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* Illustrated.

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A CASE involving the basis of the duty on certain copper ores was heard by the General Appraisers in New York October 27th. The special point involved was the duty on Rio Tinto pyrite, imported by certain sulphuric acid manufacturers. Expert testimony was taken, and the Secretary of the Treasury will decide upon the question.

THE sixty-first annual fair of the American Institute, which is now in session, through the commendable rivalry encouraged by its competitive exhibits, cannot fail to be of lasting benefit to the Mechanical Art. To the manufacturers of machinery, improvements are at once suggested by the observation of other appliances in operation, with their strong points and their failings shown clearly under the duties required of them.

We are extremely glad to notice that there is a marked improvement in the method of awarding prizes, former partiality and undue prejudice, if not venality, of which the ENGINEERING AND MINING JOURNAL exposed some years ago. This grave error, which would necessarily imperil the existence of the Institute, corrected, there is no reason why the Institute should not be a lasting success and a benefit to the exhibitors, the public and the members alike.

THE REMOVAL OF SULPHUR FROM PIG IRON.

Mr. STEAD's article on this subject, now being published in the JOURNAL, and Mr. SANITER's description of his own process, which we will take up shortly, open a field of experiment far reaching and important. The removal of phosphorus from pig iron by the Thomas process has attained large proportions abroad and promises, under the impetus of the Pottstown Iron Company, to be established in this country.

It now remains to attack the removal of Sulphur from pig iron, so as to bring within the range of the forge and the foundry material that remains somewhat upon the outside. It has not been long since a shipment of Southern iron, said to be Bessemer, was condemned on account of the sulphur content, the phosphorus being below the ordinary Bessemer limit.

The sulphur content in the ores of the United States, while locally important, cannot be said to exercise much influence upon their treatment. If it exists as sulphide, in ores relatively free from lime, it is removed by roasting, and is of little importance in the actual production of iron, except in adding slightly to the cost of the stock ore.

But calcareous iron ores containing sulphides and ores containing sulphates are exceptional in this country. There is an abundance of ore not handicapped with these objections, and it will be a long time before we will have to use these less pure ores. The flux used is, in great measure, free of sulphur in any form, or, at least, contains but a small portion of this element.

The introduction of sulphur into pig iron, under the conditions generally obtaining in this country, is due to the fuel used, whether anthracite or coke. The question, then, resolves itself into one of betterment of the fuel in the first place, and, in the second place, of the elimination of sulphur from the pig iron itself.

It seems to us that we have not yet reached a satisfactory position as regards the removal of sulphur from the fuel previous to its introduction into the furnace. Much indeed has been done and works now built and building will, it is hoped, bring the matter further along year by year. The subject concerns the coke-makers and users chiefly, and the Southern furnaces more than the others. The coal washers at the Sloss furnaces in Birmingham, the Mary Lee and Standard coal mines in Alabama, and the St. Bernard mines in Kentucky, are proofs that some of the Southern coke men appreciate the situation. If all the furnaces purchasing their coke

in the open market would insist upon a minimum sulphur as well as a minimum ash content we would perhaps hear less about white and mottled iron.

As regards the removal of the sulphur from the iron itself it seems to us to be one of the most important questions of the day, deserving all the care and money that is now engaged in its elucidation. No more important matter has come before iron and steel men since THOMAS argued for dephosphorization in a basic lined converter, and it may be that some modification of his process, whereby deoxidation is effected in a similar vessel, will be found to answer all practical requirements. A basic lining, a basic flux, a deoxidizing atmosphere and a moderate heat seem to condition the removal of sulphur from pig iron.

THE PALMAREJO MINE, MEXICO.

In the ENGINEERING AND MINING JOURNAL of July 16th and August 20th, in referring editorially to the Palmarejo Mining Company, Limited, owning and now operating mines in Chihuahua, Mexico, we stated that the ore, which had been claimed to average \$30 per ton, would, in all probability, when milled on a large scale, fall far below this value, and in fact had been estimated by reliable experts as below \$20 a ton, some putting it but little over \$15 a ton. At that time the mill had not started, and there were no returns save those from assays of hand samples, which, however closely taken, are often misleading. Actual milling has now commenced and the first returns justify everything we have said concerning the doubtful prospects of the property and the gloomy outlook for the stockholders who have contributed several million dollars to its development. After many delays and more excuses the mill commenced operations on June 28th, mining to July 27th, crushing 1,092 tons of ore and producing \$28,375 (Mexican), an average of 22.3 oz. per ton.

Then it stopped for alterations on the roasting furnaces. Twenty-five stamps started on August 14th, the other 25 being hung up for want of power to drive them, an obvious miscalculation having been made by the engineers who are responsible for the plant. It was found possible to drive 40 stamps, however, and the extra 15 started on August 28th. The returns so far are here tabulated:

Date.	Tons crushed.	Bullion produced, value in Mexican dollars.	Per ton, actual bullion value at 66c. per Mexican dollar.
June 28th to July 27th.....	1,092	\$28,375	\$17.11
August 14th to 27th.....	343	9,720	18.70
August 28th to September 3d.....	285	8,000	18.48
September 4th to 10th.....	238	8,000	17.69
September 10th to 17th.....	345	8,650	16.54
September 18th to 24th.....	377	8,700	15.22

These figures more than confirm all we have stated and the confidence our esteemed contemporary the London *Financial Times*, expressed in the reliability of our statements.

To restore confidence among the stockholders the directors have issued a circular from which we have copied the above figures. This circular, among other errors, calculates the yield in ounces per ton by dividing the gross product in Mexican dollars by the tonnage, instead of dividing the yield per ton by \$1.23, the approximate coinage value of an ounce of silver in Mexico.

This "temporary" decline, the circular says, was anticipated, as there was a quantity of ore of uncertain value stored in the mine, which had to be removed before they could get at the higher grade. This explanation to anyone experienced in the practice in starting new works needing money and further subscriptions, seems rather "attenuated," to use expressive slang. In such cases the poorest ore is not milled first, and we would on this showing lower the figures we quoted and would be disposed to say that instead of \$30 a ton, which the promoters promised as average yield, the actual product will probably average a good deal less than \$15 bullion value per ton.

The reports from the mine, replete with excuses and promises, sound strangely familiar. Are they not stereotyped from the same forms, which gently persuaded the dispirited stockholder to meet the last call on the Eberhardt or Monitor of Nevada? It may be but a coincidence, but Capt. FRANK DRAKE, formerly in charge of the Eberhardt, is now managing the Palmarejo, and Mr. APPLGARTH has been the enterprising promoter of both.

It is claimed that the company has paid its current expenses and some old debts with its output during the period for which we have returns. The expenses, Captain DRAKE says, guardedly, cannot be estimated at less than \$15 per ton, but may they not be more? It is probably safe to say that they will be more. It is a remarkable mine in Mexico which can mine and mill an ore which requires chloridizing-roasting for less than \$25 a ton, where salt will cost at least \$6 a *carga*, or \$42 a ton. We believe, basing our estimate on the cost of working in Sonora and in Chihuahua, that the milling alone of the ore will cost over \$12, Mexican money, a ton. It will take some little ingenuity to show that a profit can be made on ore producing bullion actually worth \$15 per ton, or \$23 in Mexican money.

While the directors close the circular with the statement that the posi-

tion of the company is far from unsatisfactory, we close ours with the statement of our belief that the condition of the Palmarejo mine is even worse than we said, and that the English stockholders have indeed a very gloomy prospect ahead. This is another of those mining enterprises which do so much injury to legitimate mining and that disgust investors though they may enrich unscrupulous promoters. The English courts will probably write the closing chapters of this history.

A PROFITLESS BONANZA.—THE CONSOLIDATED CALIFORNIA & VIRGINIA MINE.

The accounts of the Consolidated California & Virginia Mining Company for the year ended October 1st, 1892, presented at a recent meeting, while undoubtedly "cooked" like those of all Comstock mines controlled by the ring, showed an apparent loss of \$109,926.51 during this period. This apparent loss, which is actual to the stockholders, is attributed by the controlling interest to the low tenor of the ore, the low price of silver and the failure to discover any new extensive bodies of ore. Some 53,421 tons after being intrusted to the tender mercies of Senator Jones' Comstock Milling and Mining Company were reported to have yielded \$974,351.89 in dullion, the net value of which product was reduced to approximately \$845,000, some \$545,787.73 being in gold and suffering no discount.

From Superintendent LYMAN'S report we learn that while some prospecting has availed nothing, as might be expected, other drifts and crosscuts have developed more or less ore. At one point on the 1,500 level 30 tons of ore are being stoped daily. On the 1,750 and 1,800 levels there is still workable ore. In a drift 45 feet below the 1,800 level the ore is 8 feet wide, said to run from \$13 to \$20 a ton. There are no explorations below this point. The water stands but 52 feet below the 1,800 level.

These details, which are very probably entirely within the truth, show clearly that very much better results should have been obtained had not the management been more desirous of lining their own pockets, levying assessments and fleecing the stockholders than enriching stockholders by the legitimate profits of mining.

In the ENGINEERING AND MINING JOURNAL of October 8th are published the costs of the Montana Company, Limited, operating the Drumlummon mine in Lewis and Clarke County, Montana. These returns furnish an interesting comparison with those of the California & Virginia, which is the more fair, as both mines were unprofitable and presumably every effort was made to reduce expenses to a minimum in each case.

The net yield on the Comstock was \$15.81 a ton, while in Montana it was \$6.22, or less than half. The expenses on the Comstock were \$17.87 a ton, while in Montana they were \$6.98, again less than half. The question is pertinent why the expenses on the Comstock were nearly 150 per cent. higher than in Montana. Even after allowing for every possible contingency on the Comstock and for the differences in local conditions the question can be answered in one way only—it was due directly to dishonest management.

The most important factors in the costs of mining operations are labor and supplies. Labor on the Comstock is slightly higher than in Montana, 14.2%, \$4 per day against \$3.50, to be exact. Surely the higher cost cannot be due to labor alone. Supplies should be about equal cost, were not the expenses on the Comstock increased exorbitantly by the ring, which not only owns the lumber company supplying timber and cord wood, but controls the Virginia & Truckee Railroad over which the supplies are hauled, and the various stores selling minor articles.

Timber, an important item on the Comstock where the square set system is necessary, should cost no more per foot than in Montana, while timbering as a whole should cost, say, 25% more. The minor supplies, such as powder, steel, oils, cables, etc., should cost at least 10% less, since the Comstock mines are located nearer the source of supply.

Mining of ore or stoping should be cheaper than in Montana, as the ore is often in "picking" ground, in which rapid progress is made and but little powder required. Moreover it generally occurs in large bodies, while in the Drumlummon the vein is narrow and the ground harder. Prospecting on the Comstock, where the practice is to search for a new and large bonanza, while neglecting the smaller and already existing bodies which offer the surest profits, is in reality expensive, due not to any difficulties in advancing drifts or sinking winzes through the decomposed country rock inclosing the Comstock lode, but to the extravagant extent to which it is carried. If these mines were well managed and the superintendents had the welfare of the stockholders at heart, prospecting would be confined to proving the continuation of bodies already exposed rather than to searching aimlessly through the vast quantity of country rock. In no case should it exceed a total expense of 50% of the cost of mining. This amount in a well regulated mine would be considered more than ample for developing reserves.

Milling on the Comstock, as is well known to readers of the ENGINEERING AND MINING JOURNAL, is in the hands of an unscrupulous ring and cannot be compared with milling elsewhere. The ores of the Comstock lode, as have been proved by repeated tests made on them, are far from refractory and should yield not less than 80% in free milling instead of 60 or 65%.

It is very probable that if fair precautions were used to avoid undue loss in slimes, which, as well as the tailings, become perquisites of the mill ring, 85 or even 90% would be extracted. The continuous process mill, which ran on California & Virginia ore for some time, is stated on good authority to have returned 92% of the battery assay. The use of this process was abandoned as no battery slimes were produced, all the pulp flowing directly to the pans, thereby cutting off an important source of revenue to the mill ring.

The cost of milling to the companies is from \$6 to \$7 per ton. Of course this includes the large margin of profit to mill owners. The cost by the continuous process is stated to have been \$3.50 a ton, and there is no doubt that it can be reduced much below this figure. If the combination milling process, consisting of concentration on Frue vanners and pan amalgamation of the tailings, was used, the costs could be reduced still lower, and a high percentage of extraction maintained. This process would not be an experiment upon Comstock ore, for it has been tried with success, and is now being used in modified form at the mill of the Occidental Mining Company. Hale & Norcross ore was worked to 84 per cent. in this mill, and there is no reason why Consolidated California & Virginia ore should not be worked to as high a percentage. The cost at the Drumlammon mine, where this process is used, is but \$1.86 a ton. On the Comstock it need not be over \$2. To place the California & Virginia mine on a paying basis requires only honest and competent mine management, and the possession of a mill in which the ores are treated successfully and cheaply and where no perquisites or stealings of whatever nature go to the ring.

What mining engineer, however, conservative, would not be hopeful of earning profits in a mine easily worked, with an ore averaging over \$20 per ton, which is easily and cheaply milled to a fair percentage, provided he was unhampered by directors, either arrant knaves or positive dummies, regardless of the welfare of those who have intrusted their interests to them? To a professional man it would be a labor of love to place on a paying basis this grand old mine which has paid over \$75,000,000 in dividends. If this mine were in Montana, we will say on the property of the Montana Company, Limited, under its careful management and free from the control of the iniquitous ring, dividends would be declared monthly. That the California and Virginia can be worked to a profit without striking new bonanzas is certain for there is a bonanza already in its low grade ore. But as the present management will not do this, it rests with the stockholders to assert their rights to withdraw by process of law the control of this company from the ring and to work the property under their own direction.

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.

Mining in the Republic of Colombia.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In writing of experienced Californian miners in my letter published in your issue of July 16th, I should have explained that there was no experienced miner in charge of any of the English companies' mines which I enumerated. There are and have been a few experienced Californian miners in the country, but they have not been employed by the English companies excepting as subordinates, so that there is not one example in the country of how hydraulic mining should really be conducted.

Attention is at present centered in the probable action of the Senate, now sitting at Bogotá, with regard to the pollution of rivers. If the law is maintained in its present form hydraulic mining will receive a great check. The feeling against this class of mining is strong and general. It is maintained that the Magdalena River, which is the chief highway into the country, has silted up to an alarming extent during the last few years, and that whereas a few years ago steamers drawing 5 or 6 ft. had no difficulty in getting up to within a few miles of Honda, difficulty is now often experienced in getting steamers through which have a draught of only 3 or 4 ft. If the Senate are convinced that this is the fact hydraulic mining is doomed as far as the Magdalena watershed is concerned.

There is nothing particularly new in vein mining to note. The Frias mine has produced for July and August 157,000 oz. of silver.

Dr. J. Pereira Gamba has completed his tour through the two principal mining departments, Tolmia and Antioquia, and has collected, as I am informed, a fine lot of mineral specimens and important data with regard to the mining industry, with a view to a proper representation being made at the Chicago World's Fair of the resources of this country.

HONDA, Sept., 1892.

COLOMBIA.

The Loot of the Consolidated California & Virginia Mine.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: At the annual meeting of the Consolidated California & Virginia Mining Company held this day, the following protest and demand was offered, and, on motion duly seconded, was unanimously adopted by the stockholders:

We, the Undersigned, Stockholders in the Consolidated California & Virginia Mine, enter the following protest:

The evidence in the suit of Fox vs. The Hale & Norcross Mining Co., disclosed to shareholders in the Comstock mines some of the reasons for the failure of dividends,

and the constant heavy assessments of the stock. The line of methods by which thousands of dollars were fraudulently appropriated by the mill owners who milled the ores of the Hale & Norcross Mine have been adopted and successfully used by other milling companies on the Comstock.

We are now prepared to state to the stockholders of the Consolidated California & Virginia that they have been plundered by the same system of methods, and property of the mining company to the extent of thousands of dollars has been unlawfully appropriated by the Comstock Mill and Mining Company, the corporation which has been milling the ores of the company for years. The contract with that milling company makes no provision for the protection of the property of the mining company, but under its terms the valuable ores of the mine are delivered into the possession of the milling company to be by it milled without checks or guarantees of any character.

No percentage of the value of the ores as they are assayed at the mine is exacted, and the milling company is permitted and entrusted with the duty of ascertaining the value of the ores as they are worked at the mill, and this valuation is accepted by the officers of the mining company without question. Under this system the Comstock Mill and Mining Company has been enabled to extract from the ores of the mining company vast amounts of bullion worth thousands of dollars and has thus unlawfully appropriated the same to its own use. Such a loose and unbusinesslike system would not be permitted by directors of a mining company not under the control of the milling company, and we charge that the directors of the Consolidated California & Virginia Company are now and for many years have been under the absolute control and direction of the owners of the Comstock Milling Company, and through a shrewd and cunning manipulation have declared small dividends at long intervals and levy no assessments. Of the business of the mining company the stockholders have been falsely led into the belief that its affairs have been honestly and carefully managed.

The incident of three "cestray" bars of bullion is but an illustration of the facts and methods above alluded to.

We are prepared to furnish to the Directors of the Company a list of a great many bars of bullion of great value which have been claimed and appropriated by the Comstock Mill and Mining Company out of the ores of the Consolidated California and Virginia Company.

The directors to be elected should be instructed to suspend the further milling of ores under the unlawful contracts now existing between it and the Comstock Mill and Mining Company, and that a new contract be made making provision for the honest working of said ore.

The directors should be further instructed to make efforts to obtain a reduction in charges for milling, transportation, water and lumber, which are exorbitant and unfair.

We charge that the Consolidated California and Virginia Mine is not managed in the interest of the shareholders of the company, but in the interest of, and for the profit of, the Comstock Milling Company. In proof of this we submit the following figures:

Ore extracted from the mine from Aug. 1, 1891, to Aug. 1, 1892, 54,898 tons. According to the pulp assay publicly given by the Company, this ore was worth an average of \$23.37 per ton, or a total value of \$1,282,767.08.

The Comstock Mill Company returned of this pulp assay in bullion \$987,634, retaining in tailings \$295,143. They received for milling 54,898 tons of ore at \$6. Gold per ton, 329,388, equal in bullion to \$375,502.32. Making their receipts \$670,645.32, bullion value, out of \$1,282,767.08 worth of ore, or more than one-half of the pulp assay of the ore.

The company commenced the fiscal year with \$98,374.94 in the Nevada Bank. They have crushed over 55,000 tons of ore, worth nearly \$25 per ton, and at the end of the fiscal year the company is reported in debt.

Is this working the mine in the interest of the shareholders or in the interest of the mills?

We demand: 1st.—That the directors of this Company take immediate steps to recover all bullion or its value, unlawfully appropriated by the Comstock Mill and Mining Company out of the ores of the Consolidated California & Virginia Company, and we will furnish them a full list of all such fraudulently appropriated bullion.

2d.—We further demand that the Board of Directors of this Company instruct the Superintendent of the Mine to stop shipping ore to the mills owned or controlled by the Comstock Mill and Mining Company as John P. Jones, one of the parties owning one-third interest in that Company has been proven in the Hale & Norcross case, and publicly stigmatized in the press of the country, a common thief, and he is unworthy to be trusted with the property of this incorporation.

MINING STOCK ASSOCIATION,

Per J. H. TINGMAN, Secretary.

The meeting was evidently called with unusual promptness, as stockholders who arrived at one minute past one o'clock found the roll called, the directors already selected, and the motion to have the secretary cast the vote already passed. This lightning-like speed was evidently due to the desire of the board of directors to avoid the protest of the Mining Stock Association.

The ruling powers had a representation of 195,500 shares by proxy and 36 shares of stock—as usual the brokers stood in to citch their customers and gave up proxies on stock which did not belong to them, and it may be assured that they never consulted the owners of the stock as to whether they should give these proxies or not. Without the proxies from the brokers it is questionable whether the Comstock Milling ring could have put their dummy directors in to loot the mine for the coming year. It is a suggestive fact that the mine started the year with a cash balance in the Nevada Bank of \$98,374.94. They produced during the year 900,000, and are reported in debt \$11,541.59, showing \$1,509,916.51 expended during the year.

The stockholders in the mine got nothing and the stockholders in the mills got over a half million dollars.

There is no mine on the Comstock more dishonestly managed than the Consolidated California and Virginia, and the managers of it are John W. Mackay, James L. Flood and the notorious Senator John P. Jones. That this condition exists is due to a large extent to the negligence of the shareholders. If they had taken advantage of the invitation of the Mining Stock Association and sent the secretary of that organization their proxies or stock, or placed it where he could have voted on it, the control would have been taken away from the infamous mill ring.

