons Cold Blast, 26.00 cash.

Steel Blooms, Billets and Slabs.
2,000 Tons Billets, Jan., Feb., 14.15 cash.
2,000 Tons Billets and Slabs, Jan., 24.00 cash.
2,000 Tons Billets, first three months 1893, at mill, 23.65 cash.
500 Tons Billets, Dec., 25.00 cash.
500 Tons Billets and Slabs, Jan., Feb., 24.20 cash.

Muck Bar.
500 Tons Neutral, Dec., 24.75 cash.
500 Tons Neutral, next three months, 24.85 cash.
500 Tons Neutral, next three months, 24.85 cash.

Skelp Iron.
70 Tons Wide Grooved, 1.63 1/4 m.
600 Tons Narrow Grooved, 1.60 4 m.
500 Tons Sheared Iron, 1.80 4 m.

Skelp Steel.
750 Tons Wide Grooved, 1.55 4 m.

Sheet Bars.
800 Tons Sheet Bar, at mill, 30.00 cash.
500 Tons Billet and Bloom Ends, 16.70 cash.

Steel Wire Rod, five-gauge American.
400 Tons American, Five Gauge, at mill, 32.60 cash.

Ferro-manganese.
75 Tons, 80% Foreign, delivered, 62.50 cash.

Old Iron and Steel Rails.
475 Tons, American T's, 20.25 cash.
400 Tons Old Steel Rails, mixed lengths, 16.00 cash.
100 Tons American T's, 20.00 cash.

Scrap Material.
400 Tons No. 1 Cast Scrap, gross, 12.00 cash.
250 Tons No. 1 R. R. W. Scrap, net, 16.10 cash.
200 Tons Iron Axles, net, 21.00 cash.
150 Tons Cast Scrap, gross, 12.00 cash.
150 Tons Charcoal Cast Scrap, gross, 16.00 cash.
50 Tons Coil Springs, gross, 18.50 cash.

COAL TRADE REVIEW.

New York, Friday Evening, Nov. 25.
Statement of shipments of anthracite coal (approximated) for week ending November 19th, 1892, compared with the corresponding period last year.

Regions.	Nov. 19, 1892.		Nov. 21, 1891.		Difference.
	Tons.	Tons.	Tons.	Tons.	
Wyoming Region....	439,802	529,719	Dec.	89,908	
Lehigh Region.....	148,958	131,759	Inc.	17,199	
Schuylkill Region....	292,433	342,178	Dec.	49,685	
Total.....	881,253	1,003,647	Dec.	122,394	
Total for year to date	36,941,701	35,751,964	Inc.	1,189,737	

PRODUCTION OF BITUMINOUS COAL for week ending November 19th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

Region.	1892.		1891.	
	Week.	Year.	Week.	Year.
Phila. & Erie R. R.....	2,018	81,921	146,429	
Cumberland, Md.....	77,354	3,397,591	3,705,281	
Berkey, Pa.....	982	60,676	170,183	
Broad Top, Pa.....	16,164	562,812	451,009	
Clearfield, Pa.....	90,279	3,539,749	3,550,948	
Allegheny, Pa.....	29,898	1,143,839	1,108,183	
Beach Creek, Pa.....	36,782	2,013,090	2,126,417	
Pocahontas Flat Top.....	46,198	2,334,734	2,014,686	
Kanawha, W. Va.....	66,836	2,322,979	2,133,781	
Total.....	358,511	15,457,381	15,437,607	

* Week ending October 21st.

WESTERN SHIPMENTS.

Region.	1892.		1891.	
	Week.	Year.	Week.	Year.
Pittsburg, Pa.....	24,157	1,120,590	1,137,711	
Westmoreland, Pa.....	33,459	1,558,705	1,734,927	
Monongahela, Pa.....	11,807	591,819	529,317	
Total.....	72,423	3,271,144	3,401,955	

Grand total..... 430,934 18,728,525 18,839,562

PRODUCTION OF COKE on line of Pennsylvania R.R. for the week ending November 15th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 102,835 tons; year 4,784,023 tons; to corresponding date in 1891, 3,850,736 tons.

Anthracite.
In spite of the rumors that circular rates are shaded we are in a position to say that they are not, and that there is but little probability of such a policy being attempted. Considering all the circumstances of the anthracite trade it appears to be in a fairly healthy condition except as to stocks which are enormous, though not at tide water. Those that look forward to buying, standard coal at less than full circular are likely to wait longer than they anticipate. There have been reports of an attempted break in the market, and some of them have seemed to be true, but on close inquiry it was found that prices are substantially unchanged, and that such coal as has been sold below the circular was not standard. The accumulation of stock is checked by the continuation of the cold wave, and dealers express themselves as pleased with the outlook.