The parties who own the mills which crush the ore do not own the majority of stock in the mining company, and it is not to their interest to make the mine pay dividends, as they get all there is to be got through the mills. They get immense dividends through the mills. The mine stockholders get nothing. To show stockholders how shamefully their interests are treated by the brokers we give the vote:

Proxies from brokers.....	122,101
Proxies from secretary	12,508
Proxies from banks.....	60,840
	195,449

The proxies from the banks come under the same category as the brokers. They do not own the stock. They have no right to give these proxies, and are liable for any loss that may be brought upon shareholders through their illegal acts.

John W. Mackay swore that \$14 rock would pay a profit to the mine, but the mine under his management loses money on \$23 ore. He will be called to account for the difference, and where the Hale & Norcross gang got away with a million, the Comstock mill gang will have several million to account for. It's another year for the looters. Are the stockholders going to sit still and stand it?

MINING STOCK ASSOCIATION.

SAN FRANCISCO, Oct. 19, 1892.

Per J. H. TINGMAN.

ABSTRACTS OF OFFICIAL REPORTS.

Comstock Tunnel Com an .

In his annual report to the stockholders Mr. Theodore Sutro, president of the company, says: "The funded debt of the company remains as at the date of the last annual report, \$1,908,000; the unissued bonds also remain as last reported, \$861,000. During the past fiscal year \$38,160 was applied to the payment of coupon No. 4, which matured November 1st, 1891. Coupon No. 5, maturing May 1st, 1892, was passed for reasons explained to the bondholders in a circular notice (see ENGINEERING AND MINING JOURNAL, Vol. LIII., page 484, April 30th, 1892).

The output of ore of the royalty paying mines for August last amounted to only 8,633 tons, and for the entire year 152,809 tons. Its average yield per ton has remained as for the preceding year, \$15.

"Contracts for the transportation of waste rock and ore through the tunnel were executed under date of October 12th, 1891, with the Consolidated California & Virginia, the Savage and the Hale & Norcross mining companies, and we expect to execute similar contracts as soon as the proper connections can be made with their works for transportation purposes with the Gould & Curry and the Best & Belcher companies. It is likely that gradually most of the mining companies will enter into an arrangement with us for the transportation of their waste rock at least. So far none of the mining companies have transported any ore through our tunnels, even those with whom we have executed contracts having given us only waste rock. The main reason for this is that we have no facilities at the present time for transporting the ore from the mouth of the tunnel to any mills for reduction. In this connection we can only recommend that the company erect a mill on its island. With a view to that end we have once more carefully looked over the ground on a recent visit to the property. We have had surveys made, had consultations on the spot with representatives of the General Electric Company and various other experts, and believe that the most feasible plan would be to erect an electric plant near the Carson River, using the water power of that stream for the purpose of generating electricity, and then transmitting this to a mill to be erected near the mouth of the tunnel.

"In order to prepare the roadbed of our tunnel for the additional strain which the transportation of so many tons of waste rock would impose upon it, and also the ground outside the tunnel for the purpose of dumping this waste material, and also in order to have sufficient cars and mules to convey it, we had to go to considerable expense. The results effected by this expenditure are, however, of a permanent nature. In order to reduce the cost of transportation still further we have recently ordered a mine locomotive of a special pattern to be substituted for mule power.

"The contract with the Occidental Mining Company was closed under date of September 1st, 1891, substantially on the basis mentioned in our last annual report. The money received from this company in the way of royalty had to be applied, under our contract with it, to running a drift on or along the course of the Brunswick lode, and could not be used for any other purposes. This being entirely new work, the expenditure connected therewith has properly been classed under the head of extraordinary expenses. This drift, when completed, will not only be a permanent addition to our tunnels, but, at the same time, answers the purpose of an exploration drift. It had advanced, at the date of this report, 809 ft. It remains for the Occidental company, or the owners of the St. John's ground, through which we are passing, to do this additional exploration work, our function being, under our contract, simply to extend the drift, at our option, either 1,000 or 2,000 ft., toward the Occidental ground. Should pay ore be discovered in running this drift, it would lead to a thorough exploration of the Brunswick lode, about 1,000 ft. of which, in a northerly direction from our main tunnel, we have the exclusive right by act of Congress to purchase for a nominal sum.

"The arrangement with the Alta Mining Company, which we mentioned in our last annual report, has also been completed, substantially as then indicated, and \$12,000 cash paid us by this company in settlement of our claims for past royalty."

President Sutro suggests that an independent company be formed to explore the Tunnel company's ground thoroughly, erect an electric plant and mill and make other improvements, at present beyond the means of the Tunnel company. To the bondholders he recommends patience, saying that since the income of the company is always more or less precarious, it "would be the height of folly to run the risk of having no cash surplus whatsoever in our treasury, should at any time this income fall below what is absolutely requisite in order to keep our property from permanent and irreparable deterioration and ruin."

The report of Mr. C. C. Thomas shows that the main tunnel has been retimbered for 178 ft. and various other repairs made. Mr. Thomas recommends to his company to continue the work of prospecting on the Brunswick lode, and also on other veins cut by the tunnel in the hope of finding ore bodies. According to the treasurer's reports the total receipts, including \$10,816 for back royalty paid by the Occidental Mining Company and \$12,038.54 back royalty paid by the Alta Mining Company, were \$123,024.65. Total disbursements (including cost of preparing for transportation, \$21,800, and cost of preparing Occidental drift, \$15,987.78) were \$148,637.59. This shows an actual loss of \$25,612.94, caused by the extraordinary expenses mentioned above. The company, on the 31st of August last had a balance of \$78,082.08; on August 31st, 1891, there was a balance of \$103,695.02.

The Treasury Department in a recent circular (13,082) states that the depositing in any bonded warehouse of gunpowder or other dangerous or explosive substance is prohibited by Sec. 2,692, Revised Statutes, and such articles are likewise prohibited from the privileges of transportation in bond. Such articles must, therefore, be entered and the duties paid at the port of first arrival.

Lighting a Railway by Electricity.—A plan to light by electricity the tracks of the Pennsylvania Railroad between Broad Street Station, Philadelphia, Pa., and Bryn Mawr, Pa., on the main line, and between Frankford and Broad street, on the New York division, is under consideration. If the project is carried out there will be practically no further use for headlights on the locomotives running between these points, and should the line of electric lights be continued all the way to New York, which is not improbable, the entire roadway will be as light as day at all times.

THE ELIMINATION OF SULPHUR FROM IRON.

By J. E. Stead, Middlesbrough.

Continued from page 388.

Iron Sulphide Heated with Silica.—Percy gives the result of experiments in his laboratory which indicate that when sulphide of iron and silica are heated together to whiteness for two hours no sensible change is effected.

Iron Sulphide Heated with Silica and Carbon.—Hochstetter melted iron sulphide, silica and charcoal together to whiteness for two hours in a covered plumbago-crucible, and obtained the following result, viz.: Mixture used—Sulphide of iron, 600; silica, 60; charcoal, 300. Product obtained—Iron, 80.23; silica, 18.77; sulphur, 1.00%; loss of sulphur, 97.46%. In this experiment the amount of silica reduced most clearly indicates the very great heat employed, for it is well known that it is impossible in the blast-furnace to obtain such a high percentage of silicon excepting by the use of an extravagant amount of coke and a very high temperature. To ascertain what result would be obtained if the experiment were conducted at a temperature not so elevated, I conducted another experiment. Two grammes of sulphide were placed in a mixture of lampblack and silica, and were covered with a portion of the same mixture and heated for one and a half hours to a good white heat. The button after the treatment consisted of apparently unaltered sulphide, and no metal was produced. A second experiment was made, using instead of sulphide a portion of the same sulphurous white iron as was used in previous experiments, all other conditions remaining the same as in the last experiment. The button remaining contained: Silicon, 5.37; sulphur, 0.52%. The temperature employed was the same as in the previous trial. Now, judging from the fact that the silicon was reduced to such an extent as 5%, we must admit that the temperature must have been considerable, and that at any rate up to that degree there is no reaction such as Percy found in his experiment when 18% was reduced. Turner, in his paper to this Institute, has shown that silicon pig containing 13.45% silicon may contain 1.46% sulphur, and another sample containing 10.78% silicon, 0.45% sulphur at their melting point; and has shown that silicon sulphide of iron containing about 10% silicon and the same amount of sulphur, on heating to the melting point of cast iron in a clay crucible, was split up into two perfectly distinct bodies, one containing the greater part of the silicon, while the other was exceptionally rich in sulphur. The metal, however, containing the greater part of the silicon (13.45%) still contained 1.46% sulphur; we may assume, therefore, that at the temperature mentioned a stable compound was formed, and that this large quantity of silicon had no effect or power to remove the 1.46% sulphur associated with it. In concluding his remarks, he says: "Silicon has the power of expelling sulphur from cast iron, and that in blast furnace practice there are three chief agencies at work tending to eliminate sulphur from iron, of which in Cleveland practice not more than one-twentieth passes into the iron: 1st—A high temperature tends to prevent the absorption of sulphur by iron. 2d—A slag rich in lime readily combines with sulphur. 3d—The amount of sulphur actually retained by the metal is influenced by the proportion of silicon, and probably also certain other elements present in the iron."

Now it appears to me that Mr. Turner's experiments show that iron with excessive silicon may still contain 1.46% sulphur, an amount exceeding what is usually found in any ordinary cast iron produced in a blast-furnace, and that although his conclusions apply very aptly to compounds of iron, silicon and sulphur which have never been met with in practice, they do not apply to ordinary blast-furnace work, where the silicon rarely exceeds 5%. Interpreting Mr. Turner's results, it would seem that we are justified in concluding that silicon *per se*, excluding any slag or bases capable of combining with sulphur, is not influenced by the amount of silicon usually present in cast iron. It is well known that silicon-pig is produced with a slag deficient in bases, and therefore not well adapted for the absorption of sulphur, and I have found in such iron more sulphur than No. 1 pig iron usually contains—viz., 0.1%, and Mr. Hadfield has stated that out of 50 to 60 analyses of such iron, containing from 8 to 12% of silicon, the sulphur has varied from 0.1 to 0.32%, an amount frequently not exceeded in white iron containing under 1% of silicon.

The following analyses represent pig iron produced in blast furnaces working hot, but with deficient lime—Silicon white, 1.76%; close gray, 4.27%. Sulphur white, 0.46%; close gray, 0.32%. Now, taking all these facts into consideration, we are safe in stating that great and prolonged heat and the consumption of a large quantity of coke in the blast-furnace, and the presence of large quantities of silicon in the pig, do not, if the lime or magnesia or bases capable of absorbing the sulphur are deficient, result in its elimination or prevent it from being retained in the pig-iron. It is a well known fact frequently demonstrated, that as the sulphur increases in iron its capability of combining with carbon is reduced. Many investigators have also proved that the carbon to a greater or less extent is expelled from cast iron on the addition of sulphide of iron. It is certain that in all classes of cast iron, no matter at what temperature it is produced in the blast-furnace, when the sulphur is high, the carbon will be lower than it would have been had the sulphur existed in less quantity.

Smelting Ores Containing Barium and Calcium Sulphates.—In many practical crucible experiments I long ago found that when barium and calcium sulphates are present in iron ores, the sulphur present is nearly as liable to be found in the cast iron as if it existed in sulphide of iron or pyrites. The tank waste experiment made by Sir Lowthian Bell clearly shows us how and why this is. Both the sulphates of lime and barium in presence of carbon are rapidly reduced to sulphides, and these sulphides in the intermediate and less heated region of the blast furnace must behave exactly as in the experiment referred to, the sulphur leaving the alkaline earth metals at the comparatively low temperature and combining with the iron to form iron sulphide. So we see that it is immaterial to the iron manufacturer as to what combination the sulphur originally exists in his iron ore, as it all eventually in its passage downward combines with the iron. Professor Finkener, of Berlin, upon heating calcium sulphate with metallic iron at a red heat, found that they were transposed into oxide of iron, lime and sulphide of iron.

The Effect of Manganese in the Blast Furnace.—As has been before stated, it would appear that Parry, of Ebbw Vale, first noticed the coincidence that when manganese ores were used in a blast-furnace, sulphur

was exceedingly low in the pig, and correspondingly high in the slag. Caron observed the same phenomenon, and since then it has been repeatedly confirmed and taken advantage of for the purpose of making iron low in sulphur. Akerman, in discussing the reason why manganese should have this valuable property, considers that it drags sulphur into the slag even more powerfully than calcium does. The opinion has been expressed by another gentleman, that the manganese in pig iron abhorred sulphur, and the two could not exist together; therefore, as manganese was the stronger element it expelled the sulphur. Mr. Snelus explained the effect of manganese by assuming that it was the oxide in the slag which, combining with the silica, allowed the lime to act upon and carry off the sulphur.

Howe, in discussing this question, says that manganese in some cases actually removes sulphur from iron (probably because sulphide of manganese, like sulphide of calcium, is less soluble in metallic iron than sulphide of iron is) by forming some compound rich in sulphur and manganese, which liquates or separates by gravity. This deduction of Mr. Howe is evidently based on the results obtained by Caron, Riley, Ponsard, Walrand, and Ledebur, all of whom proved that when manganese is added to sulphurous iron in a liquid state it causes a separation of sulphur from the mixture. Ledebur found that drop-like masses separate from liquid cast iron and float on the surface, and in these he found much more manganese and sulphur than in the mass of the metal. The correctness of Howe's deductions has been most perfectly demonstrated by Herr Massenez, in his most valuable desulphurizing process at the Hörde Works, where it has been practically proved that manganese does combine with sulphur, and rises by gravity in the state of manganese sulphide, when the two elements are brought to-

gether in fluid cast iron. There can be little doubt, therefore, that manganese, when it is reduced in the blast furnace and enters the fluid iron containing sulphur, behaves in the same way as if added to the fluid iron after it leaves the furnace. This hypothesis takes for granted that some of the manganese is reduced, and that from 1½% to 1¼% is still retained in the metal after it leaves the furnace. When the manganese is not reduced in the furnace, but remains almost entirely in the slag, its presence in that form is valueless as a desulphurizer, the heat being low partially accounting for this. This has been repeatedly proved in the manufacture of basic iron in the Cleveland district.

From the above considerations, we may safely grant that the effect of manganese in a blast furnace in removing sulphur, depends on a portion of the manganese at first reduced entering the metal, where it combines with the sulphur, and, leaving the metal again, carries it off to the slag as sulphide of manganese. Whether or not it remains in the slag as such I am not prepared to say. There are cases on record given by Tucker and Harbord, in which they had found blast furnace metal containing large amounts of both manganese and sulphur together—

	Per cent.	Per cent.	Per cent.
Manganese.....	2.26	2.54	1.76
Sulphur.....	0.20	0.11	0.42

Such a series of metals, we must admit, is most exceptional. It is possible the presence of so much sulphur and manganese together in the same pig iron may be accounted for by assuming that the opposite sides of the furnace in which they were smelted were producing on one side highly manganese iron, and on the other sulphurous iron low in manganese, and that perfect mixing had not been effected at the time the metal was tapped, and that when they eventually left the furnace, sufficient time was not given to admit of the separation of the sulphide of manganese before it had become solid in the pigs. If such iron could be remelted and allowed to remain fluid for a sufficient time, in all probability separation would result. The same remarks apply to the manganese steel produced

by Mr. Hadfield, in which, it will be remembered, we were told that even 10% manganese failed to reduce or carry off any of the sulphur present.
(To be continued.)

BLOUNT SPRINGS LIMESTONE QUARRIES.

The limestone quarries at Blount Springs, Blount County, Ala., were opened four years ago and have supplied a large amount of excellent stone for fluxing. The Louisville & Nashville Railway runs at the foot of the face and shipping facilities are provided for handling 1,000 tons per day. The stone is used by the furnaces of the Birmingham district, which lie at distances of 35 to 50 miles. The analyses of the stone in bulk shows it to be of first rate quality, free of magnesia, and carrying from 1 to 2% of silica.

As shown by the illustration, the stone is worked in benches, the uppermost ones being from 30 to 40 ft. above the tracks. Both power and hand drills are used, the latter mostly of the churn-drill type. The holes are put down to depths varying from 10 to 25 ft., dynamite being employed as explosive. The larger blocks thrown down are broken by hand, loaded on the mule cars and dumped over the tippie on to the railroad cars. The method of chamber work is not used in any of the Alabama quarries, the preference being given to open cut and bench work. In chamber work regular drifts are opened up and a large room prepared at a distance of 50 to 100 ft. from the face. This, as well as the immediately adjoining galleries, are filled with the explosive, dynamite generally, and the whole fired at once by the electric current.

In this way an immense amount of stone is brought down at the same



BLOUNT SPRINGS LIMESTONE QUARRIES.

time, frequently enough for a year's shipment, and a saving is made in hand breaking for furnace use.

The quarry at Blount Springs would be well adapted for this kind of work, more especially as the extension into the hill brings harder material to the front. So long as the limestone men have to do with material more or less friable and permeated with weather cracks and fissures the method now used is perhaps the best, but this condition of things is passing away with every month, and the time is approaching when some other system will have to be taken in hand. It is not so difficult to work a face of 40 or 50 ft. by benches when the stone is, in a measure, crumbly from atmospheric influences, but as the height of the face and the solidity of the mass increases bench work will not offer its old advantages.

Oxygen in Glass Manufacture.—Recent experiments made in England, says the *Revue de Chimie Industrielle*, show that the introduction of pure oxygen gas in the crucible greatly facilitates the melting of glass; in fact, an economy in fuel of 30% is claimed.

The gas is contained in steel cylinders under a pressure of 120 atmospheres, the flow being maintained at a uniform pressure of 2½ atmospheres by a regulator. The gas is introduced into the crucible through a platinum tube, which terminates in a spiral perforated on its under side. The gas is at first introduced very slowly, the quantity being gradually increased toward the last. The effect is to hasten the operation and promote the chemical combination of the different constituents. According to the figures given, 100 kilos. of glass require 600 litres of oxygen.

The glass made by the aid of oxygen is claimed by the workmen to be more easily workable, but the main advantages of the method are rapidity of fusion, which permits of an increased number of fusions per crucible, and in the rapid clearing of the melt, giving a glass free from air bubbles.]

THE DOLCOATH TIN MINE, CORNWALL.

Written for the Engineering and Mining Journal by Wm. P. Blake.

The short notice of the celebrated Dolcoath tin mine of Cornwall, which appeared in the ENGINEERING AND MINING JOURNAL of September 24th, was very welcome to me, as it must also have been to many of your readers, for Dolcoath may be regarded as a typical mine, and the leading tin mine of the world. But the notice seemed too brief for such a grand old mine as the Dolcoath truly is—a mine with a history of a century or more; with three shafts, each more than half a mile in depth; with levels at regular distances, following a lode which yields copper ore near the surface and tin ore below. There is not a mine which is worked with more system and regularity, nor one more interesting to the mining geologist and the practical miner. Having had the privilege of visiting it, and of being entertained by its manager, Captain Josiah Thomas, one of the ablest of the many able Cornish mine captains, I may be excused for asking you to give space to this somewhat more extended notice.

On the occasion of the visit of the Royal Institution of Cornwall to the mine at the end of last August, the members and their friends were entertained at luncheon by Captain Thomas, who presented them with a printed card giving the salient facts concerning the property.

The mine was worked in the last century to a depth of 160 fathoms, and is believed to have produced about £1,250,000 worth of copper ore. The present company commenced working in 1799. The total amount of calls made is £45,252, and from this investment the mine has received as follows:

Copper ores sold.....	£2,328,435
Tin ores sold.....	3,219,386
Arsenic, silver, cobalt, etc., sold.....	23,153
Total dividends.....	£5,600,975
Dividends paid on copper to 1836.....	157,541
Dividends paid on tin from 1833 to the last meeting.....	699,788
Total dividends.....	£857,329

At the quarterly meeting last June the accounts showed:

	\$62,905*	Per ton of tin.
Labor cost.....	\$105.50	
Tribute.....	6.525	10.95
Supplies.....	32,160	54.10
Stannary dues.....	9,385	15.75
Hospital, etc.....	2,110	3.55
	\$113,085	\$189.85

* Estimating the pound sterling at \$5.

Net receipts from the sale of 594.5 tons of black tin at \$281.40 per ton were \$157,280; the net profits for the 12 weeks were therefore \$44,195. For the 12 weeks ended September 3d the profits amounted in round figures to \$55,000. A dividend of £9,400 was declared for each quarter.

The engine shaft had then reached a depth of 13 fathoms below the 412 fathom level, but since then it has been carried to a depth of 455 fathoms, or 2,742 ft. The number of hands employed is about 1,300. Many young women, "bal maidens," are employed in light work upon the dressing floors. It is a very interesting sight to see 100 or more young women, neatly dressed, and with large snowy-white aprons and caps, working together at the buddles, concentrating black tin and singing Wesleyan hymns in unison as they work.

Between the years 1836 and 1853 no dividends were paid, the mine having become poor in copper ore, and not very rich in tin. Dolcoath is no exception to the general rule in Cornwall that where the lodes pass from the killas (slate) into the granite, the copper ore found in the slate gives out and tin ore comes in. I found this to be the case in every instance. In the slaty rocks the lodes bear copper ore, and in the granite tin ore. One of the Cornish mines has been cited as an example of this by some writers, but it is the rule for all.

The deepest run upon the Dolcoath lode is 440 fathoms from grass, and the lode at that depth is richer in tin ore than it was found to be at any level above it, showing no lack of mineralization at this great depth. In the new east shaft, which in June was down 8 fathoms below the 312 fathom level, the lode has a fine appearance for the whole of the distance, varying in value from £80 to £100 per fathom. A massive and rich run of ore was expected for at least 80 fathoms east of this shaft. It is claimed to be a striking characteristic of Dolcoath that as the mine has deepened so the mineral wealth has increased, and as the deepest point yet reached is the richest this claim is not without foundation. It is a fact which has great significance and value to all mines, and is separately commented upon in another article.

In the central and northern portion of the mine there is a piece of poor ground for about 80 fathoms in length, where Capt. Thomas, instead of driving levels as usual 19 fathoms apart, has only driven two levels below the 254 fathom level, one at the 314 fathoms, and the other at the 375 fathom level, thus saving considerable expense. He has recently introduced power drills for opening and breaking ground.

At the June meeting the manager directed the attention of the shareholders to the importance of adding to the stamping capacity of the dressing works, in order to be able to stamp the tin stuff as fast as raised from the mine. He highly commended to them the American or Californian pattern of stamp mills as far superior to the old fashioned Cornish stamp, an opinion which he has made more emphatic since his recent brief visit to the tin mines of Dakota. At a banquet on his return he said that he saw one stamp mill in the United States stamping more stuff daily than all the mills together in Cornwall.

The plans for the new 40-stamp mill were shown in June and the contract was given to the Hayle Foundry at £2,775, but the total cost, perhaps including the engine, is estimated at £5,000. The firm of Messrs. Harvey & Co. has been making stamp mills upon the Californian pattern for the gold fields of Africa. It is expected at Dolcoath that with the mine improving in depth for tin ore, and the increased stamping capacity above, the production of black tin will be largely increased. The new mill is erecting on the eastern side of the valley going toward Cook's Kitchen.

The Dolcoath sett, nearly 1,100 fathoms long, adjoins Cook's Kitchen, and there is a space of only about 25 fathoms unworked between them, but the Cook's Kitchen lode is said to be heaved 70 fathoms to one side, so that connection of the two mines is not expected.

Captain Thomas was intrusted with the management of Dolcoath when he was 30 years of age and has been the manager for 24 years. He has made all the underground surveys, and the beautiful section of the mine hanging in the counting room shows what a great and intricate task this must have been. The surveys and the plotting are kept well up with the work.

The mine has not only been a most profitable venture to the owners, but it has been a blessing to many households and to the region about it. It has been really a great practical school of mining, and many successful Cornishmen in the United States and other lands can look back with pride and gratitude to the days they spent in the levels and stopes of Dolcoath.

MINES ON THE LAHN IN NASSAU, GERMANY.

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

The graywacke of Coblenz, belonging to the lower devonian formation, contains two fine veins of galena, on which a number of mines are operated. One of these, extending for 7½ geographical miles, starts at a point near St. Goar, on the west bank of the Rhine, crosses that river, and can be followed to Holzappel on the Lahn, at which point the vein is richest. Another, the Ems vein, extends from Braubach on the Rhine, crossing the valley of the Lahn near Ems, to Deerbach, near Montabaur. It is on these two veins that the mines of which this article will treat are located. The concentrating works connected with them are large and complete; the ores are so mixed that separation is quite difficult. Following the River Lahn downward in its course from east to west we come first to the mines at Holzappel and the Laurenburg works.

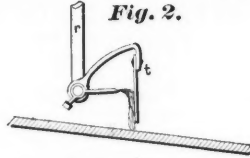
This property belongs to the *Rheinisch-Nassauische Bergwerks und Huetten Actien Gesellschaft*, whose manager resides at Laurenberg, on the north side of the Lahn, some distance east of Ems; this village is reached by rail from Ems. These mines have been worked since 1785, and a very extensive tunnel has been driven from the river bank toward Holzappel and the vein; it runs as a crosscut for 1,600 m. (5,248 ft.) and then, changing its course, follows the vein for 3,500 m. (11,480 ft.) more. The vein is quartz, with an average thickness of about 80 cm. (32 in.), and pitches toward the south at an angle of 52°, with a strike nearly east and west. The main shaft near the top of the hill and far to the north of Laurenburg is 450 m. (1,476 ft.) deep, but there is so little water in it that iron bailing tanks (with automatic valve in the bottoms), as on many Colorado and California mines, are sufficient to drain it. Labor in mines is mostly on piece work, and miners average 2½ marks, or 60 cents per day of 8 hours.

A model of this mine shown in the illustration, is composed entirely of glass, with exception of the wooden posts in the corners of the box into which a number of parallel grooves are cut into which plates of glass are inserted, and is in the director's room at the office. It is a very large box of plate glass, inside of which a number of plates of glass are set up all parallel with the bottom of the box (Fig. 1). The first plate below the cover of box has on its surface tiny models of shaft houses and works on top of ground; the second plate represents all workings underground on the plane of the first level, also the veins, cross veins, faults, etc.; the third plate shows the same at depth of second level, etc., and a sufficient number of plates is inserted to represent all the planes of the different levels in this way. Everything is, of course, made to scale; drifts and levels are drawn on the glass with black oil paint; veins and cross veins are designated in different colors; faults are indicated by arrows in red paint. On the second plate the side and end lines of properties are shown in colors. It makes a beautiful model.

Concentrating Works.—On the slope of the hill a short distance above the village there is a sorting house to which ores are delivered from a tunnel; the ores are hoisted in a shaft up to the level of this tunnel and then run out to the surface. They are very much mixed, galena, blende (the black variety predominates over all other ores), spathic iron ore, gray copper, copper pyrites and a small amount of iron pyrites. Culling is done dry and on the ground, three classes being selected: blendiferous, galeniferous and spathic ores (i. e., those containing a large amount of siderite), and each kind is subsequently treated separately in the concentrator. The ore selected is run down in cars by gravity to top of old concentrator building; the machinery there was built in large part by the Humboldt Company, of Kalk, but is now thought to be antiquated, and Mr. Luehrig, of Dresden, is engaged in building a new mill of large dimensions for the company. The old mill undoubtedly requires too much labor in shoveling and wheeling. The wash dirt is delivered to a screen with holes, 35 mm., 15 mm. and 8 mm., and the coarsest is delivered to and picked on a round culling table, while the 15 mm. and 8 mm. go to the three or four compartment jigs. They are driven by eccentrics and discharge through vents on one side of the box (the newest style of jigs has no vents). Fine sand jigs of the usual form are used and rotary and Rittinger tables. The latter do not give satisfaction, while the rotary tables in the modifications made by Mr. Schranz, the mill superintendent, are doing well. One of these modifications is to run the pulp on to the table at two points and to finish washing when the ore has traveled half way round. The table thus does double the amount of work. Another modification is to have sprinklers delivering water in a very thin sheet (see Fig. 2). To the large sprinkler pipe *r* is attached a sheet-iron skid *t*, against which the water is thrown from numerous nozzles and runs down from it on to the surface of the table in a thin sheet. The rotaries have a covering of hard cement 2 in. thick, which is held around the periphery by a wrought iron band. The floor on which this cement is laid has iron beams to support it. These tables furnish clean lead and clean blende. The Salzburg tables (see my article on Pribram) are used very extensively. They produce clean galena, and blende with only 2-3% Pb. For crushing wash dirt and middlings the mill has a modification of the Blake crusher invented by Mr. Schranz, rolls, and the Schranz mill. The latter has three rollers, but otherwise resembles the mill at Pribram.

Total output of this old works per month is 606 tons (2,000 lbs.), blende with 38 p. c. Zn and 165 tons galena with 65 to 75 per cent. Pb and concentrating average 32 oz. silver per ton. Tailings of this old mill at present carry ⅝ to ⅞ per cent. lead and 7 per cent. blende; the work may, therefore, be called very good. From former times large heaps of tailing

remain which are very rich: 7 per cent. lead and 13 per cent. blende; these will all be worked over in the new mill building now going up under contract with Mr. Luehrig, which is to be very large. The old mill will be remodeled. It is understood that the new mill is to cost in the neighborhood of 600,000 marks, or \$144,000, but the contractor is to receive no money at first, but will be paid out of expected savings of the new mill over the old one, during a limited term of years. He is putting in quite a number of the Luehrig *Verbund heerd*, a combination of vanners, claimed to be an improvement on the Stein. This contract, if reports be correct, certainly shows much faith in the working of this new machinery and other modern improvements adopted, for although much may be made out of the tailing heaps, the waste of the old mill as run at present cannot be very much reduced. The main saving may, however, be effected



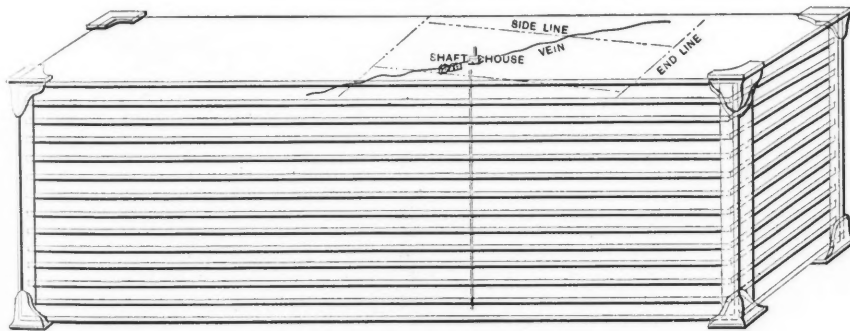
in labor required. If the *Verbund heerd* can clean the slimes at one operation, as it is expected to do, and reduce waste at the same time, it will be a great progress, and the new Laurenberg works will be models for others.

The company at present employs 800 men; those on the concentrator work from 6 A. M. to 6 P. M. The average pay of men and boys is 38 to 43 cents per day, but some men actually earn 72 cents.

THE MILL AT SILBERAU.

The vein mentioned in the beginning of this article crosses the Lahn a short distance above Ems. At the Silberau a large concentrator, forming part of the Emser Blei and Silberwerke, receives ores by rail from the different workings. The concentrator itself could not be visited, but Mr. Linkenbach, the superintendent and author of a book on ore concentration, inventor of a well known buddle, kindly gave much information on the subject. The Silberau ores carry galena and blende, much spathic iron and some little iron pyrites. Very thorough hand culling is done. There are three or four classes of ores to be assorted, each to be separately concentrated. Mr. Linkenbach decided the question of grinding and the best machine for the purpose in favor of rolls, and he had found they made less slime than either mills or stamps (rolls, whether intended for coarse or for fine work should all be of one pattern, as a smaller assort-

Fig. 1.



MINES ON THE LAHN IN NASSAU, GERMANY.

ment of extra pieces for repairs would then be needed). Very careful sizing should be done and cylindrical or conical screens are used for stuff down to 1½ millimetres, all of which is treated in ordinary jigs.

The stuff finer than 1½ mm. goes to a classifying box, making three sizes for the sandjigs; the overflow of the classifier is again sized in *spitz kasten* and slimes from them are washed on rotary and Rittinger tables and the Linkenbach buddle. The rule at Silberau is, not to run lead concentrates higher than 50% Pb, as the waste increases largely wherever attempt is made to enrich them further. With admixture of so much blende in the ore, this galena would be very high in zinc.

Amount of ore treated daily at Silberau is 180,000 kilos and 26,000 kilos of concentrates are produced. The tailings carry 2½% zinc and there is a loss of 0.4% of total lead contents.

These results are, therefore, exceptionally low.

(To be continued.)

Storage Battery Cars in New York.—Ten cars to be propelled by electric storage batteries are now being built for the Second Avenue line in New York City. The system adopted is radically different from others, and the entire equipment, including batteries, motors and plant will be manufactured by the Waddell Storage Battery Company. In an experiment made with this class of car at Chester, Penn., during the winter of 1891-92, the car ran 5,000 miles.

The cars will be of regulation style, 16 ft. bodies, palace finish and of complete appointment. They are to be lighted by an auxiliary set of batteries, so the light will be independent of grades and variations of speed. The batteries are to be disposed under the seats and contained in two long trays. They will be removed from the ends and not from the sides. Each car will be equipped with two motors; either will be of sufficient power to handle the car under ordinary conditions. This large amount of motor power will be for emergencies and for heavy traffic as well as for towing an additional car. The motors will be the hollow Gramme ring type. It is claimed that this system of accumulators has surmounted many of the difficulties of the storage battery system.

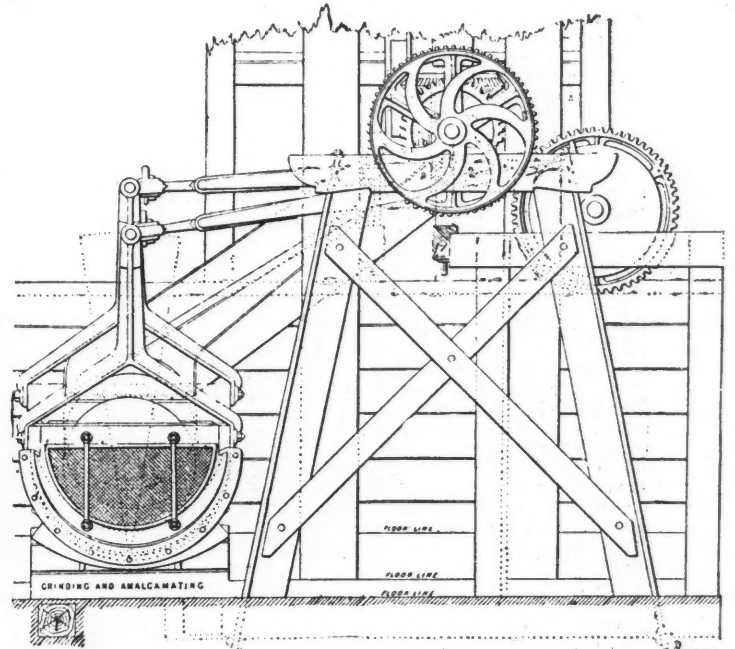
MUDIE'S AMALGAMATOR.

We herewith illustrate a form of crusher and amalgamator which is used a good deal in Australian gold mines. It is adapted more especially to prospecting work, as it is easily transported and can be worked by a horse or even by a man. It is also useful in isolated works and localities. The ore is ground by rollers in a rocking trough, which is divided into three divisions each with a roller. Each division is a little below the previous one. The ore is fed first into a quicksilver well in the first division and then it passes under the first roller. Between the first and second divisions there is a grating to size the ore. After passing through this grating it is ground under the second roller to a certain fineness and afterward flows into a well lined with amalgamated silver plated copper plates. The pulp then passes under the third roller and flows through another amalgamating well. The trough is made of a cast iron shell lined with boiler plate.

It is about three feet long and a horse can give it 54 oscillations per minute, the length of each oscillation being eight inches. The machine is capable of crushing 18 tons of quartz a week, when working continuously. Our authority for this article, "Industries," in using the word continuously means, we presume, 10 hours a day, seven days a week. A mill like this, which is being used rather extensively by Australian miners, would be of great value to our prospectors, who thus could get returns from their ore without going to the expense of erecting a plant. These moderate returns would allow them to prosecute their development work continuously and to support themselves in the meantime.

New Mining Explosive.—A patent has been taken out in France for a slow explosive, the proportions of which are: Perchlorate of potash 2 to 6 parts, nitrate of potash, 105; ammonium nitrate, 80; binitro-naphthalene, 10 to 50 parts.

Sumatra Petroleum.—According to a report recently made to the



MUDIE'S AMALGAMATOR.

directors of the Royal Netherlands Company for the Exploitation of Petroleum in Dutch India, by Profs. Rombouts and Engler. Sumatra petroleum, generally known to the trade as "crown oil" is of excellent quality. Dr. Engler said in his report: "The Sumatra oil is superior in its chemical composition, in its lighting power and in its power of ascending the wick. Photometrical experiments showed its lighting power to be 40% greater than that of Russian or American oil." Dr. Rombouts stated that the Sumatra oil does not form a crust on the wick, and that its specific gravity was less than that of all other oils.

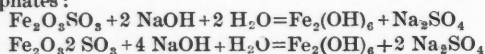
Chrome Steel.—The first use of small quantities of chromium for hardening steel was by Julius Bauer, of New York. His experiments being successful, the practice of alloying steel with chromium was adopted by several steel companies. At the fall meeting of the Iron and Steel Institute of Great Britain, Mr. R. A. Hadfield presented a paper treating this subject at length and described some remarkable results obtained with this class of steel. The subject to which special attention was called, and which at present is the more worthy of attention on account of the expensive experiments being made by the United States Government upon Harveyized armor plate, is the great strength shown by chrome steel projectiles. Among the trials made are the following: A chrome steel shell, 6 in. in diameter, successfully penetrated an 8 in. wrought iron plate and was in condition to be refired. A 9.2 in. projectile penetrated a 16.5 in. iron plate, entering 8.5 in. in a second plate behind the first. A 6 in. shell was fired through a 9 in. plate, the point reground and again fired through a second plate, and still the shell was left in serviceable condition. It remains to be seen whether this class of steel projectile would break, as so many Holtzer projectiles have done, if fired against a Harvey plate. Chrome steel shoes and dies were formerly, if not yet, manufactured in some quantity by the Chrome Steel Works of Brooklyn. The wearing parts of crushers, rolls, etc., were also manufactured by this firm, but although in some cases the increased length of wear, in spite of the high first cost, made their use economical, yet their adoption was by no means general, as the portions unworn were unsalable, while those of cast iron found ready purchasers in local foundries.

THE CHEMISTRY OF THE CYANIDE PROCESS.

Written for the Engineering and Mining Journal by Chas. Butters, Ph. B., and John Edward Clennel, B. Sc.

(Concluded from page 392.)

Preparatory Treatment of Pyritic Material.—Before attempting to treat such ores or products with cyanide, it is therefore necessary to get rid of the free sulphuric acid and soluble iron-compounds. This is generally done by giving a leaching with water until the liquid running off the tanks no longer shows a coloration with ammonium sulphide. After the treatment, however, there still remain the insoluble basic sulphates, which are gradually decomposed by water, and would act upon the cyanide solution. A washing is accordingly given with caustic soda or lime-water, which converts the basic salts into ferric hydrate, and sodium or calcium sulphates:



But the preliminary water-wash may be omitted with advantage in cases where the quantity of free acid and iron salts is comparatively small. Lime, in the dry state, is sometimes mixed with the tailings before the cyanide treatment commences. When this method is adopted, the iron is precipitated as a mixture of ferrous and ferric hydrates.

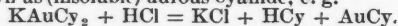
After the washing with alkali is complete, the tanks are allowed to drain, and "strong cyanide solution" (about 6%) is pumped on. Even after this treatment, the consumption of cyanide, with moderately pyritic tailings which have been partially decomposed by exposure, is found to be four times that which occurs with free-milling material. The presence of a large excess of alkali in the solution brings about various secondary reactions which lead to a loss of cyanide, such as the hydrolysis, before alluded to, and a peculiar action in the zinc box, which will be discussed later.

Lime, although slower in its action, is preferable to caustic soda as a neutralizing agent, as it is equally effective in decomposing the iron salts, less active in bringing about secondary reactions on the cyanide, and also less energetic in attacking the zinc in the precipitating boxes.