Aside from a determination to adhere to the circular, and the conditions of the market would seem to warrant this course, the anthracite trade is not marked by any new features.

The date for taking certain testimony in the matter of the receivership of the Jersey Central has been put on Saturday, November 20th. The witnesses to be examined are Henry W. Maxwell, W. G. Zell, George F. Baker, James A. Garland and

Henry A. Graves. The date of final argument is December 1st.

Bituminous.

There is still serious complaint of a scarcity of cars. Even companies that own their cars are but little better circumstanced than those who depend on the railroads. In this particular it may be said that the trade is really suffering. Last week there seemed to be a feeling that a better time was near at hand, but if it is on the way it has been delayed, and to-day the outlook is not encouraging. It is a commentary on the state of the coal trade generally that when the anthracite is prosperous soft coal suffers more or less. The rivalry between them is unabated, and it must happen that what seems to be the advantage of the one reacts, to some extent, upon the other. The anthracite men have no special complaints to make as regards shipping facilities just now, but the soft coal men are not in a very smiling humor. Another turn of the wheel may reverse matters. The closing season for the ice ports can not be very far off, and when it does come there may be a much needed relief.

Some apprehensions as to the possible changes in the tariff are expressed, but we do not share them. The duty on soft coal is 75 cents per ton, and if it should be taken off entirely there would, of course, be a somewhat larger importation of Nova Scotia coal to our Northern markets. It is true our miners are compelled to haul their coal, except from the Cumberland, Md., region, at least 400 miles to the seaboard, and Nova Scotia mines are near the sea, but it is well known that Nova Scotia coal is by no means as good as ours; it carries more slate and sulphur.

With the duty off and a \$2.00 rate to Boston this coal could be imported for perhaps as a minimum \$3.25 or \$3.50 per ton, and in spite of its inferior quality it would enter the lists as a rival to American coal in the Northern market. The competition, is not, however, likely to be severe for any large amount of coal; for coke it might be more so. It will be more than a year before any modification of the tariff can be made, and when it does come the stimulus which free raw materials will give to manufacturing will no doubt more than offset any partial supply by Nova Scotia of the increased demand for coal.

Charter rates are: Philadelphia and Baltimore to Boston and Salem 85c.; to Portland and Portsmouth 85c. to 90c.; to ice ports 50c.; advance on ordinary rates.

Buffalo. Nov. 24.

(From our Special Correspondent.)

The near close of navigation occasions much activity to prevail on the docks at the coal wharves and trestles. The shipments continue heavy and would be much larger if boats could be had for Duluth and Superior, the demand for vessels being greater than the supply. Many small crafts have already gone into winter quarters and the weather has changed to a steady freezing temperature.

There are no changes to note in the anthracite coal trade. There is a good demand for coal for family use. Prices without change.

Bituminous coal continues in good request, but consumption will decrease as soon as navigation closes. Manufacturers are working their establishments full time. Prices are firm with supply about adequate to wants.

Quite a family trade is being built up in coke in consequence of the high prices of anthracite.

It is noted that freight cars are being ordered quite extensively by many of the railroad companies, including hundreds of gondolas for coal.

The difficulty in handling freight, especially coal, over the Buffalo & Geneva extension of the Lehigh (the Reading system) has been obviated by adding additional motive power and other facilities. It is said that large coal car storage yards are to be constructed at East Waverley and other points.

The contracts for General Poe's deep water project between Buffalo, Chicago and Duluth will be awarded in eight distinct sections, and work must be begun by May 15th, 1893, and completed by November 30th, 1896. Congress has limited the cost of the channel to \$3,340,000.

The movement of coal westward by lake from Buffalo, from November 16th to 22d, both days inclusive, aggregated 89,030 net tons, distributed about as follows: 46,600 to Chicago; 19,200 to Milwaukee; 8,300 to Duluth; 2,200 to Superior; 1,350 to Toledo; 2,000 to Washburn; 2,630 to Detroit; 1,500 to Ashland; 1,050 to Ft. William; 2,000 to Gladstone; 500 to Saginaw; 800 to Port Huron; 200 to Mackinaw, and 600 to Lake Linden. The rates of freight were as follows: 75c. to Chicago; 70c. to Milwaukee; 50c. to Ashland, Gladstone, Washburn and Lake Linden; 35c. to West Superior and Duluth; 30c. to Detroit, and 40c. to Port Huron, Toledo and Saginaw. To Ft. William and Mackinaw on contract.

The movement of coal by canal for third week in November was: Receipts, 1,270; shipments, 2,059 net tons.

Chicago. Nov. 24.

(From our Special Correspondent.)

Under the stimulus of the colder weather, and the full realization that present prices are as low as coal will be, the general country trade has improved very materially during the past week, the scarcity of cars alone preventing a larger business being done than has been for some time. While the orders are not large the aggregate of sales is very satisfactory, and the full car price for coal loaded from dock as also the schedule for all-rail coal is well maintained, and we hear of no cutting worthy of mention. From

present indications all the shippers should have a good steady trade for the remainder of the season, and by January 1st, 1893, we expect to report a diminution of the stocks to about the amount on hand at that time this year. The only difference will be that the producers (shippers) will be carrying the stocks, instead of as heretofore, their being in the hands, very largely, of the dealers in Chicago and the country, under contract. Shippers outside of the consolidated companies still complain of the light receipts of all-rail coal, and that they are entering the limited season with light stocks of chestnut at their dock yards. This is very much scarcer than any other domestic size—broken, egg, or stove—notwithstanding the increased shipments. Receipts via the lake are large, as navigation will soon close, when dependence will be entirely on all-rail shipments for further supplies, should they be needed. Retail coal is all that could be desired by dealers, whose teams and wagons are kept busily employed.

Bituminous coal is in unprecedented demand and fears are expressed of a soft coal famine. This will be easily precipitated by the actions of the various railroads in refusing to allow their cars to be consigned to points beyond Chicago on Western roads, unless they will guarantee to transfer promptly to their own cars and return the empties to the initial line. Many of the mines and shippers have contracts and transactions only with what is known as "commercial" and with railroads whose termini are outside of Chicago, consequently they are practically idle for want of outside cars and the utter inability of the Western roads to make the transfers, coupled with the fact of the unsettled condition of the mines themselves owing to the hubbub caused by the late election. We view with some alarm the prospects for next week.

To-day is "Thanksgiving," Friday the miners will not care to work, Saturday is pay day at most of the mines in Indiana and Illinois, hence the output will be seriously curtailed. Last year at this time the Ohio fields threw large amounts of coal daily upon this market, this year they seem to participate in the general improved condition of the coal trade and have not the cars and coal to supply the demand from this section. It is very generally conceded that never have the railroads had so much of this branch of the coal traffic offered to them or ever delayed and made their deliveries so thoroughly unsatisfactory. Some of the miners are still idle in the Springfield, Ill., district and the mine owners declare that the strikers must return on their (the operators) terms.

Coke is in steady demand, supply good with little if any surplus, and prices firm on all standard Connellsville makes. Crushed coke as a substitute for anthracite continues in good inquiry and meets with favor wherever introduced, and trial orders of one ton and upward are more frequent, with satisfactory results in every instance.

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, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.40; Hocking Valley, \$3.20; Youghiogheny, \$3.25; Illinois block, \$1.90; \$2; Brazil block, \$2.60; \$2.75.

Pittsburg. Nov. 24.

(From our Special Correspondent.)

Coal.—The coal strike along the Monongahela is now a thing of the past; work has been resumed already at certain points. The mining price for coal in the first three pools is 3 cents, in the fourth pool 2½. The rise in the Ohio was not sufficient to send out coal; at the same time it was very acceptable to coal men who made excellent use of the same by sending empty tow boats below to bring up empties which on arrival are sent to the various ports to be loaded. The consumption of coal at Pittsburg and vicinity is steadily increasing, the high price of natural gas compels the use of coal. Shipping coal to the lakes has ceased; the season has been a long one, and report says a profitable one, and would have been more so if the railroads had been able to meet the wants of the trade with cars. There seems to be always a set-back of some kind in the late trade. The stock of coal loaded in the pools, and in the Pittsburg harbor does not exceed 5,500,000 bushels, an unusually small one considering that the shipments the past five months does not exceed 3,000,000 bushels.

Connellsville Coke.—Shipments showed a slight increase. Trade was brisk; there was also a slight increased average in the days worked in the entire region. This was undoubtedly caused by a better car supply, with a fair prospect for a good supply for some time to come, as the railroad companies are making extra exertions to meet the wants of coke shippers. The Mahoning plant, one hundred ovens, owned by the Cambria Iron Company, has been fired up and made 6 days full. The 77 plants of the region averaged 534 days last week as against 533 the week previous. The Frick Coke Company averaged 484 days against 483 the previous week. The week's shipment aggregated 188,461 tons—previous week, 127,680 tons—consisted as follows: To Pittsburg, 2,100; points east of Pittsburg, 1,349; points west of Pittsburg, 3,470; total 6,919 cars. Prices are firm, but unchanged.