Ferric hydrate does not appear to be acted upon by potassium cyanide, but ferrous hydrate, which is formed in the neutralization of the iron salts by alkalis, reacts on the excess of cyanide, with formation of ferrocyanide of potassium:



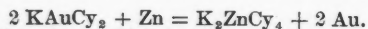
Deposition of Gold from Cyanide Solutions.—Under certain conditions, such as the absence of sufficient oxygen in the solution, a partial precipitation of the previously dissolved gold appears to occur. If by any chance the solution should become acid, there is a decomposition of the double cyanide of gold and potassium, in which the gold is generally supposed to be thrown down as (insoluble) aurous cyanide, e. g.



In working on the circulation and transfer system, we find that where pyritic material is under treatment, it is not safe to transfer a solution already rich in gold to a fresh lot of tailings, as the extensive decomposition of the solution which takes place may lead to a final loss of gold.

Selective Action of Cyanide.—It is claimed by the promoters of the McArthur-Forrest process, that in a mixture containing metallic gold, silver, copper and base metals, cyanide of potassium exerts a selective action, dissolving first the gold, then the silver, and afterward attacking the copper and base metals. The process, however, does not appear to have been successfully applied to ores, such as those met with in California and Australia, which contain considerable quantities of foreign metals. Ores containing sulphide of silver and sulphide of copper produce considerable decomposition of cyanide, the copper being partially dissolved as sub-sulpho-cyanide, the silver, however, remaining unattacked. In two experiments, carried out by Mr. William Bettel, Chief Chemist of the Robinson Gold Mining Company, who has kindly given us valuable assistance in the compilation of this paper, on ore from the Albert Silver Mine containing 30 oz. of silver and 10% of copper, it was found that no extraction of silver occurred, this metal being present as sulphide.

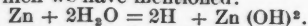
Action of the Zinc Shavings on the Solution.—We must now pass on to consider the action of the zinc on the gold cyanide solution. Theoretically a simple substitution of zinc for gold occurs in accordance with the following equation:



Taking Zn = 65.1, Au = 196.8, it follows that 65.1 parts by weight of zinc should be sufficient to precipitate 393.6 parts of gold, or 1 lb. of zinc should precipitate about 6 lbs. of gold. The actual consumption is about 1 lb. of zinc per ounce (Troy) of gold recovered. It is evident then that zinc is consumed in some other way than in mere substitution for gold.

During the passage of the solution through the zinc boxes we notice a constant and vigorous evolution of small bubbles, which prove to consist principally of hydrogen gas. The outflowing liquid is found to possess a greater degree of alkalinity than it had on entering at the top of the box, and a smell of hydrocyanic acid, and sometimes of ammonia, is constantly observed in the neighborhood of the zinc boxes. It is clear, then, that a decomposition of the potassium cyanide solution itself by the zinc is in progress, and this is not to be wondered at when we consider the powerful electro-chemical effect which must be produced by the contact of such a highly positive metal as zinc with a strongly negative metal such as gold. Ordinary commercial zinc loses weight when immersed for some time in cyanide solution, but the action is slow. It is doubtful whether pure potassium cyanide would have any action at all on chemically pure zinc. It is well known that the "copper-zinc couple" produced by immersing zinc in a solution of a copper salt decomposes water.

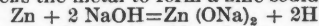
An analogous reaction of the gold-zinc couple accounts for the evolution of hydrogen which we have mentioned:



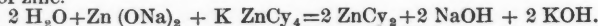
The hydrate of zinc is at once dissolved in the excess of cyanide: $\text{Zn}(\text{OH})_2 + 4 \text{KCyanide} = \text{K}_2\text{ZnCy}_4 + 2 \text{KOH}$, which reaction explains the increase in the alkalinity of the solution.

There are reasons for believing that the black deposit formed on the zinc shavings is an actual chemical compound of gold and zinc, which acts as the negative element in the electric couple, the undecomposed zinc forming the positive element.

When strong solutions of caustic soda have been used for neutralizing the acid salts of the ore a white deposit is frequently observed on the zinc. The alkali first attacks the metal to form a zinc-sodium oxide:



This then reacts on the double cyanide of zinc and potassium always present in the solution, and precipitates the white insoluble simple cyanide of zinc.



This reaction is of some importance as affording one means by which the excessive accumulation of zinc in the solutions is avoided.

Affinity of Zinc for Cyanogen.—Potassium auro-cyanide (KAuCy_2) appears to be one of the most stable of the salts of gold, but the reaction in the zinc boxes shows that the affinity of zinc together with potassium for cyanogen is greater than that of gold with potassium for the same radicle. Hence a solution of potassium cyanide cannot dissolve gold which is in contact with zinc; neither can gold replace zinc in a solution of the double cyanide of zinc and potassium. So long as any zinc is present, therefore, we need not fear that the precipitated gold will redissolve in the excess of potassium cyanide flowing through the boxes.

It is evident also that the cyanogen contained in the double cyanide of zinc and potassium is not available for dissolving gold, and when a solution charged with zinc is employed in the treatment of a fresh lot of tailings it is only effective in so far as it contains a certain quantity of simple cyanide of potassium or other alkaline cyanide.

New Methods of Precipitation.—The cyanides of sodium and ammonium, and those of the alkaline earth metals (calcium, barium, etc.), will dissolve gold, as well as potassium cyanide. Sodium cyanide is more difficult to manufacture than the potassium compound, but a given weight of it should be more effective than the same weight of potassium cyanide, since 49 parts of the former are equivalent to 65 parts of the latter.

The advantage of Molloy's process and others which employ sodium or potassium amalgam was pointed out in our previous paper. The alkali metal is obtained by the electrolysis of the carbonate between electrodes of lead and mercury:

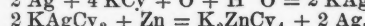
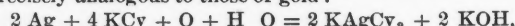


The sodium forms an amalgam with the mercury. Sodium amalgam may also be manufactured direct from its elements. It is claimed for this method of precipitation that the whole of the cyanogen is restored to a condition in which it is available for dissolving gold, as shown by the reaction



Composition of the Zinc Slimes.—Any base metals which happen to be in solution in the cyanide liquor are liable to be precipitated by the zinc along with the gold. Hence the "zinc slimes" are found to contain a certain percentage of copper as well as traces of arsenic and antimony. Moreover, any impurities in the zinc will also find their way into the slimes, as zinc will be dissolved by the cyanide in preference to any less oxidizable metals (e. g., tin and lead).

Silver is dissolved by cyanide and reprecipitated by zinc by a set of reactions precisely analogous to those of gold:



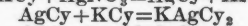
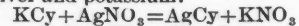
It has been observed that the proportion of silver to gold is greater in the "cyanide bullion" than in the gold from the batteries, and this is explained by supposing that the loss of silver in amalgamation is greater than that of gold.

Treatment of the Zinc Slimes.—The removal of the zinc is a troublesome operation and is only very partially carried out in smelting the dried slimes. The admixture of sand is made for the purpose of forming a fusible silicate of zinc. A portion of the zinc is volatilized, and burns at the mouth of the crucible with a greenish flame, producing the white oxide, ZnO , which is found incrusting the flues, and doubtless carries with it no inconsiderable quantity of gold and silver. The most promising method of treating these slimes appears to be that suggested by Mr. Bettel, of fluxing with acid sulphate of soda and fluor spar.

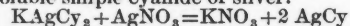
Attempts to remove the zinc prior to smelting have been only partially successful, as all such methods involve the filtration of a slimy mass which retains soluble salts with great tenacity.

The slags from the fusion of the zinc-slimes contain a considerable amount of gold, some of which is in the form of round shots, and may be removed by pounding up the slag, passing through a coarse sieve, and "panning-off." The residue from the first fusion should always be fused again, with addition of lead, to form an alloy with the gold. The same lead-bars may be used for a number of successive fusions of the slag, and when sufficiently enriched, the gold may be recovered from them by cupellation.

Testing of Cyanide Solutions.—It is a matter of importance to determine exactly what strength of cyanide solution is used in treatment of tailings. The ordinary method of testing depends on the fact that silver cyanide is soluble in excess of potassium cyanide, with formation of a double cyanide of silver and potassium:



When silver nitrate solution is added drop by drop from a burette to a solution of cyanide, a white precipitate is formed, which quickly redissolves. At a certain stage the precipitate becomes permanent, when, in fact, the whole of the cyanide has been converted into the soluble silver salt, and an additional drop of silver nitrate produces a permanent precipitate of the insoluble simple cyanide of silver:



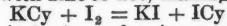
From these reactions 107.66 parts by weight of silver are equivalent to 130.04 parts of potassium cyanide. A convenient standard silver solution is one of such a strength that every c. of the solution to be tested, corresponds to 1% pure KCyanide.

This method gives good results when pure cyanide solutions are under examination, but when we come to test solutions containing zinc, it is difficult, if not impossible, to determine the end of the reaction. A white flocculent precipitate occurs at a certain stage, probably consisting of simple (insoluble) cyanide of zinc, formed by decomposition of the soluble double cyanide



This precipitation occurs long before the whole amount of potassium

cyanide has been converted into the soluble double salt of silver (KAgCy₂), for the solution, after the appearance of the flocculent precipitate, still gives the Prussian blue reaction with acidulated ferrous sulphate. A standard solution of iodine in potassium iodide may be used with great accuracy for determining the total amount of cyanogen in a solution, whether in combination with zinc or not, making use of the reaction:



The color of the iodine is discharged so long as an excess of cyanide is present. The sharpness of the end reaction may be increased by adding a small quantity of starch to the solution under examination, which gives a permanent blue color as soon as an excess of iodine has been added.

What is most needed, however, is a rapid method of determining the amount of cyanide available for dissolving gold, for, as we pointed out above, the cyanide in combination with zinc is not available for that purpose.

The method of testing solutions containing zinc for "available cyanide," which was introduced by Mr. Bettel at the Robinson General Mining Company's works, is as follows: Two perfectly clean flasks of equal size are taken. To each of these is added a considerable bulk, say 50 cc. of the solution to be tested, and 50 cc. of water. The liquid in both flasks will probably appear slightly turbid, but the degree of turbidity will be the same in each. Standard silver nitrate solution is run into one flask until the slightest possible increase in turbidity is observed on comparison with the liquid in the other flask. This point is taken as indicating the con-

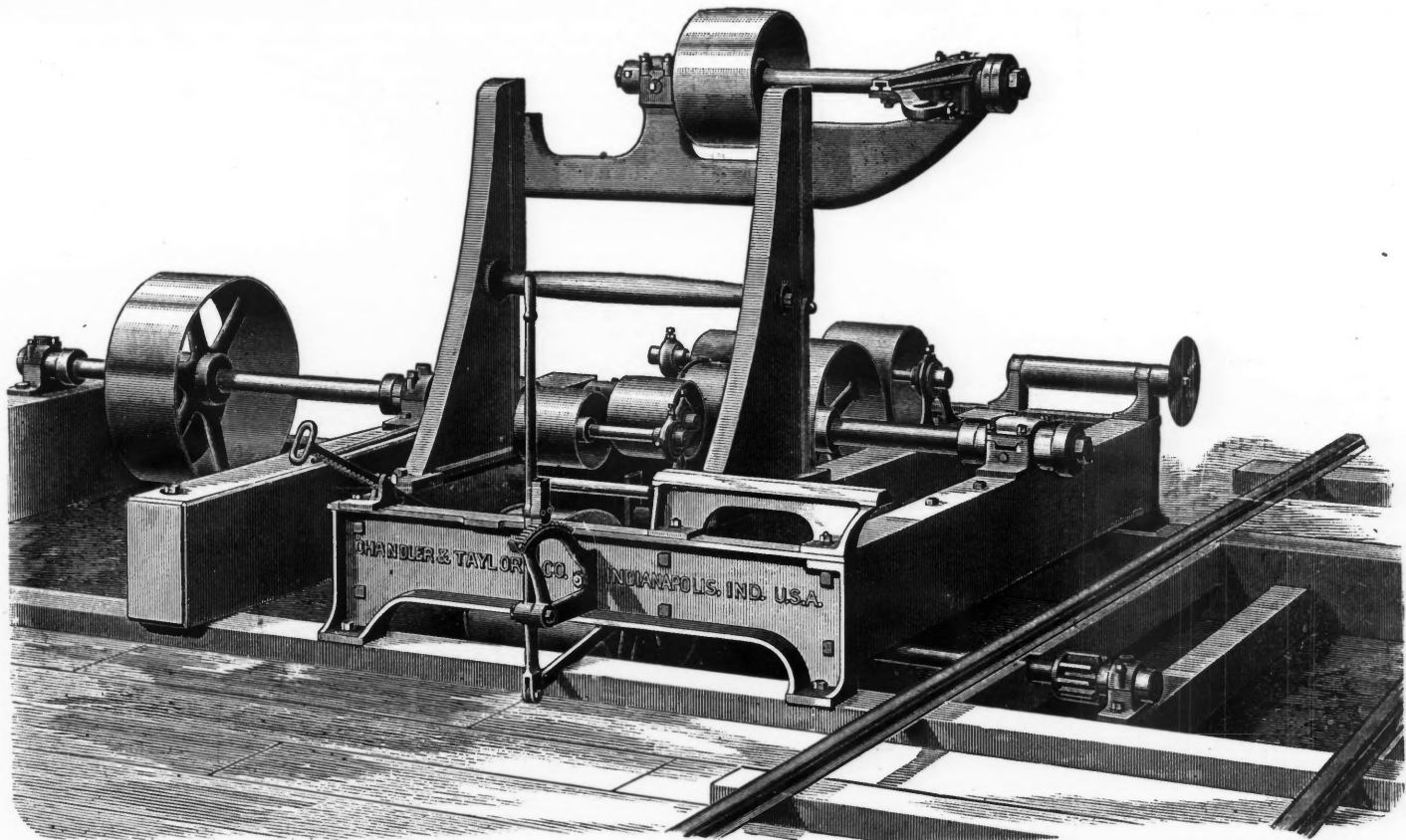
THE CHANDLER & TAYLOR SAW MILL.

The cut shown herewith shows an entirely new saw mill design just completed by the Chandler & Taylor Co.

The leading features given to this latest design of mill are: A large mandrel, with self-adjusting, self-oiling boxes; an extension shaft, with clutch coupling, and lever and independent boxes, which relieves the mandrel of the pull of the main belt, giving increased space for off-bearing and furnishing a means for driving edger, cut-offs and hog hauls, etc., without the intervention of the line shaft. The Heacock patent belt feed is provided with all mills of this design, which, aside from independent steam feed, is the simplest and most powerful devised. With this arrangement the feed can instantly be changed by means of a single lever, shown at the sawyer's position in the cut, to give from no feed to 4 1/2 in. feed on the medium mill and from nothing to 7 1/2 in. feed on the heavy mill.

A choice of carriage propulsion is given, and can be either made by rack and pinion or wire cable, the latter being usually preferred where long timbers are to be sawed. The carriage is sustained by large track wheels with axles extending from side to side of carriage, and these wheels in turn rest upon a track of steel made of the same shape as is used in railways.

The admirable arrangement for the sustaining of the top saw mandrel is also to be noted, this being provided with adjustable self-oiling



THE CHANDLER & TAYLOR SAW MILL.

version of the whole of the free potassium cyanide into the soluble silver salt, and, therefore, as determining the amount of available cyanide present in the solution.

The amount of gold in the solution is generally found by evaporating a known bulk with litharge, fluxing the residue, and cupelling the resulting lead button. Evaporation on lead foil may likewise be employed.

Poisonous Properties of Cyanide.—A few words may not be out of place as to the poisonous action of cyanide of potassium. Although one of the most rapid and deadly of known poisons when taken internally, its action as a blood poison is much less violent. Nevertheless, when introduced into cuts it produces very painful sores. The men employed in the "clean-up" and in melting the slimes are subject to a peculiar eruption, especially on the arms, and complain of headache, giddiness and general depression. Ferrocyanide of potassium has been recommended as a remedy for the eruption; it may be taken internally and also applied as a lotion. Considering the dangerous nature of the substance, it is remarkable how few fatal accidents have occurred through the use of cyanide on a large scale. In cases of poisoning, precipitated carbonate of iron, obtained by mixing solutions of sodium carbonate and ferrous sulphate, may be used as an antidote. This forms internally an insoluble blue compound with the cyanide.

Hydrocyanic acid acts directly on the nervous system causing instant paralysis; hence any treatment which will excite the action of the nerves, such as application of cold water to the spine, inhalation of ammonia, etc., may be tried in cases of faintness produced by breathing the vapor of the acid.

The disposal of waste cyanide liquors is a matter for serious consideration. Solutions containing .1 or .2% of potassium cyanide must occasionally be discharged and are likely to contaminate the water of the dams or streams which receive them to a dangerous extent. If some effective means of precipitating the zinc, or, better still, of dispensing with the use of zinc altogether could be devised, there would never be any necessity for allowing cyanide liquors to leave the building.

boxes and devices whereby the teeth of the upper saw are made to cut under the bark and carry the sawdust out of instead of into the kerf.

Four sizes of these mills are built, all made after the general design shown in the cut.

Soap Lake, Washington.—Professor J. C. Russell, of the United States Geological Survey, gives the following information concerning the water of Soap Lake in Douglas County, and compares it with that of other alkaline waters. The sample analysed contained sediment amounting to four parts in 1,000,000. He says: "The absence of calcium carbonate is of interest, since deposits of that salt are now taking place on the lake bottom through the agency of low forms of plant life. Compared with other alkali lakes of the West, Soap Lake contains but a small quantity of the alkaline metals as the following analyses show."

CONSTITUENTS IN PARTS PER THOUSAND.	Great Salt Lake, Utah, 1869.	Soda Lake, near Ragtown, Nev.	Mono Lake, California.	Owen's Lake, California.	Soap Lake Washington.
Sodium, Na.....	49'690	41'632	18'100	21'650	10'5041
Potassium, K.....	2'407	2'290	1'111	2'751	.....
Calcium, Ca.....	255	.....	278	Trace.	Trace.
Magnesium, Mg.....	3'780	245	125	Trace.	'0108
Lithium, Li.....	Trace.	.....	.....	Trace.	.....
Chlorine, Cl.....	83'946	41'496	11'610	13'440	3'5262
Carbonic acid, CO ₂.....	.....	15'650	11'440	13'140	9'6246
Sulphuric acid, SO ₄	9'853	11'771	6'420	9'362	4'3624
Nitric acid, NO ₃.....	.....	.....	.....	.....	.....
Boric acid, B ₂ O ₇	Trace.	285	153	Trace.	.....
Silica, Si O ₂.....	.....	275	268	164	'1130
Hydrogen in bicarbonates.	.....	.....	.....	.....	'0534
Totals.....	149'936	113'644	49'630	60'507	28'1945

THE RELATIVE EFFICIENCY OF ELECTRICITY AND COMPRESSED AIR IN MINING.*

By David L. Lloyd, Manager, Edinburg Coal Co., Ill.

In January, 1891, I contracted with the Thomson-Houston Electric Company, for a 30-h. p. constant potential Thomson-Houston generator; also for 1,000 ft. of No. 00 woven insulated cable, 1,500 of No. 4 insulated wire, 1,000 ft. of No. 6 insulated wire, and one Thomson-Van Depoele electric coal cutter.

The coal cutter consisted of a 7½-H. P. motor, which transmitted power from the armature to a counter-shaft by means of cog-gearing, and thence from the counter-shaft to the center gang-bit or auger, of which there are nine in all, with bits 4¼ in. wide. The mechanism of this coal cutter was perfect so far as the working of the same was concerned. We tried the machine on the surface several times before taking it into the mine. It was also tried as soon as we reached the face of the working, but it never made one complete cut, and this failure was, in my opinion, due to the light cog-wheels.

While the coal cutter was in operation we observed the ampère meter which indicated 80 ampères, and the voltmeter, which indicated

220 volts, taking the electrical formula (1) $\frac{\text{volt} \times \text{amp.}}{746 \text{ watts}} = \text{H. P.}$,

and (2) $\frac{\text{H. P.} \times \text{watts}}{\text{volts}} = \text{amp.}$, or (3) $\frac{\text{H. P.} \times \text{watts}}{\text{amp.}} = \text{volts}$, then taking

the formula $\frac{75 \times 746}{220} = 27.9 \text{ amp.}$

The electrical expert who came to start the plant placed a 30-ampère fuse upon the motor, which blew, or in other words, melted; he then replaced it with a 40-ampère fuse which also blew, and the last time he put on two 40-ampère fuses together. The machine then received current enough to run it. We then placed an ampère meter and voltmeter at the machine, which indicated 80 ampères 220 volts, the same as the two meters upon the switchboard at the generator. This was evidence that there was no material loss on the wire between the generator and the motor; it also showed that according to the first formula $\frac{\text{volts} \times \text{amp.}}{\text{watts}}$

= H. P. or $\frac{220 \times 80}{746} = 23.5 \text{ H. P.}$, that it required 23.5 H. P. from the generator to operate a 7½ H. P. motor, thus showing an efficiency of only about 32%, or a loss of power of 66% from the generator to the motor.