CHEMICALS AND MINERALS.

New York, Friday Evening, Nov. 25, 1892.

Heavy Chemicals.—Owing to the holiday yesterday which tended to disturb the trade somewhat, the past week in the heavy chemical market has not been very active. There is absolutely nothing new to report, and those features which characterized the market at the time of our last continue without change. A very fair quantity of alkali for future delivery has been sold during the week; stocks on the spot are rather scarce. The latter applies also to carbonated soda ash, which is without change. Caustic soda continues as last reported. In bleaching powder considerable business has been done for delivery over 1893. Our quotations to-day are as follows: Caustic soda, 60%, 3-17½@3-27½c.; 70%, 2-95@3-12½c.; 74%, 2-97½@3-15c.; 76%, 3-12½@3-25c.; 77%, 3-12½@3-25c. Carbonated soda ash, 48%, 1-57½@1-60c.; 58%, 1-47½@1-52½c. Alkali, 48%, 1-50@1-55c.; 58%, 1-45@1-50c. Sal soda, English, 1-02½@1-10c.; American, 1-00@1-05c.; on the spot shipments, in quantities, 97½@1c.; for English and 90@95c. for American; bleaching powder, 2-50@2-75c.

Acids.—Manufacturers continue to report a very good business in acids. Of all the chemical market no division is as active to-day as that which includes acids. Even now at the close of the year, when consumers are apt to buy in light quantities, the demand for the various acids shows no falling off. Some New York makers have been obliged to buy acid elsewhere in order to supply their requirements. There is no change in prices to report this week and 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", \$1@1.25; 20", 90c.@\$1.10; 22", \$1.25@1.50; 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@3.75; Glycerine by nitroglycerine, 11¼@12½c., according to quality and quantity.

Brimstone.—A further decline has been experienced in futures, which are now quoted at \$20@20.25 for best unmixed seconds, and \$19.25@19.50 for best unmixed thirds. Brimstone on the spot is held at \$25 for seconds. Owing to the decline in future shipments consumers have bought more freely.

Fertilizers.—The market for fertilizing chemicals is in a very fair condition. During the past week a good business was done. The trade in the North has been good, and this, added to the better feeling in the South and the light stocks in the West, makes the dealers take a more cheerful view of the future. The ammoniates are higher. Our quotations this week are as follows: Sulphate of ammonia, \$2.90 @ \$2.95 for bone goods and \$2.95 @ \$3 for gas liquor. Dried blood, \$2.37½@2.40 per unit for high grade and \$2.30@2.35 for low grade; acidulated fish scrap, no stocks on hand; dried scrap, \$25; Azotine, \$2.30. Tankage, high grade, \$23.50@24; low grade, \$20@22, according to grade. Bone tankage, \$22.50@23.50; bone meal, \$23.50@25.50.

Double manure salts are unchanged. The price has been fixed by the syndicate's agents, and has not changed during the year. Quotations are as follows: \$1.13½ cwt., basis 48@50%, in 50 ton lots, on foreign weights and analysis. High grade sulphate, \$2.13 cwt. basis 90%, foreign weights and tests.

Phosphates.—Phosphate rock, Florida, 60@90%, is quoted from Punta Gorda at \$4.50 per ton of 2,240 lbs. Charleston rock is quoted at \$4.75@5 f. o. b. Charleston.

Kainit.—During the past week arrivals of kainit at this port amounted to 1,000 tons. Prices continue as follows: \$8.75 for invoice weight and \$9 for actual weight. New York and Philadelphia; Southern ports \$1 higher.

Muriate of Potash.—There is no change in the position of this salt. Arrivals during the week were heavy, aggregating 1,200 tons. New sales were 100 tons, for future shipments. Prices are: For 50 tons or over, New York or Boston, \$1.81½; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.86½.

Nitrate of Soda.—Nitrate on the spot is very strong just now owing to the fact that the recent heavy demand has diminished considerable the available stocks in store. Quotations to day are: \$2.15@2.17½ for car load lots and \$2.10 in 1,000-bag lots.

Liverpool. Nov. 16.

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

Since our last report heavy chemicals are but little changed, the business reported being very limited. Soda ash is still quoted as follows: 45 lbs. 3d. per ton for 48% and 46 7s. 6d. for 57@58% caustic ash, 45 7s. 6d. per ton for 48%, 46 10s. for 58% carbonated ash. For next year contracts could doubtless be made at 15% less, or perhaps even a greater difference.