The generator was driven by an "Ideal" engine 12 in. × 12 in., running 275 revolutions, or with a piston speed of 550 ft. per minute, and built by A. L. Ide & Son, of Springfield, Ill., and was bought separate from the electric plant. The engine showed a mean effective pressure of 20.7 lbs. per square inch; then taking a for area of piston, p for pressure and s for speed in feet per minute, we have the formula $\frac{a \times p \times s}{33,000} = \text{H. P.}$ or

$\frac{12^2 \times .7854 \times 20.7 \times 550}{33,000} = 39 \text{ H. P.}$ produced by the engine. This shows

that the generator gave 60% efficiency from the engine, or a loss of 40%; also it shows that the 7½-H. P. motor gave only 19% efficiency from the engine through the generator, or a total loss of 81%.

Let us now see what our air compressor is doing. We have at our plant rather a small straight-line air compressor of the Ingersoll-Sergeant type, and five coal cutting machines manufactured by the same company. This plant was bought in October, 1891, through the Charles W. Melcher Machinery Company, of St. Louis, and consists of one air compressor 14 × 18 in. steam end and 14½ × 18 in. air end, five coal cutting machines, two air receivers 42 × 18 in. each 475 ft. of 3½ in. pipe, 1,000 ft. of 3 in. pipe with valves and all the connections, and cost the sum of \$5,200. The electrical plant, with only one coal cutter and no steam engine, cost the sum of \$3,300.

Let me now endeavor to show the efficiency of the air compressor. Units of air cylinder divided by units of steam cylinder equal efficiency. The effective steam pressure on the piston was 23 lbs. per square foot, and the piston speed was 204 feet per minute; $14^2 \times .7854 \times 23 \times 204 = 706,640$ units of the steam cylinder. Now for the air cylinder: the product of the area of piston multiplied by the gauge pressure, plus atmospheric pressure, multiplied by the piston speed in feet per minute, divided by the extent of compression equals units, hence: $14.5^2 \times .7854 \times 95 + 14.67 \times 204 + 7.4 = 470,417$ units of the air cylinder, and $\frac{470,417}{706,660} = 66\%$ efficiency of the air cylinder, thus showing a loss of 34% from steam to air. These operations were made while two of the coal cutters and one pump were in operation.

To find the quantity of air in cubic feet per minute that the compressor produces under a given gauge pressure, we take area of piston in square feet, multiplied by speed of piston in feet per minute, divided by gauge pressure, plus the atmospheric pressure, and thus find the quantity to be $\frac{1.092 \times 204}{95 + 14.67} = 23.1$ cubic feet per minute under 95 lbs. gauge pressure.

I found that the two coal cutters whose cylinders are 4 in. × 10 in. with a piston speed of 333 ft. per minute, at ¾ cut-off, consumed 18 cu. ft. of air per minute and by the following formula $\frac{\text{area} \times \text{speed}}{\text{cut-off}}$ or $\frac{136 \times 100}{4} = 3.4$ cu. ft. per minute were consumed by the pump.

Now the quantity consumed by the cutters and the pump divided by the quantity produced by the air compressor equals the efficiency from the compressor to the machines and pump, hence $\frac{21.4}{23.1} = 92.6\%$ of efficiency, showing a loss of only 7.4%.

I find that 5% of this loss is due to contraction from the falling of the thermometer 10° Fahr., and the rising of the barometer ¼ of an inch

from that on the surface to that of the mine, which is found by the following formula: $\frac{B. 1. \text{ surface}}{459 + T} + \frac{B. 1. \text{ bottom}}{459 + t} = \text{efficiency}$. Temperature

on the surface, 82° Fahr.; at the bottom 62° Fahr. Barometer on the surface of 29.9 in.; at the bottom 30.3 in., $\frac{1.3253 \times 29.9}{459 \times 82} + \frac{1.3253 \times 30.3}{459 \times 62}$

= 95%, or a loss of 5%. This leaves 2.4% loss due to coefficient of friction, leaky valves and joints in the pipe line.

To compare this in volumes: the weight of a cubic foot of air upon the surface being .0782 of a pound of avoirdupois, and the weight of a cubic foot in the mine being .077 of a pound avoirdupois we find that the volume upon the surface is 1.051 greater than the volume in the mine. If we now divide the quantity in cubic feet upon the surface by its ratio of volume, we will thus find that the quantity in the mine after contraction has taken place will be $\frac{23.1}{1.051} = 21.979$ cu. ft., thus showing a loss

of 23.1 - 21.979 = 1.121 cu. ft. from concentration. Then, again, if we take the quantity produced, minus the quantity consumed, minus the quantity lost due to contraction, we will find a loss of 21.1 - 21.4 - 1.121 = .579 cu. ft. due to the coefficient of friction, leaky valves and joints in the pipe line.

I venture to say that the cost of laying the pipe will not in our case exceed the cost of hanging the wire. I will also say that taking pipe and wire of equal capacity for transmitting power, the pipe will prove the cheaper. For it should be borne in mind that the transmission of electricity to coal cutters requires two wires, and not merely one, as in electric haulage; one to and one from the point where the power is applied. If the entries are in good condition and uniformly timbered, it is but a simple matter to fasten the brackets and suspend the wires; but with entries like ours and many others, where the top is irregular and the timber sometimes entirely omitted, it will be necessary to put up timber, or drill holes in the ribs expressly to carry the wires. Then when falls of the roof occur, if they do not break the wires, they will usually bring them to the floor, and frequently cut the insulation. With the compressed air pipes laid firmly on the ground, it is almost impossible to break or misplace them, even by an extensive fall.

Compressed air is not only perfectly harmless, but it is highly beneficial from a sanitary standpoint, but in the presence of fire-damp electricity may become very dangerous.

[We publish Mr. Lloyd's paper, in order to create a discussion on this subject, not because we agree with his conclusions. On the contrary, we are certain that Mr. Lloyd has overestimated the efficiency of compressed air and underestimated that of electricity. We consider that his estimate, in this particular case, of over 60% energy available at the coal cutter is entirely too high for compressed air, and that his estimate of 19% of available energy after loss in electric transmission and in the motor is much too low. We invite correspondence on this subject.—Ed. E. & M. J.]

DIGEST OF RECENT DECISIONS.

MINING CLAIMS LOCATED BY AGENT.

General evidence that an alleged agent for locating and acquiring mining claims and interests was supported, before and after he had located and acquired in his own name a particular lode and interest by the claimant thereof, and that subsequent payments were made to him by the claimant for protecting and working the lode, does not establish the relation of agency for its location and acquisition in the absence of proof of the payment by the claimant to the alleged agent of money for that purpose. In such case, the claimant, in order to establish a resultant trust, must make definite proof that the interest was acquired by his money paid at the time, and traceable directly into the property; and general evidence of support, and of agreements and payments made before and after the acquisition of title, is inadmissible, unless they are connected with the acquisition and its prerequisite payments, or the transaction itself establishes a resultant trust. *First Nat. Bank of Denver v. Campbell Court of Appeals of Colorado 30 Pac. Rep., 357.*

EFFECT OF EXCEEDING AUTHORITY IN PURCHASE OF MINE.

A person authorized another to purchase for him a half-interest in a mining claim for \$1,500, and sent \$500 to be used as a first payment. The latter purchased the whole mine for \$4,000, and took a deed in his own name. He then wrote the person first mentioned explaining what he had done, and saying he would make a deed for one-half on receipt of \$1,500 more, who answered, accepting the offer, and asked for a more specific description of the property, but sent no more money. The purchaser testified that he never received this letter, but that he wrote another letter, stating that the money must be paid within a certain time. The person first mentioned said he never received this letter. He waited 10 months, and then sent \$1,000 instead of \$1,500, asking the other to state the balance due. The second person, as the first's agent, had exceeded his power in the purchase, and his action was not binding without ratification; the letter of acceptance, without sending money, was not a sufficient ratification, even if received; and the delay of 10 months was unreasonable, so that he who purchased the mine for \$4,000 had a right to repudiate the agency and hold the mine as his own.—*Wenhan v. Switzer, U. S. Circuit Court, D. Montana, 51 Fed. Rep., 351.*

WHEN THE LOCATION OF INTERSECTING VEINS CANNOT BE DENIED.

Where a person conveyed a portion of a mining claim, of which he was in possession and claimed ownership, and subsequently located the remaining portion of the claim, at a date prior to a location by his purchaser of the portion conveyed to him, and a vein running from the former's claim intersected one of the latter's veins within his surface boundaries, the latter person was entitled to all mineral at the point of intersection, since, as against him the former's claim was not a prior location, within section of the statute providing that all the mineral in the space of intersection of two veins shall belong to the prior location; the first mentioned person being estopped by his deed to deny that his title to the portion conveyed was perfected by a location valid at the time of the conveyance.—*Stinchfield v. Gillis, Supreme Court of California, 30 Pac. Rep., 839.*

*Journal Ill. Mining Inst., vol. I., No. 2, Aug. 1892.

BOLTE AUTOMATIC TIME KEEPER.

The Bolte Automatic Time Keeper is a new device for keeping accurately a record of the time of arrival and departure of employes.

Cut No. 1 shows the complete detail with clock dial and the hand making the registration.

Cut No. 2 shows a section of the upper part of the record sheet. The cylinder around which this record sheet moves turns in time with the hour hand, making one revolution every twelve hours. The heavy line marked 7 o'clock indicates the hour at which the workmen are expected to arrive. The numbers recorded on the left of this line are early, whereas those on the right are late. Each of the light colored lines indicates five minutes, therefore anyone registering three lines to the right of the 7 o'clock line would be fifteen minutes late, and as the proprietor enters his establishment in the morning one glance at the clock will indicate just those employes who are absent or late, and how many minutes they are behind time. Cut No. 3 shows a section of the key rack through the openings of which the registrations are made. Cut No. 4 shows the registering key full size. Each workman draws his pay according to a certain number, and in this case the one shown is No. 75. This number appears in raised letters on each end of the key; the end marked "in" being nickel, the

those which cooled quickly and the slow cooling ones crumbled much more easily and were, therefore, more suitable for fertilizing purposes. Dr. von Reis has a theory which he considers is sufficient to explain this phenomenon satisfactorily. The slag, he says, contains calcium ferrate, besides calcium phosphate and silicate. When the slag cools, this ferrate decomposes with the separation of ferric oxide, which disseminates itself in the solid state through the mass and prevents the slag from binding together as it solidifies. If the cooling be rapid there will not be sufficient time for the decomposition to occur and for the ferric oxide to disseminate itself. Consequently, the binding of the slag will be greater when the cooling is more rapid. The slower the cooling, not only will the decomposition of the calcium ferrate and the dissemination of the ferric oxide be more perfect, but more of the ferrous oxide will be oxidized to ferric oxide, and the less of it there will be to impede the dissemination of the ferric oxide by combining with it.

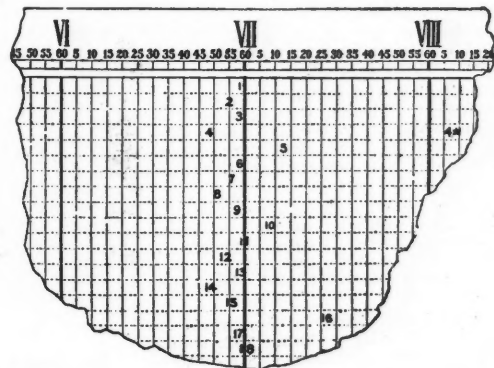
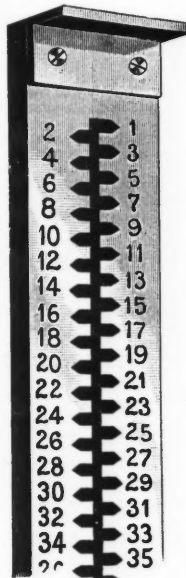
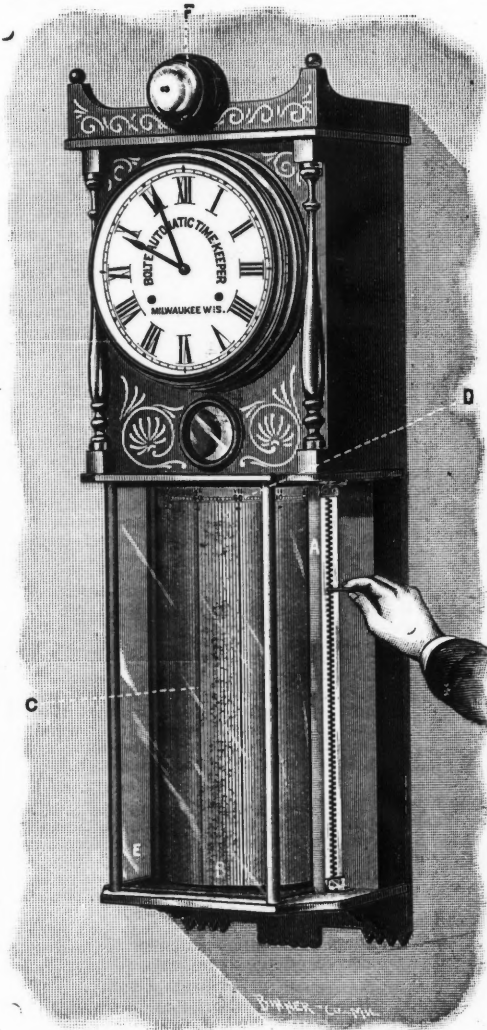
When a basic slag is dissolved in dilute hydrochloric acid (1 part of acid of specific gravity 1.19 to 5 parts of water), a red or dark-brown residue consisting almost entirely of ferric oxide is left; this residue is much greater when the slag is soft and contains little ferrous oxide, than when the slag is hard and contains much ferrous oxide. That the ferric oxide is left insoluble is chemical evidence that it exists as such in the slag. The quantity of residue thus left by dissolving a slag in hydrochloric acid forms a rapid test as to the probability of a slag being easy to mill.

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, OCTOBER 18TH, 1892.

- 434,388. Process of Making Ultramarine Blue. Johann Büttel, Newark, N. J.
- 484,416. Apparatus for Refining Metals by Electricity. Charles R. Fletcher, Boston, Mass.
- 484,425. Coal or Rock Drilling Machine. Martin Hardsocg, Ottumwa, Ia.
- 484,475. Apparatus for the Manufacture of Carbureted Hydrogen. James W. Tallmadge, Albany, N. Y. Assignor to Frank W. Beardsley, Bayonne, N. J.
- 484,474. Process of and Apparatus for forming Solid Metal Ingots. Arthur J. Thowless, Newark, N. J. Assignor to Orlando M. Thowless, same place.
- 484,535. Apparatus for Electroplating. Frank H. Howard, Irvington, N. J.
- 484,546. Process of Treating Bisulphate of Soda. Eugene J. Barbier, Paris, France.
- 484,570. Process of Separating Matte from Slag. Edwin C. Pohle, Denver, Colo.
- 484,579. Process of Making Cyanides. George T. Beilby, Slateford, Scotland.
- 484,586. Gas Producer. William A. Koneman, Chicago, Ill.
- 484,631. Nitrogenous Fertilizer and Process of Making the Same. John J. Dunne; Philadelphia, Pa.
- 484,637. Apparatus for Annealing Wire or Metallic Rods by Electricity. Joseph H. Hunter, Pittsburg, Pa.
- 484,639. Slag Separator. John F. Keiper, Denver, Colo.



BOLTE'S AUTOMATIC TIMEKEEPER.

end marked "out" being of copper. The indication of an employe registering "out" is shown by a (*) being placed after the number, thus 75*.

The value of this device is self-apparent. Each workman makes his own registration and cannot complain of the time keeper. No collusion is possible between time keeper and employes. By actual use it has demonstrated the fact that employes are much less liable to be late, as by the use of the Bolte Automatic Time Keeper not only the workmen themselves are able to inspect the record, but their employers are able each day at a glance to ascertain the numbers and names of those who are arriving on time, or others who are habitually late or absent.

THE UTILIZATION OF BASIC SLAG AS A FERTILIZER.

If basic slag is allowed to become hard on cooling the expense of milling often precludes its utilization as a fertilizer. If it is allowed to cool slowly it is easier to mill than when it is rapidly cooled. This is a somewhat anomalous state of things, for usually the strength of a material varies directly with the time of cooling. Dr. von Reis has investigated this matter, and his results are given in the *Zeitschrift für Angewandte Chemie*. From a great number of analyses he has found that the hard slags all have a smaller proportion of ferric oxide (Fe₂O₃) in them than the soft slags, or, in other words, in hard slags the ratio of ferric to ferrous oxide is less than one-third, and in soft slags the amounts of ferrous and ferric oxides are more nearly equal.

Those slags which cooled slowly had more ferric oxide in them than

- 484,697. Blue Dye. Rene Bohn, Mannheim, Assignor to the dische Anil Bain and Soda Fabrik, Ludwigshafen, Germany.
 - 484,704. Apparatus for the Manufacture of Metallic Articles by Electrolysis. Alexander S. Elmore, Leeds. Assignor to Elmore's American and Canadian Patent Copper Depositing Company, Limited, London, England.
 - 484,728. Gas Engine Motor for Cars. Daniel Best, San Leandro, Cal.
 - 484,735. Bituminous Rock Reducing Machine. Samuel P. Hall and James W. Wood, Oakland Cal.
 - 484,764. Apparatus for Boring Artesian Wells. Benjamin W. Elder, New Orleans, La.
- TUESDAY, OCTOBER 25TH, 1892.
- 484,770. Converter. William A. Baldwin, New York, N. Y. Assignor of one-half to Roswell D. Sawyer, same place.
 - 484,782. Automatic Latch Opener for Buckets. Charles P. Dole, West Superior, Wis. Assignor of one half to Charles R. Heneage, St. Paul, Minn.
 - 484,802. Slate Shaving Machine. Henry Kurtz and Ephraim Kurtz, Bangor, Pa.
 - 484,823. Apparatus for Purifying Sewage. Ernest E. Scrubby, Epping, England.
 - 484,861. Apparatus for Treating Ores. Harrison B. Meech, Chicago, Ill.
 - 484,869. Process of Separating Gold and Other Metals from their Ores. George J. Atkins, London, England.
 - 484,875. Method of Treating Minerals Containing Nickel. Jean de Coppet, Paris, France.
 - 484,877. Process of Separating Iron from Ore. Henry H. Eames, Baltimore County, Md. Assignor, by direct and mesne assignments, to the Eames Purifying and Separating Company, of West Virginia.
 - 484,933. Ore Separator and Amalgamator. Fred J. Hotz, Chicago, Ill.
 - 484,942. Smelting or Reducing Plant. John Rourke, Denver, Colo. Assignor of one-half to Amos C. Giltner, same place.
 - 484,990. Electrolytic Process and Apparatus. Henry Blackman, New York, N. Y.
 - 485,135. Process of Separating Tin from Tin Plate Waste. Hans C. W. Harmssen, Lueneburg, Germany.
 - 485,063. Process of Producing Paint-Pigment from Ores. Noah B. Smith and Carl P. Ludwig, Birmingham, Ala.
 - 485,069. Grinding Pan. Albert J. Taylor, Silver City, Nev.

PERSONALS.

The Michigan Mining School, Houghton, Mich., now has over 80 pupils in mining engineering.

Mr. E. N. Van Cortlandt, mining engineer, has returned to this city from a professional trip to Colorado.

Mr. B. F. Bivins, of the Pittsburg & Michoacan Mining Company, of Michoacan, Mexico, was in this city this week.

Gen. J. M. Tuttle died at Casa Granda, Ariz., on the 25th inst. He was interested in the Jack Rabbit and other Arizona mines.

Mr. R. Mackintosh, of the Pioneer & Park City Sampling Works, one of the World's Fair commissioners from Utah, was in Chicago at the World's Fair dedication exercises.

Mr. P. T. Farnsworth, manager of the Horn Silver Mining Company, at Frisco, Utah, has returned to Salt Lake from a visit to Nevada mining properties owned by the company.

Mr. W. L. Austin, the patentee of the Austin pyritic smelting process, has been in Salt Lake. He has investigated the available source of pyritic ore in Utah and, it is said, proposes to erect a plant.