Caustic soda, minerals, £9 2s. 6d. for 60%, £10 5s. for 70%. £11 5s. for 74% to £12 5s. for 76%. These prices could be shaded considerably for contracts over 1893.

Soda caustic, £3 3s. 9d. @ £3 5s. fair demand. Bicarb soda, £6 15s. for 1 cwt. kegs, £8 5s. for 10 wt. cans.

Bleaching powder drooping steadily; the price nominally is £7 10s.@£7 15s. for contracts over 1893. Considerable less would no doubt be accepted.

Sulphate of ammonia is quiet; £10 5s., £10 7s. 6d. f. o. b. double bags.

Nitrate of soda £9 5s., £9 7s. 6d. f. o. b. double pay. Chlorate of potash scarce at 8½ per lbs. For contracts over 1893 price is about 7d. per lb.

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

Table with columns for Name and Location of Company, Nov. 19, Nov. 21, Nov. 23, Nov. 25, SALES, and Name and Location of Company, Nov. 19, Nov. 21, Nov. 23, Nov. 25, SALES.

*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 10,715. Non-dividend shares sold, 10,825. Total shares sold, 21,540.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Nov. 18, Nov. 19, Nov. 21, Nov. 22, Nov. 23, Nov. 24, SALES, and Name of Company, Nov. 18, Nov. 19, Nov. 21, Nov. 22, Nov. 23, Nov. 24, SALES.

*Ex-dividend. Dividend shares sold, 6,568. Non-dividend shares sold, 13,405. Total shares sold, 20,213.

DIVIDEND-PAYING MINES

NON-DIVIDEND PAYING MINES

Table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Name and Location of Company, Capital Stock, Shares, Assessments, Dividends.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Par, Total Levied, Date and amount of last, Dividends, Total paid, Date & amount of last, Name and Location of Company, Capital Stock, Shares, Par, Total levied, Date and am't of last.

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 \$42,000,000. ** 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 1888. ‡‡ 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.

Table with columns: COMPANY, Bid, Asked, Nov. 23. Includes entries for Baltimore, Md. such as Atlantic Coal, Balt. & N. C., etc.

Denver.

Table with columns: High, Low, Sales, Nov. 19th. Lists various commodities like Anaconda, Amity, Bangkok-Cora Belle, etc.

Pittsburg, Pa.

Table with columns: COMPANY, H., L., Nov. 24th. Lists companies like Bridgewater Gas Co., Charliers Val. Gas Co., etc.

St. Louis.

Table with columns: Bid, Asked, Nov. 23. Lists commodities like Adams, American & Nettie, Bi-Metallic, etc.

Deadwood.

Table with columns: Bid, Asked, Sales, Nov. 12. Lists commodities like Bullion, Carthage, Golden Reward, etc.

Colorado Springs, Colo.

Table with columns: Bid, Asked, Sales, Nov. 12. Lists commodities like Anaconda Gold, Argentum Junniata, Gold King, etc.

Foreign Quotations.

Table with columns: London, Nov. 16, Highest, Lowest. Lists various foreign commodities like Alaska Treadwell, Amador, American Belle, etc.

Paris.

Table with columns: Nov. 10, Francs. Lists commodities like East Oregon, Ore, Golden River, Laurium, Greece, etc.

San Francisco, Cal.

Table with columns: NAMES OF STOCKS, Nov. 18, Nov. 19, Nov. 21, Nov. 22, Nov. 23, Nov. 24. Lists various stocks like Alpha, Alta, Belcher, etc.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Lists prices for various chemicals and minerals like Acid-Acetic, Commercial, Chromic, Hydrobromic, etc.

Continuation of current prices for various metals and minerals like Aluminum, Arsenic, Barium, Bismuth, Cadmium, etc.

THE RARER METALS.

Aluminum, Arsenic, Barium, Bismuth, Cadmium, Cesium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Glucinum, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Niobium, Osmium, Palladium, Platinum, Potassium, Rhodium, Ruthenium, Rubidium, Selenium, Sodium, Strontium, Tantalum, Tellurium, Thallium, Thorium, Titanium, Tungsten, Vanadium, Yttrium, Zirconium.

COAL STOCKS.

Table with columns: NAME OF COMPANY, Nov. 19, Nov. 21, Nov. 22, Nov. 23, Nov. 24, Nov. 25, Sales. Lists various coal companies like Cambria Iron, Cons. Coal, Del. & H. C., etc.

Total shares sold, 260,816.