Mr. Edward Gudeman, Ph.D., formerly chemist of the American Glucose Company, at Buffalo, N. Y., is now in this city. He leaves within a week to take the superintendency of the company's works at Peoria, Ill.

SOCIETIES.

The Canadian Society of Civil Engineers will hold an ordinary meeting, October 28th, at its rooms, 112 Mansfield street, Montreal. There will be a discussion of Mr. Gilpin's paper, "The Use of Safe Explosives in Coal Mines, Part II. The Results of Experiments." Mr. H. R. Lordly will read a paper on "Transition Curves."

The regular October meeting of the Engineering Association of the Southwest was held at the headquarters of the Association, Nashville, Tenn., October 13th. Vice-Pres. F. P. Clute, of South Pittsburg, Tenn., presided. Mr. Frank Cawley, of Montreal, Canada, presented a paper on "The Mining Interests of Nova Scotia," in which he discussed the mining resources of the province, the development of them, facilities for transportation and shipping, and exports to the United States. Mr. Thos. Sharp, of Nashville, Tenn., discussed "The Spathic Ores and Iron of Lawrence County, Tennessee." The third annual meeting of the Association will be held at Nashville, November 10th.

INDUSTRIAL NOTES.

Non-union men employed at the Carnegie mills in Pittsburg and Homestead have been frequently assaulted by strikers within the last week. One of them, assaulted in Homestead on the 24th inst., is believed to be mortally injured.

The Swansea Steel and Tin Plate Company has been incorporated at Chicago, with a capital of \$200,000, held principally by Welsh stockholders. Four mills are to be built at St. Paul Park, Minnesota, and will employ, it is reported, not less than 300 men.

President Weihe and President-elect Garland, of the Amalgamated Association, held a secret consultation with Advisory Board officials in Homestead, Pa., on the 24th inst., and rumors were circulated to the effect that the strike may be declared off.

The Western Union Telegraph Company's report for the year ending June 30th, 1892, shows: Revenue, \$23,700,000; expenses, \$16,300,000; profits, \$7,400,000; surplus, \$11,417,741, total surplus, \$18,817,741; deduct dividends, \$4,308,607; interest on bonds, \$891,245; sinking fund, \$40,000, and the net surplus is \$12,576,899.

Work has been resumed on the railroad from Deming, N. Mex., into Mexico. The grade from Deming to the Mexican line has been completed for a number of months, and there has been considerable grading done in Mexico. The proposed road will run through some of the richest mineral sections of Mexico, and a large number of mining claims have been taken up by Americans near the line of the new road.

The "direct black print paper," to which we referred in our editorial columns last week, is being sold by Schwenke, Kirk & Company, of 26 Church street, this city. This paper is intended as a substitute for the blue print paper used in copying tracings, and it is superior in the two important respects that it gives black lines on white ground and that it only requires a plain water bath as a developer. It is an article long desired by engineers.

The Treasury Department has rendered an important decision overruling its former action as to the standard which shall govern in deciding what constitutes "anthracite" and "bituminous" coal. Heretofore coal containing a minimum of 90% of carbon has been classed as anthracite coal, and

when less, as bituminous coal. This minimum has now been reduced to 88% of carbon to be classed as anthracite coal. The importance of this decision is seen when it is stated that bituminous coal is subject, when imported, to a duty of 75 cts. per ton, and anthracite coal is admitted free of duty.

Invitations have been issued by the Union Iron Works of San Francisco, to witness the launch on November 5th, of Protected Cruiser No. 6, the "Olympia," the fifth built by this firm. The five war vessels constructed by this enterprising works comprise the "Charleston," 4,040 tons, and 6,660 I. H. P.; the "San Francisco," 4,083 tons and 10,400 I. H. P.; the "Monterey," 4,000 tons and 5,400 I. H. P.; the "Oregon," 10,200 tons and 9,000 I. H. P., and No. 6, the "Olympia" of 5,870 tons and 13,500 I. H. P. This last vessel, which will have a speed of 20 knots, will carry, in its main battery, four 8-in. breech-loading rifles and ten 5-in. In the secondary battery there will be fourteen 6-lb. and six 1-lb. rapid firing guns and four Gatling guns.

The German-American Petroleum Company, which is the German branch of the Standard Oil Company, now owns 15 tank steamers of an aggregate capacity of 53,975 tons for transporting oil across the Atlantic. Beside these, the company owns 5 lighters, 43 tanks, capacity, 70,650 tons; a cooperage shop turning out 750,000 barrels per annum; storage tanks in various inland cities, tank boats for the Elba and Rhine Rivers and finally 247 tank cars. The Standard Oil Company has or controls four European organizations, namely, the Anglo-American Oil Company, which controls the English trade; the American Petroleum Company, of Rotterdam for Belgian and Holland "la Societe Italo-Americana del Petrolio" for Italy and Switzerland, and "Det Danske Petroleum Aktieselskab" for Scandinavian countries.

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.

2,814. A quantity of 2½ in. and 4 in. second-hand wrought iron pipe in good condition. Alabama.

2,815. Detailed estimate and full particulars for an inexpensive pumping plant for irrigating purposes. Power to be supplied by a gasoline, naphtha or kerosene engine. Capacity of pump to be 1 cu. ft. per second, with lift of 60 ft. Washington.

2,817. Three or four 3 ft. tram cars and a lot of belting. Arkansas.

2,818. Prices, catalogues and circulars of kaolin machinery. Georgia.

2,819. Shaft pulleys and belts. North Carolina.

2,820. Fine wire cloth from 60 to 150 mesh, both brass and iron. North Carolina.

GENERAL MINING NEWS.

The coal output of the Tracy City Division of the Tennessee C. & I. & Ry. Company for September was 27,042 tons, and from January 1st to October 1st, 265,956 tons. Shipments for September were: Coal, 10,715 tons; coke, 9,138 tons; total, 19,851 tons. Shipments from January 1st to October 1st were: coal, 85,948 tons; coke, 85,140 tons; total, 171,078.

Tennessee Coal, Iron and Railroad Company.—This company has decided to place its properties in the hands of a board of control, about November 1st. The board is to consist of Nat Baxter, A. M. Shook, J. J. Hillman, J. H. Aldrich and H. F. Debardeleben. The company will consolidate all its Alabama offices and locate them in Birmingham, making Mr. Debardeleben financial manager.

ARIZONA.

Mohave County.

(From our Special Correspondent.)

The G. A. R. Mine, White Hills.—Nearly \$4,000 worth of ore is being taken out from No. 1 shaft daily. The shaft has been sunk 70 ft., the ore body showing a width of from 3½ to 4 ft. At the bottom there is a 12-in. streak of ore that mills over \$1,000 per ton. About 80 ft. east a second shaft has been sunk to about the same depth as No. 1, and the same rich ore is showing.

Placer County.

(From our Special Correspondent.)

Mayflower Gravel Mining Company, Forrest

Hill.—At the annual meeting held this week 31,500 shares were represented and the following officers elected: F. Chapellet, president; F. H. Green, vice-president, and F. W. Zeile, C. Mayne, F. H. Bendel, directors. B. M. Keut was re-elected secretary and his statement showed a credit to the company of \$3,000. During the year bullion of the value of \$50,365 was produced.

San Diego County.

(From our Special Correspondent.)

Good Hope Mine, Ferris.—Since this property was purchased by its owners three years ago the most extraordinary progress has been made. Then it was a mere prospect hole, but active work in sinking and developing revealed an important ore body. At the beginning of 1891 the mine had been opened sufficiently to show an ore body valued at \$250,000 and a Bryan mill with a capacity for working 25 tons every 24 hours was erected. To date this mill has been kept continuously at work. The ore is mostly decomposed, carrying free gold, though sulphurets are found in paying quantities. Since being first worked the ore has averaged \$23 per ton, and as the cost of working has been \$5 per ton there has remained a net gain of \$18 per ton. The most conservative estimate of the ore in sight puts it at 75,000 tons, and as the owners of the property have refused this summer \$500,000 for the mine, it is safe to say the outlook is in every way satisfactory.

CALIFORNIA.

Amador County.

The Amador "Ledger" publishes the following Sutter Creek correspondence: At the Hector 30 stamps are running. In blasting at the 600 ft. level, good ore has been encountered.

At the South Eureka preparations are being made to sink 300 ft. as rapidly as possible.

The Wildman is looking well, the 30 stamps being kept going steadily, and the ore being crushed is of good average quality.

Clinton Consolidated Mining Company.—It is reported that this company's property is to be purchased by an English syndicate.

Mono County.

Standard Consolidated Mining Company.—This company, says the Bridgeport "Chronicle-Union," is pushing work on its electric plant, and it is expected to have it in working order by December 1st. The poles are all set, and wire on the ground.

Nevada County.

Brunswick Consolidated Gold Mining Company.—Mr. H. R. Lounsbery, treasurer of this company, has received the following letter from the superintendent, dated Grass Valley, October 18th: "During the past week the shaft has been sunk 7 ft.; total, 650 ft. The east drift advanced 8 ft.; total, 74 ft. West drift, 8 ft.; total, 84 ft. Very little change has occurred in the mine; the quartz is not so high grade as last week but the ledge is wider. At the present time there is a streak of high-grade quartz coming in upon the foot wall of the east drift; in the west it is not as good and is small but shows indications of widening. Both ledges are strong and solid, being little waste and easily mined. The contractors are doing good work and all the machinery is working well."

Placer County.

Mayflower Gravel Mining Company.—At the annual meeting of this company, 31,500 shares were represented, and the following directors were elected for the ensuing year: F. Chapellet, F. H. Green, F. W. Zeile, Charles Mayne and H. Bendel. D. M. Kent was re-elected secretary, and his financial statement showed a credit of \$3,000. During the year there was produced \$50,365 in bullion. A bullion shipment valued at \$5,700 was received on the 18th inst.

Shasta County.

Reed Mines Consolidated Company.—The San Francisco "News Letter" is informed that this company has acquired possession of the Kit Carson and Spanish mines, together with mill sites and other property belonging to the estate of the Joshua Hendy Machine Works. This company is engaged in developing important mining property in the Old Diggings District, where it is in possession of six mining claims and a stamp mill. The claims have four separate and parallel ledges of gold-bearing quartz, running through 5,000 ft. of the property. Three of the ledges have been cut with tunnels at a depth of 50 ft., 75 ft. and 200 ft. respectively, and the rock is said to assay on an average from \$5 up to \$25 a ton. The concentrates from the average rock, after the free gold has been extracted, goes over \$400 a ton, it is said, and some of the sulphurets ore pays to select and ship to the smelting works direct. The gold-bearing ledges on the property run from 2 ft. to 8 ft. in thickness, and the formation is porphyritic and metamorphic, similar to the formation in the Grass Valley District of Nevada County. The Joshua Hendy mines, now acquired by the Reed Mines Consolidated Company, lie adjoining, between the Reed mines and the road. There are two ledges on this property parallel to the ledges on the Reed. The managing director, Mr. Robert Stevenson, of San Francisco, informs the "News Letter" that two shafts will be sunk on the property as soon as arrangements can be made with contractors for the purpose, and that the continuity and value of the ledges will be proved to a depth of 500 ft. before any stopping or cross-cut

ting be attempted. One of the shafts has already been sunk 40 ft. on the ledge, which was 3 ft. thick on the surface, and yielded \$10 a ton in free gold and \$15 a ton in sulphurets. The ledge at the bottom of the shaft has widened to 5 ft., and shows a value of \$20 in free gold and \$25 in sulphurets. That shaft will be continued to a depth of 300 ft., following the ledge all the way.

COLORADO.

Colorado Fuel and Iron Company.—At a joint meeting at Denver on the 21st inst., of the stockholders of the Colorado Coal and Iron Company and the Colorado Fuel Company, the long-talked-of consolidation was finally effected. It is said that 90% of the capital stock of the two companies was represented and the vote to consolidate was unanimous. New officers were elected as follows: President, J. C. Osgood; first vice-president, Henry R. Wolcott; second vice-president, Paul Morton; third vice-president, J. A. Kebler; secretary, C. M. Scherck; treasurer, A. C. Cass. The executive committee consists of J. C. Osgood, Henry R. Wolcott, J. F. Jerome, Dennis Sullivan and J. A. Kebler. The directors are: Henry R. Wolcott, C. H. Toll, Dennis Sullivan, J. A. Kebler, W. H. James, J. C. Osgood, J. L. Jerome, of Denver, Paul Morton, of Chicago, W. L. Graham, of Pueblo, E. T. Berwynd, Ernest Thalman, H. K. McHoag and C. F. Meek, of New York city. The new company assumes the outstanding bonds of the Colorado Coal and Iron Company, amounting to \$3,101,000, and the outstanding bonds of the Colorado Fuel Company, which amount to \$1,043,000. It also assumes the indebtedness on the lands of the Denver Fuel Company, which company was a part of the Colorado Fuel Company, of \$100,000. The total liability of the new company is \$4,244,000. By this consolidation the Denver Fuel Company, the Huerfano Land Company, and the Grand River Coal and Coke Company are also absorbed. The total stock and bonds to be issued by the new company will be \$19,000,000, of which \$2,000,000 is to be issued to the Colorado Fuel Company's preferred shareholders. The new company will increase the prospecting and development work in Colorado and Wyoming. The appointive officers are: J. A. Kebler, general manager; C. T. Schenck, secretary; A. C. Cass, treasurer.

Boulder County.

At Copper Rock, in almost all the older claims the ore is said to be changing for the better, and free gold is found scattered through the quartz. Work on the Orphan Boy tunnel is being pushed, and it will soon be 300 ft. long. A vein of quartz and iron pyrites bearing gold have been encountered in the north wall. The Gold Dust, Maud S., Luck, Lode, and Silent Friend mines are promising properties.

El Paso County.

Good reports come from Cripple Creek, where development work is being pushed with considerable activity. A new smelter and stamp mill is in course of erection, and it is estimated that these plants will treat 1,500 to 3,000 cu. yds. per day. The Anaconda continues to produce high-grade ore.

Lake County.

Chrysolite Silver Mining Company.—The annual meeting of the stockholders of this company will be held in this city on November 2d. Dr. K. W. Raymond, president of the company, has issued the following circular to the stockholders:

"The policy of recent years has been continued by the management. Explorations have been continued, both by the company and by responsible lessees, who have expended, upon limited portions of the property, considerable sums at their own risk. At the same time, it has been sought, by means of the strictest economy, to make the operations of the company self-sustaining by the extraction and sale of iron ore as a flux to the smelting works of the Leadville district. The market for this material is precarious, and its value depends (other things being equal) upon the amount of silver it contains, which, though too small to pay for its reduction as a silver ore, is nevertheless taken into account by the smelters, as incidentally increasing the value of flux. While the mining of ore for this purpose is not, by itself, a profitable business for the company, it renders important assistance in explorations, by reason of the fact that this low-grade material is the matrix in which the lead and silver ores occur, and that the extraction of it is really the best method of exploring for the irregular deposits of these more valuable ores which it may inclose. The continued decline in the price of silver has greatly reduced the margin of profit, already small and doubtful, in the mining of this low-grade material, and the net value of the occasional pockets of richer material encountered. Nevertheless, it has been possible, by strict economy, to cover with the proceeds of such sales all the expenses of the company and to increase by a small amount (which cannot be precisely stated until the final accounts have been received from Leadville) the cash balance in the treasury. This balance was reported in the circular to the stockholders a year ago at about \$13,000, and when the accounts were closed October 31, 1891, proved to be \$14,085.93. It may be one or two thousand dollars greater this year. Explorations are still in progress; and while, in view of the disappointment of the past, it is not possible to be sanguine concerning the future, it is believed that the con-

tinuance of the present policy is the best that can be done at this time for the interest of the stockholders."

Pitkin County.

Aspen during the month of September continued a steady production, while during the present month a much larger output is expected, says the New York "Sun." The Aspen Mining and Smelting Company register an output for the month of 3,620 tons. The Aspen produced during September 3,465 tons of fair-grade mineral. The Mollie Gibson output was equally large. Within the past week 150 cars of ore have been shipped out of Aspen, a record that is said to exceed any previous record this year.

Aspen Contract Mining Company.—The regular annual meeting of this company was held on the 18th inst. at Colorado Springs, the greater part of the stock being represented either in person or by proxy. The former board of directors, consisting of J. J. Hagerman, D. M. Hyman, H. P. Lillibridge, Henry Paul and Hal Sage, were re-elected. At a subsequent meeting of the directors the following officers were elected: J. J. Hagerman, president; D. M. Hyman, vice-president; Perry Hagerman, secretary and treasurer.

Aspen Mountain Tunnel Company.—This company continues to acquire new territory, and there are few claims that have not cast their destiny with the enterprise, says the Aspen "Times." Among the latest is the Sixty-six. The tunnel is pushing ahead.

Deane.—It is reported that a body of good ore has been encountered in this group of mines. It was discovered while driving the Anderson tunnel which is now in 115 ft. The management is pushing the tunnel parallel to the vein as rapidly as possible. Crosscutting will be commenced at another 100 ft. in.

Great activity prevails in mining circles in Tourtelotte Park, says the Aspen "Times." At the Justice there is a promising outlook from a drift on the main incline on the 400 ft. level. At the Dollar, work goes forward uninterruptedly; at the Edison leases periodical shipments are being made. The exploration of the North Star and Carlisle is to be resumed under lease to Manager Morse, of the lixiviation works, who proposes to do some active prospecting during the winter.

Mollie Gibson Consolidated Mining and Milling Company.—According to the Aspen "Times," Mr. A. Glassbrook is at present overhauling this company's mill on the banks of the Roaring Fork and will conduct a number of experiments on the low grade ores from the mine, which are now on the dump. The mill was constructed in the early days of the mine and ran continuously for 10 months upon the low grade products of the upper levels. The low grades were limited, however, and when later and richer strikes were made, the mill suspended. The approaching experiments are for the purpose of ascertaining what changes, if any, the properties of the low grade ore at the mine have undergone and, if necessary, to make such changes in the process as may be required to successfully handle them.

Smuggler Mining Company.—Manager S. I. Hallett, of this company, reports excellent progress on the work of sinking the shaft another 100 ft., says the Aspen "Times." The production of the mine at present is 4,000 tons of milling ore and from 600 to 700 tons of shipping ore, that goes direct to the market.

Saguache County.

The Denver "Republican" says that Mr. L. D. Roudebush has secured a \$5,000,000 option upon the Amethyst group of mines in the Creede district. This group includes the Amethyst mine proper, the Hidden Treasure and the Sunnyside. The group is owned by N. C. Creede, Captain Campbell, D. H. Moffat, S. T. Smith and W. E. Cheesman. Mr. Roudebush has been in communication with a syndicate of New York capitalists for a month. He is reported to have said that the deal would be made and the properties would change owners within 60 days.

GEORGIA.

Polk County.

A recent change has taken effect in the management of the Augusta Mining and Investment Company, of Cedar Town, by which C. W. Haskins, of New York, formerly vice-president and treasurer, takes the presidency, vice C. A. Avery, who retires from any active management of the company but retains his stock. J. R. Barber, of Cedar Town, was appointed general manager of the company for the Georgia and Alabama property; he is also general manager of the Cherokee Iron Company, of Cedar Town, which position he still retains pending the result of an option on that company's entire property given to C. A. Avery, who is at present in New York for the purpose of promoting a new company to operate the furnaces and mines included in his option.

During a recent visit to Cedar Town I went over the works of the North Georgia Mining Company at the Ledbetter brown ore bank, which that company operates under lease. A McLanahan & Stone double angle steel log washer complete, except the jigs, has lately been erected and is now washing about 100 tons of ore each day, which is shipped to South Pittsburg, Tenn. This ore is sold on the unit system and at the banks it is claimed that the furnace analyses shows 52.5% in metallic

iron. The water supply for this washer is pumped from the Cedar River, a distance of 1 mile, to a tank from which it is distributed to the washer. The entire plant, including pumping stations, pipe line, engines, boilers and washer complete cost \$10,000.

IDAHO.

Seven Devils Mines.—A correspondent of the Butte "Miner," writing from Boise City, says the Seven Devils mining region is enjoying a gold flurry. None of the men interested in the district will say much about it, but during the past two weeks, \$1,200 worth of gold, which the miners pounded out of the rock, has been sent to the United States assay office in Boise City. Boston, London and Rotterdam capitalists are largely interested in the Seven Devils district. The Boston people will put up a smelter next summer, it is said, and the Dutch investors are now on their way to Idaho to investigate the wisdom of putting money into the Weiser & Northern Railroad which, if built, will tap the region. One of the best undeveloped claims in the Seven Devils country, the Queen Bess, has been bonded for \$5,000. It is probable, however, that a sale will not be made, the owner of the lode having offered the holder of the option \$1,000 for a release.

Alturas.

Starr.—It is stated that the purchase of this mine at Wood River has been consummated. Elias Morris, one of the purchasers, said yesterday that the sale was consummated, \$50,000 has been paid, and the remaining amount will be paid in nine months. The purchase price is about \$120,000. One of the experts said there is a vein of ore 6 ft. wide at a depth of 140 ft. The vein is all ore, but the high grade ore is from 6 in. to 3 ft. wide, the remainder being second-class ore. The mine has been worked by leasers since April last, and since that time \$72,000 has been taken out, and, at the same time, worked under great disadvantage, having only a windlass to hoist their ore and waste.

Custer County.

Livingston Group.—In June, 1891, Peter V. Huston, of New York, made a deal with William F. Livingston, A. L. Livingston, and T. Clare Hunter, whereby he was to secure the Livingston group of gold mines in Custer County. He paid \$5,000 down and stipulated that eight months later, after necessary deeds had been deposited in the First National Bank, in Denver, he was to pay \$40,000, the final payment to be made in August, 1892. Deeds were not forthcoming and Huston brought suit in the United States Court to compel the defendants to refund or turn over the mines. San Francisco, Seattle and Montana people are interested with Huston.

Owyhee County.

Phillips & Sullivan.—Two bars of bullion, valued at \$7,000, have been received at Boise City, the result of a run on 87 tons of ore from two veins in the Phillips & Sullivan mine. The gold bar is worth \$5,200 and the silver bar \$1,800. The ore from which the gold was extracted came from the lower workings of the mine and was of better grade than has ever been taken from the upper levels of the property. The suit of William Knott vs. Phillips & Sullivan involves this property. Knott some time ago filed an adverse claim in the United States Land Office, this city, to the application for a patent made by Phillips & Sullivan. The adverse claim is too late to be recognized, and Knott applied to the commissioner of the General Land Office to have the matter reopened. That official refused to grant the application and Knott appealed to the Secretary of the Interior, before whom the matter is now pending. Knott failed to answer the counter-complaint filed at the last session of the United States District Court held in this city, in the suit in which he sought to have Phillips & Sullivan enjoined from working the property, and it is the opinion of many that the case will be dropped.

Shoshone County.

Argentine Mining Company.—This mine, owned by O. M. Lonsdale and others, of Portland, Ore., it is reported, will resume work within a fortnight with a force of 60 men. This mine closed down in May last on account of some disagreement among the owners. A new 75-ton concentrator and an expensive hoist had just been completed when the works shut down. The Argentine has a large body of low grade galena with some gray copper and spathic iron. The ore is transported from the mine to the railway by a gravity tramway about 2,500 ft. in length. J. H. and Frank Davey, father and son, are general managers. Last winter, while the mine was in full operation, eighty tons of ore were shipped daily to smelters at Helena, with very satisfactory results.

Nellie & Mineral Point.—This mine at Osburn has commenced shipping ore to Helena via the Northern Pacific road. One carload was sent to Pueblo, Colo., as an experiment. Heretofore all Nellie ore has been treated at the Ryan smelter at Tacoma. Active preparations by the Minnesota syndicate which has control of the Mineral Point and Coeur d'Alene Nellie are on foot for extensive operations on the Mineral Point. President Samuel McClure, of Stillwater, Minn., is now here. Already this company has a monthly pay roll of about \$5,000.

Shannon.—Copper-silver ore in good quantities has been struck in this mine, but the main ore

body has not yet been reached. Development work has been in progress for some weeks in the Shannon, and over 500 ft. of tunnels are completed. This property is owned by F. A. Stevens and Wm. Payne, and is now under bond to C. S. Jennings, T. H. McIntosh and others. The work has been done under the direction of Foreman J. J. Liddy. The Shannon is situated midway between two good mines—the Mineral Point and Coeur d'Alene Nellie—and the finding of a big body of ore is expected.

KANSAS.

Cherokee County.

During the week ending Oct. 22d the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,001,360; rough ore, pounds sold, 1,066,290; zinc ore, pounds sold, 675,000; lead ore, pounds sold, 103,270. Sales aggregated a total value of \$8,972.

KENTUCKY.

Hopkins County.

Coal shipments of the St. Bernard Coal Company, Earlington, Hopkins County, Ky., from the beginning of operations to September 1st, 1892. Tons of 2,000 lbs.:

Coal.		Coke.	
1871.....	31,700	1882.....	256,584
1872.....	91,757	1883.....	315,208
1873.....	134,201	1884.....	285,573
1874.....	139,597	1885.....	303,861
1875.....	153,678	1886.....	320,689
1876.....	121,963	1887.....	353,277
1877.....	177,249	1888.....	392,272
1878.....	149,661	1889.....	355,863
1879.....	173,234	1890.....	373,867
1880.....	209,073	1891.....	428,029
1881.....	310,689	1892 (8 months)....	309,803

MICHIGAN.

Copper.

The Portage Lake Mining "Gazette" has some figures on the Arnold copper mine, the shaft of which is down between 350 and 360 ft. In sinking it has passed through copper ground which has ranged from 1/2 to 2%, say that it has averaged 3/4 of 1%, and continues to do so. Under these conditions the Arnold would make a mine and a paying one at that, as from its advantageous location it could make copper very cheaply. It probably could treat its rock for from \$1 to \$1.15 per ton, or at an average, calculating 15 lbs. of copper to the ton of rock, from 6% to 7% c. per pound. Figuring transportation, smelting and other expenses at 1 1/2 to 2 cents per pound, and the Arnold would lay down its copper in New York at from 8 1/2 to 9 1/2 cents per pound. On this basis, figuring 15 lbs. of copper to the ton of rock and treating 1,000 tons per day, the mine could produce 390,000 lbs. of mineral per month, which would probably average about 75 per cent. ingot, about the average of the Copper Falls Mine, which works on the same lode, and it would mean 292,500 lbs. ingot per month, with copper at 11 1/2 c. per pound. The Arnold, if the cost of its copper were 8 1/2 c., would net 3c. per pound, or \$8,755 per month, \$105,300 per year. With the cost of copper 9 1/2 c. and the price received for the same 11 1/2 c. the mine ought to net \$5,850 per month, or about \$70,000 per year. This adrift drifting from the lake shore will pass through the same formation where the Owl Creek vein made very heavy deposits of copper in the Copper Falls at various times. To show the persistency of the lode in length and depth, the Atlantic, 35 miles southwest, is considered to be working on the same lode. The Copper Falls, too, which is working on the same lode a mile to a mile and a half further east, is showing excellent copper ground in its lower workings.

Atlantic Mining Company.—The Atlantic Mining Company expects to move its stamp mill from Portage Lake to the mouth of Salmon River on Lake Superior, eight miles away. The action has been made necessary by the order of the Secretary of War forbidding a further dumping of the tailings or stamp sand in the waters of Portage Lake. The railroad will be completed next summer and most of the timbers be hauled. Already the site and a portion of the right of way have been purchased. If allowed to take its time the company calculates to consume about three years in building and moving. The expense has not been figured, but will probably fall within \$250,000. This amount is now in the treasury in the form of a surplus, while the earning capacity at the present market price of copper is about \$40,000 per year.

Houghton County Mine Inspector's Report.—From the report of Capt. Josiah Hall, the mine inspector of Houghton County, for the year ending September 30th, 1892, it appears there were 17 fatal accidents in the mines (underground), viz., 4 at the Hecla, 8 at the Tamarack, and one each at the Wolverine, Peninsula, Franklin, Atlantic and Huron. Another fatal accident happened to a man in an exploring pit only 12 feet deep, on the Atlantic property, by some ground giving way and knocking him down, and his head striking against a boulder he was killed. As there were 7,640 men employed in the mines during the year, the death rate (2.23 per thousand) may be considered very low. None of the above accidents could in any way be laid to the door of the officials of the different mines. Several of them were clearly traceable to the carelessness of the men themselves, while those which were not so could not have been prevented.

Peninsula Mining Company.—The mines closed down and all work has stopped. All hills were paid.

Ridge Mine.—The tributers at this mine have hoisted their copper and are busy cleaning it up. It is expected that they will clean up between 10 and 11 tons of copper, the work of four men for about five months. As soon as cleaned it will be taken to the railroad and shipped to the smelting works at Hancock to be smelted into ingots.

Tamarack, Junior, Mining Company.—North drift No. 2 Tamarack, Jr., finds the Calumet vein 10 ft. wide with paying ground 1 1/2 ft. wide. None of the Tamarack, Jr., rock has been stamped; supposed percentage less than 2%. Vein in Tamarack, Jr., No. 1, is 10 ft. wide, quite good, but not so rich as the vein in Calumet or old Tamarack.

Volunteer.—This mine on the Cascade range will hereafter, until further orders, use but one shaft. The off shift men will not be laid off, but will be put to work in the shaft which was stopped last spring; thus the full force of men will still be employed.

Gogebic Range.

Pike Mining Company.—At the Pike work is now in progress on the second level at a depth of 260 ft. From near the foot of the shaft a drift has been carried eastward a distance of 180 ft. with the result of a handsome stockpile of good looking ore. There is a marked improvement in the quality as well as quantity of the ore as the depth increases. The decrease of phosphorus as the depth increases is very noticeable. The shaft will accordingly be put down another level. In the meantime the ground to the northward is being tested by a cross cut which is now in about 165 ft.

Iron—Marquette Range.

Iron Cliff's Mining Company.—This company has given a party of miners an option to explore the old workings at section 12 near Cornishtown. They are now erecting machinery for the purpose of hoisting and pumping.

Iron—Menominee Range.

Mastodon Mine.—At this mine 50 men are employed, a number nearly equal to the largest force ever employed at the mine. About 60 tons per day are being hoisted to the surface and being stocked. Twelve thousand tons are now in stock.

MINNESOTA.

Iron—Mesaba Range.

The St. Paul "Pioneer Press" says concerning this range: Several ore contract deals have been made lately to handle the ore product of the Mesaba range, which insure that the output of this range will come into active and direct competition with that of all other ranges at the opening of lake navigation next year. The ore brokerage firms of Cleveland furnish the lessees of the Mesaba mines the necessary capital to go on with the work, and agree to dispose of the product in the Cleveland markets, at the same time paying all freights by lake and rail and the brokerage and insurance. Ogilby, Norton & Co. are to handle the output of the Mountain Iron mine, which will be operated by the owners. Todd, Stambaugh & Co. will dispose of the output of the Ohio mine and advance the working capital needed. P. L. Kimberly has arranged also with the last mentioned ore brokerage firm to handle the output of the Biwabik. The commission firm advanced \$25,000 to work the mine, 25 cents per ton for putting the ore on hoard the cars, and will pay all freights, while it gets 10 cents a ton commission and interest on money advanced.

The ores of the Mesaba can be placed in Cleveland at a profit of \$1 per ton on these terms, and it is believed that no other mines can compete with theirs in open market. Following are the mines under contract to ship next year, together with royalties and minimum ore output:

	Royalty.	Advance Royalty.	Minimum Output.
			Tons.
Cincinnati.....	\$0 55	\$25,000	150,000
Biwabik (P. L. Kimberly).....	50	.....	300,000
Biwabik (Berrington).....	50	.....	100,000
Virginia.....	50	25,000	50,000
Wyoming (A. J. Decker).....	30	40,000	25,000
Wyoming (J. T. Jones).....	50	.....	25,000
New England (N. D. Moore).....	55	50,000	150,000
New England (Welmer).....	55	25,000	50,000
Lone Jack.....	65	.....	50,000
Mesaba Mountain.....	65	75,000	400,000
Ohio.....	60	.....	150,000
Hale.....	50 & 40	.....	50,000
Wyoming (Parkersburg Iron Co.).....	50	30,000	50,000

Total..... 1,500,000
* This amount first year and 50,000 tons second year.

The first shipment of ore from the new Mesaba range reached Duluth on the 18th October. The ore came from the Mountain Iron mine over the recently completed Duluth, Mesaba & Northern railroad. Those mines of the new field that have to go under ground will have an ore cost of at least \$1.75 per ton and they will have to pay 80 cents for rail freight, \$1.25 for lake freight, 50 cents for royalty, 15 cents for insurance and commission and trimming. If these figures are added, it will be seen that the underground properties of the Mesaba cannot compete, says Ishpeming "Iron Ore," with properties on other ranges.

MONTANA.

Deer Lodge County.

Ontario.—William Dyer, who is now operating this mine, reports that the mine is doing well. The

ore carries gold and silver, and returns from shipments have been from \$45 to \$128 per ton. He is employing twenty men. But little ore is being shipped, just enough to pay expenses and a 100-ton concentrator has been ordered.

Puritan.—This company is perfecting arrangements for taking a lease on the old Salmon and Trout properties.

Royal Gold Mining Company.—This Company is running its mill steadily. It was reported that this company had made a new and important strike on one of their claims, but no definite information has as yet come.

Royal Gold Mining Company.—This company is running the mill steadily on high grade ore and keeping a large crew of men at work. It was reported in the Boulder district last week that this company had made a new and important strike on one of their claims, but no definite information has as yet come from the company.

Salmon.—It is reported, says the Phillipsburg "Mail," that John McKetchay & Co. will lease this mine and also the Trout claim. The ore will be treated at the Algonquin mill.

Lewis and Clarke County.

Montana Sapphires.—The English Sapphire Company has about 60 men at work on their ditch from the Prickly Pear creek across to their recently purchased placer grounds. The ditch is to be 5 ft. wide, and will be built for 60 miner's inches of water. The men are encountering considerable rock along the course laid out for the ditch, and it requires considerable blasting. A great amount of work has been done, and it is expected that another large section will be finished before cold weather sets in.

Whitlatch-Union-McIntyre Gold Mining Company.—Recently a body of quartz was discovered in the lower level of the Whitlatch-Union-McIntyre Gold Mining Company's property which will run very high in gold, it is claimed. The body is 4 ft. wide, and from its character and location it promises to be extensive. It may be a mere coincidence, but a payment of 25 cents on allotted stock is now due and is being called for by the management.

Silver Bow County.

A contract has been awarded to the Western Iron Works for the erection of a 100-ton copper smelter, to be built by the Montana Ore Purchasing Company, of which F. August Heinze is general manager. It will be built adjoining the Butte & Boston smelter. The calcining department will be in a building 144x70 ft. in size, and will contain two of the latest improved O'Hara furnaces. The engine and boiler rooms will be 36x36 feet and will be equipped with a compound Corliss engine and two boilers of 80 horse power each. There will be two copper blast furnaces, one reverberatory, and a complete public and private sampling plant.

Actual work on the plant has commenced, and it will be rushed through as rapidly as possible. The Western Iron Works are under contract to furnish the machinery in 60 days, and Manager Pinkston states that it will all be ready inside of the specified time. The company will have a sufficient supply of ore from its own mines to run the smelter, but at the same time it will purchase copper, gold and silver ore. It owns and operates the Stella and other properties in Butte, and several mines in the Camp Creek district and near Camas, from all of which it gets considerable ore. Mr. Ballinger will hold the position of metallurgist in the new smelter. It was a great compliment to the Western Iron Works to be given the contract for this important work. The price quoted by Manager Pinkston was considerably lower than the figures of Eastern firms, and it is hardly necessary to state that the work will be done to the complete satisfaction of all concerned. Mr. Pinkston will give the construction of the machinery his personal supervision.

Anaconda Mining Company.—The truth of the matter is, with little question of doubt, that the Anaconda has been obliged to shut down because it cannot make any money, says the Boston "Commercial Bulletin." Little is known of the mine, but this much is certain, that for three years Mr. Haggin has tried to sell the Anaconda both abroad and in this country and each time he has failed; that he has sunk about \$6,000,000 into the property, which is thought to be as much as has been taken out; and that he has alternated between operating the mine and keeping it closed down for some time. In other words, when the price of casting copper would permit of the mine being operated at a profit it has been done, and when there was no profit in the price, it has been closed. Mr. Haggin has recently closed a contract with the Butte City Water Company, a Boston concern, to supply the Anaconda with 300,000 gallons of water per day. The natural water of the region cannot be utilized, as it contains certain properties which corrode the boilers in a very short space of time.

Colorado Mining and Smelting Company.—The pumps have been taken from the workings of the Star West, situated just south of Butte. The reason for this is obvious—the ground would not pay for the working. The Star West has been in operation about two years, during which time it has been a producer of sufficient merit to warrant the company in continuing explorations therein, but as greater depth was obtained the work became more expensive, and the company shut down.

NEVADA.
Elko County.

It is stated that the cyanide process lately introduced at the Union mill, Tuscarora, to be applied to tailings, has given such good results that it will be introduced by other parties on a large scale.

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

Belle Isle Mining Company.—The stope above the 350 ft. level is looking very well, and stopes above the 250 ft. level are improving. Sent to the concentrator 62 cars second-class ore.

Commonwealth Mining Company.—Work on the company's account has been suspended and only three tributaries are at work.

Navajo Mining Company.—The stopes above the 350-ft. level continue about as at last report. Sent to the concentrator 106 cars of second class ore.

Nevada Queen Mining Company.—Second level—No. 8 raise extended 21 ft. Expect to reach the vein next. Stope on the level produced 10 cars of second class ore; average assay, \$30 per ton, and one car first class ore, \$225 per ton. Worked at the concentrator 237 tons of ore; average assay, \$30.16 per ton.

North Bell Isle Mining Company.—No. 1 north drift, south 300-ft. level, extended 5 ft.; the vein is not so wide, but the ore is more compact. North intermediate above the south 400 ft. level extended 4 ft., still yielding good ore. Sent to the concentrator 26 cars second-class ore.

Eureka County.

Richmond Consolidated Mining Company, Limited.—In anticipation of the general meeting called for October 25th, the directors have issued their report and statement of accounts. During the year 1,232 tons of ore were raised, containing 414 oz. of gold, 24,175 oz. of silver, and 235 tons of lead; this was sold at Salt Lake for \$7,148 14s. 9d.; the expenses of mining, freight and management at Eureka were \$5,414 4s. 3d., leaving a mining profit (with £37 9s. 5d. sundry receipts) of £1,771 19s. 9d. The interest on the investments of the company during the year amounted to £1,298 19s. 1d. But for the exceptionally low price of silver and lead the profits for the year would have been greater. The furnaces have remained shut down throughout the year, the amount of ore raised from the mine being too small to admit of their being re-started.

Out of the sum of £3,751 16s. 1d. standing to the credit of revenue on February 28, 1891, a dividend of 1s. per share, free of income tax, was paid on August 10th, 1891. The amount standing to the credit of revenue on February 29th, 1892, is £2,746 1s. 2d., out of which the directors recommend the payment of a dividend of 1s. per share, free of income tax. Prospecting has been carried on in the Richmond mine chiefly on the 200, 300 and 600 levels, but as nothing of importance was found the explorations were stopped. Work is at present confined to what is being done by tributaries, who are taking out ore from various parts of the mine. Portions of the old slag dumps are now being worked over by "jiggling machines," the concentrates produced being sold at Salt Lake. The results so far are satisfactory. The accounts received show a profit from this source of about £100 per month. The question of concentrating some of the low-grade ore in the mine in the same way is now receiving attention. At the Williamsburg mine very extensive developments have been made; these looked very promising at this time last year. The shaft having been completed to a depth of 400 ft., 1,543 ft. of level and 402 ft. of raises and winzes were driven from it. The cost of this work, amounting to £3,894 10s. 8d., has been charged to the reserve fund. It will be remembered that at the date of the last meeting a seam of good ore had been struck, and the prospects were good. The directors regret to state, however, that this ore, instead of widening out after a time disappeared. Numerous other narrow seams were met with, but nothing of importance being found, Mr. Probert stopped further expenditure on this property. Mr. Probert has been at great pains for a long time past in endeavoring to find and secure for the company a suitable new mine, and with this object in view has traveled many hundreds of miles, and visited a great many properties.

(From our Special Correspondent.)

Eureka Consolidated Mining Company.—The President's and other reports submitted at the annual meeting, held this week, contributed little that was calculated to encourage stockholders, albeit the affairs of the company seem to have been economically administered. During the year no ore of any magnitude has been uncovered in the mine. A large amount of money was expended in prospecting and developing work, and during the past twelve months 1,004 ft. of drifts were run, 505 ft. upraises, 152 ft. winzes, and 2,763 ft. of drift cleaned and repaired. There were extracted 3,394 5/16 gross tons of company ore and 468 3/16 tons of tribute, mostly all having been taken from old chambers. Until recently little prospecting was done in new ground, and the ore found within the last few months has all been of low grade. The terms obtained for the ore at Salt Lake have been fairly good, but not sufficient to warrant the shipment of low grade ores. The reserve fund has been reduced, owing largely to extensive underground workings which President Fries recommends shall be continued, as at several points the work looks too well to be abandoned.

During the year \$25,000 has been distributed in dividends, not from the profits, but from the reserve fund of the previous year. The lessees of the

old speiss dump, who are reworking the product by the jiggling process, are making a reasonable profit for themselves and a small amount for the company.

The following are the receipts during the year: Bullion, 333,834 tons, \$65,184.09; ore sold, \$57,503.15; supplies sold, \$205.80; interest, \$321.06; base bullion, freight refunded, \$1,516.75; zinc, freight refunded, \$155.40; overcharged on coke, refunded, \$313.15—total, \$125,200.30. Cash in office October 17th, \$21.05; cash in bank, \$14,534.82; superintendent's drafts, September 30th, \$4,677.57; unclaimed dividends, \$143.75—\$19,377.49; total, \$144,577.79. Disbursements, \$124,257.17; balances, \$20,320.63—\$144,577.79. Net resources, \$35,184.16.

The Richmond Consolidated Mining Company have not yet given any sign of their willingness to join in sinking the Locan shaft below the water line, and the continued indifference on this important point is attributed to the attitude of the resident manager, Mr. E. Probert, in whose hands the English company have left the entire working of the property.

Lincoln County.

Magnolia.—It is said that the strike recently made in the Magnolia mine, in Ferguson district, Nevada, is extremely rich, the ore running from \$1,000 to \$5,000 in gold to the ton. An interest in the Magnolia was purchased a short time ago by R. C. Chambers and others, of Salt Lake.

Yuba.—At this mine, at Pioche, a force of from 12 to 14 men is employed strengthening the shaft timbers and otherwise putting the mine in good shape. How long the force will be retained is not known.

Storey County—Comstock Lode.

Exchequer Mining Company.—At the annual meeting of the stockholders of this company on the 17th inst. 83,916 shares were represented, and the following directors elected for the ensuing year: C. Hirschfeld, A. K. P. Harmon, Thomas Anderson, A. W. Jackson and C. C. Harvey. C. E. Elliott was re-elected secretary, and his financial statement showed a credit of \$3,483.

Savage Mining Company.—The latest official weekly letter says: "During the week have hoisted 537 cars of ore from the 800, 950, 1,100, 1,400 and 1,450 levels. Shipped to the Nevada mill 525 tons, and milled 525 tons. Average car sample assay, \$24.14; average battery assay, \$19. Bullion yield for the week, \$6,940.50. Shipped to the United States mint at Carson, Oct. 15, 405 lbs. of bullion. The usual prospecting and repair work is being carried on throughout the mine. The joint north drift with the Gould & Curry Company on the Sutro tunnel level was extended 30 ft."

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

Challenge Consolidated & Confidence.—The joint northwest drift on the surface level is in 1,141 ft. from the Yellow Jacket shaft, or 233 ft. from the north line of the Yellow Jacket mine. The face shows quartz having no value. The joint north drift on the 100 level is in 1,331 ft. from the Yellow Jacket shaft. The face shows quartz having no value. The joint Yellow Jacket and Challenge west crosscut No. 5, on the same level, is out 107 ft. The face is in quartz having no value.

Crown Point Mining Company.—Explorations have been continued during the past week in the south stope on the 160-ft. level, following a streak of fair milling ore 3 ft. in width. The west stope presents no change worthy of note. Have shipped to the Mexican mill for reduction during the week 119 tons, 540 lbs. of ore, the average battery sample of which was \$21.27 per ton.

Justice Mining Company.—"We have started a south drift from the north stope on the 822 level, and it is now out 6 ft. The car samples average from \$20 to \$25 per ton. The raise on this level, 150 ft. south of the north stope, is up 33 ft. The top is in ore that assays about \$20 per ton."

Kentucky Consolidated Mining Company.—"We are stoping on the second floor above the 160 ft. level, on a streak of ore from 2 to 3 ft. in width, yielding fair assays. The opening on the fifth floor presents no change worthy of note. We have shipped to the Mexican mill for reduction during the past week 150 tons and 1,890 lbs. of ore, the battery samples of which averaged \$26.31 per ton."

(From our Special Correspondent.)

The State Board of Equalization has exempted the Sutro Tunnel from taxation under a provision by the State Constitution. It has been held that the tunnel is developing the mines for the company and other corporations, and is therefore exempt as a mine.

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

Mine.	Tons hoisted.	Car sample assay.	Tons milled.	Av. battery assay.	Bullion product, week.	Bullion shipped.
Con. Cal. & Va., ...	987	26.20	980	22.70	.....	118,223.55
Crown Point.....	119	.....	.....	21.27	.....	.....
Kentucky.....	150	.....	.....	23.31	.....	.....
Occidental.....	170	.....	80	17.40	.....	.....
Potosi.....	447	21.05	400	18.04	.....	.....
Savage.....	537	24.14	525	19.00	6,940.50	115,405 lbs.
Silver Hill.....	191	28.59	191	19.96	.....	.....

¹ First shipment on Oct. account. ²Cars. ³Crude Bullion.

Consolidated California & Virginia Mining Company.—The annual meeting, held this week, was probably the most extraordinary conducted meeting of any that has been held in San Francisco, where curiously manipulated meetings are not a rarity. The results will be found in another column.

Consolidated California & Virginia Mining Company.—The company fell behindhand again last month by \$3,000, the debt now amounting to \$10,500. The orders which were reported to have been given to Superintendent Lyman have not been acted upon to date, for the reason, so it is said, that Pine Street had become acquainted too early with the little game James L. Flood was about to play with regard to the west ledge. The annual meeting will take place next week when an interesting time is assured. The Mining Stock Association will ask of the Board of Directors, and particularly the president, an accounting for the three strayed bars of bullion which were, presumably, handed over to the milling company, and so far as it is known, without that corporation making any good or valid reason why they should be awarded them. There are other bars of bullion, also, which have been hocus-focussed out of the way, and some interesting queries will be made regarding these. Furthermore, the Mining Stock Association will file a protest against the Comstock Milling Co. (owned by Senator J. P. Jones, John Mackay and J. Flood) crushing any more California and Virginia ore, and good reasons will be embodied in the protest why such action should be taken. It is quite certain that wholesale stealing is still common on the Comstock. The Mining Stock Association seems earnest in their endeavors to stop this robbery of shareholders, and has announced its intention, if an era of radical reform is not inaugurated to take more stringent measures than in the Hale & Norcross case. The judgment obtained in the civil suit seems to have conveyed no warning to the mill ring and mine directors, and so it is now intended, if a change is not made, that criminal proceedings shall be instituted. With one or two of the more prominent "looters" landed in the State penitentiary it is likely their companions in evil doing would change their methods. In this connection it may be stated that there are those in this city who would very much like to see either Senator J. P. Jones, or his brother, and representative on this coast, "Sam," in San Francisco. For some time, however, the California climate seems to have become too tropical for both of them.

Hale & Norcross Silver Mining Company.—The defendants in the suit of M. W. Fox against the directors of the company and others have obtained a stay of execution for five days. The plea put forward was that they wished, in the event of the motion of Major Eagan being decided against him, that he might then join with them in the appeal to the Supreme Court. It has not yet transpired what the several defendants propose doing with regard to their bail bond. In some way, it is believed, the Eastern trust company referred to a week ago will assume responsibility, but whether directly or indirectly is as yet a moot point.

Justice Mining Company.—The outlook in the mine is said to be very encouraging, but as the affairs of this company would scarcely bear examination the management is not feeling very happy at the stirring up of the dry bones on the lode, and consequently work is being carried on very quietly, and little news is allowed to transpire. The South drift from the north slope, 822 level, shows some good ore, ranging, it is reported, much above the \$20 to \$25 assays made public. The top of the raise, same level, is also good grade ore.

Kentuck Consolidated Mining Company.—A streak of ore from 2 to 3 ft. wide, of good milling grade, is being stoped out above the 160 level and some ore is being taken from the other openings in the mine

NEW MEXICO.

Grant County.

There is no abatement in the excitement at Cook's Peak. The discoveries made there this year are unprecedented in New Mexico, and the development of the camp may be said to have only just commenced.

The gold production of the Territory has been increasing for several months, but the total output for the year will not exceed that of last year, says the New York "Sun." The output of the mines at Pinos Altos will be a little more than half as much as it was last year. This falling off in production is due partly to the closing down of two of the large properties there and partly to the extreme dryness of the season. The Pacific mill has been idle most of the year because a supply of water could not be obtained to run it.

According to the Silver City correspondent of the New York "Sun," the company that owns the smelting works at Deming is contemplating the erection of a large smelter there. The ores now shipped from Mexico are mostly high grade silver, carrying some lead. The shipment of lead ore to this country is not profitable, and has been practically discontinued. The result of this has been to raise the prices charged for smelting dry ores from 15 to 100%, on account of the increased cost of lead ore for fluxing. This affects silver miners principally. Although the price of silver is considerably lower than it was a year ago, the smelter charges for the reduction of silver ore are considerably higher than they were then, and the cost of mining is the same. As a result

a number of silver mines in this part of New Mexico have been closed down.

PENNSYLVANIA. Coal.

Press despatches from Pottsville announce that the Schuylkill coal region is threatened with a complete cessation of work at its industrial establishments and distress generally among its inhabitants resulting from the small water supply.

An early settlement is expected of the strike of the river coal miners in the Pittsburg district. A secret meeting of operators was held on the 25th inst. in Pittsburg, and it was said that the men in the first and second pools were willing to return to work at a three-cent rate, a reduction of half a cent from the old prices, while the fourth pool miners were willing to return at 2½ cents. There are about 8,000 river miners on strike.

The assessment valuation of the Schuylkill County coal lands is placed this year at over \$20,000,000, an increase of 100% over last year, says the Scranton "Tribune." Mahoney township lands alone are valued at close to \$3,000,000; all the other reserves under the town of Pottsville, which are said to be the deepest in existence, fully a mile below the surface, and with not one chance in 10,000 of ever being utilized, are assessed at \$40 per acre, as against \$10 heretofore. Shenandoah and other town's reserves run up to \$75 an acre. The general levy on available coal lands varies from \$750 to \$800 an acre.

Daniel Shepp, of Tamaqua, according to the Silver Brook correspondent of the Hazleton "Plain Speaker," has a force of men proving for coal on his land near Lofty. A shaft has been sunk 35 ft. by double shifts. The work is in charge of Abraham Focht, of Philadelphia, who a few years ago proved valuable veins of coal between Silver Brook and Lofty, and afterward leased his tract to the Philadelphia & Reading Coal and Iron Company, who re-leased to the Silver Brook Coal Company, one year ago, on condition that the necessary improvements would be made. This tract lies east of the Shepp tract, and bids fair to be one of the most productive coal fields in Schuylkill County.

Pennsylvania Railroad Company.—An engineer corps of this company has begun a topographical survey of some 4,000 or 5,000 acres of coal lands in Sewickley and South Huntingdon townships, Westmoreland County, lying along both sides of the Big Sewickley Creek. The coal was recently purchased by Eastern capitalists and is the Pittsburg seam of gas coal. The territory extends from Millgrove to Port Royal.

Sterrick Creek Coal Company.—The workmen employed at this company's Peckville shaft near the Delaware & Hudson station in Winton borough, expect to find within a few days the vein of coal for which they have been sinking for the past four months. According to calculations there are, says the Olyphant "Gazette," about 10 ft. of rock yet to go through before the vein can be reached. It will require two months more labor on the breaker before it will be ready to prepare coal for market. In the meantime openings will be made in the Grassy Island vein, which was partially worked heretofore, and also in Clark vein to which the shaft is being sunk, so that when the breaker is completed it may be worked to its full capacity of 1,800 tons per day. The coal which is to be worked for the next two months from both veins is to be stored in Grassy Island. The entire depth of the shaft when completed will be 245 ft.

SOUTH DAKOTA.

(From our Special Correspondent.)

Capital is being invested in Black Hills mines as never before. Since the building of our large reduction works here in Deadwood, and the successful operation of the same for a period of two years, it has increased the confidence of the investor as well as the owner of the properties, especially the owners of mines in the Bald Mountain and Ruby Basin districts, whose ores are refractory. These are about eight miles from this city. Bald Mountain proper is 6,500 ft. above sea level, and is underlain by what is called a blanket vein of gold and silver bearing ore, gold predominating. During the past 90 days Thomas H. White, the well known mining engineer of this city, has been making large purchases for a party of capitalists in Montreal, Canada. Among the properties bought by him are the group of mines known as the Horseshoe and Golden Sands.

The first-named group contains 35 claims or about 300 acres of ground. Since the purchase of this property, Mr. White has erected one of the finest hoisting works, outside of the Homestake and Old Abe, now on the hills. He has sunk a shaft to the depth of 85 ft., and has let a contract for 50 ft. more. He expects to strike the ore body at a depth of from 250 to 300 ft. This ore body is the same as that of the Welcome Mining Company, that is so well known and is said to average \$25.00 per ton in gold.

It is 7 ft. thick and 70 ft. wide. The Golden Sands group consists of 5 full claims, or about 55 acres of ground, and adjoins the well-known Portland and Trojan properties. The total cost of the above properties is \$200,000. As soon as the ore body is struck, it is the intention to build a chlorination plant of 100 tons capacity. Mr. White assures me that the properties already purchased by him for his company are only the beginnings of investments to be made.

A large sale made by Ernest May and others, a few weeks since, consisted of the controlling interest

in the Harmony, Double Standard and Tornado groups; containing about ten full claims in all. These were sold to Harris Franklin, of this city, and some Chicago parties who some months since invested large sums in other property in the same locality, and have found their investments such as to warrant the last purchase. The price paid Mr. May and others was \$150,000. Mr. Franklin says that it is intended to erect a smelter of 250 tons capacity in the near future.

In the Ruby Basin District, about one mile east of Bald Mountain, there is a large deal now made whereby the Deadwood & Delaware Smelting Co., of this City, becomes the owners of the controlling interests in the Ross Hannibal and the Mikado & Carthage property, comprising about 100 acres of ground. The sale was made through Dr. Carpenter, of the Deadwood & Delaware Co. The amount paid for these properties was \$150,000.

In addition to this purchase, Dr. Carpenter has bought for his company the Oro Fino, in Strawberry Gulch, 5 miles east of Deadwood, and the Calumet adjoining the Ross Hannibal in Ruby Basin. The price paid for the latter was \$30,000. The ores of the properties mentioned, with the exception of the Oro Fino, assays from \$25.00 to \$35.00 in gold and silver per ton. While in conversation with Dr. Carpenter to-day, he said: "My intention is to at once order another stack for our smelter, which will be a roasting furnace of the Omaha & Grant pattern, 17 x 72 ft. Blast furnace 42 x 120 in. This will increase the charge used to 300 tons every 24 hours."

He said that he would also build an addition to the present building of 48 x 60 ft. Dr. Carpenter leaves for the East, where he will order the furnace.

A new discovery of a large ledge of ore has been made about eight miles east of Deadwood. The ore is said to carry from \$9 to \$12 in gold per ton and is free milling. The ledge is said to be 50 ft. in width and protrudes out of the ground for 100 ft. or more in height. Samples taken from all parts of this immense ore body by pan test give the results above quoted. If reports are true this is one of the largest and richest veins ever discovered in the Black Hills. The owners and discoverers of the property are R. W. Cooper, James Sutherland and E. R. Collins, all of this city.

The belt mines, namely, the Homestake, Highland, Deadwood-Terra and Caledonia are still turning out their usual amounts of bullion and will continue to for some time to come. The last-named company has lately opened up a large ledge of ore that is increasing its output of bullion.

The Seabury Calkins Mining Company, whose property adjoins the Iron Hill, is now under the able management of R. M. Maloney, who is bringing the property to the front. He has, since he took charge of the mine, opened up some fine ore bodies on the 60 and 100-ft. levels; he is also taking out enough ore to keep up running expenses. Besides, he is pumping out the mine in order to open up the lower levels, which have been under water for the last two or three years. He is now shipping ore to the D. & D. smelter that is running from \$35 to \$40 in gold and from 5 to 7 oz. in silver to the ton.

The Iron Hill Mining Company has been shipping ore for some time to the smelter in this city, and will probably continue to until the railroad is completed to the mines of the company, when it is the intention of President Cooper to blow in the company's smelter and work their own ore.

Pennington County.

Harney Peak Tin Mining, Milling and Manufacturing Company.—The mill will start just before election, it is said, but when it will shut down again is not stated, although it may be soon after election. In other words, according to numerous exchanges, this starting up is for political purposes only.

UTAH.

Juab County.

Bullion-Beech and Champion vs. Eureka Hill Mining Company.—This mining company has filed a suit against the Eureka Hill Mining Company, demanding judgment in the sum of \$25,300. In its complaint the defendant states that it is the owner of lot 76 in the Tintic mining district known as the Bullion lode, and that within the past three years the defendant has entered upon its property beneath the surface and has extracted therefrom ore to the value of the amount of damages claimed.

Deseret.—The miners recently broke into a deposit of ore, which Superintendent Tate says will go not less than \$50 per ton.

Salt Lake County.

Old Jordan Mining Company.—Frank Hoffman and Henry Denhalter, two of the proprietors of the Highland mine, filed suit against the Old Jordan & Galena Mining Company and L. E. Holden for the recovery of the sum of \$50,000 damages for the following reasons: The plaintiffs state that they and L. E. Holden are owners of the Highland lode and other claims on the West Mountain mining district, and are operating these claims as the Highland Mining Company; that the defendant mining company, of which L. E. Holden is the president, owns claims adjoining the Highland Mining Company's claims, and that on September 1st, 1891, the defendant entered upon the property of the plaintiffs, and has from date named up to present time taken therefrom ore to the value of \$50,000, for which judgment is demanded as stated. The court is also asked to enjoin the defendants from working the claims or from extracting and

selling ore therefrom until a final decision in this suit is reached.

WASHINGTON.

Slocan.

Ruby Silver.—The sale of the Ruby Silver Mine has been closed, the consideration being \$25,000. The purchasers of the property are W. F. Russell, Charles Russell and C. S. Knapp, all of Spokane. Since the sale of the Ruby Silver the extension of this property has been sold to Spokane parties and the entire group will be developed.

FOREIGN MINING NEWS.

AUSTRALIA.

Gold.

(From our Special Correspondent.)

The feature of the month (September) in Australian mining circles has been the revival or "boom" in the Bendigo mines. The gold yield from the 1st January to the 31st July this year was 112,500 oz. The dividends amounted to £139,700 3s. 6d., and the calls to £81,223 9s. 6d., the dividends exceeding the calls by £58,476 14s. For the month of July the yield was 20,624 oz., the largest yield for any one month since December, 1884, when special efforts were made. The various mines totaled 23,246 oz. The yield this year was from Bendigo city and Eaglehawk borough only, the returns from outside mines at Marong-Kangaroo flat, Huntly and other suburbs included in the shires not having been made up. The gold is nearly all extracted from quartz, only a few puddling machines being left of the hundreds that were once working here on placer ground.

In several districts of New South Wales there has been more activity in the gold mining industry than was to be observed a few months ago, and a general revival is anticipated. McEvoy's mine, at Eldorado, near Albury, which ceased working 13 years ago, after having yielded 60,000 oz. of gold has been reopened, and a payable gutter, 500 ft. across and from 4 ft. to 7 ft. thick, struck. The prospecting drive passed through heavy stream tin, which is also said to be payable. At Braidwood (one of the old diggings) several fresh finds have been made. The Bell's Creek Company crushed 18½ tons of quartz, yielding 34 oz. of gold, and the Captain's Flat mines are yielding steadily.

In Queensland gold mining is brisk. The Day Dawn and Wyndham Charters Towers' for the six months under July 31st crushed 15,842 tons of stone for 22,542 oz. gold, worth £78,975 yielding dividends amounting to £59,065. Since 1887, the report says, 97,822 tons of stone have yielded 107,338 oz. of gold. The Victoria, on the same field, crushed 260 tons for the fortnight for 1,260 oz. of gold; the Brilliant Block 248 tons for 123 oz.; Clarke's Brilliant 94 tons for 248 oz., and Mosmay's Rainbow, 300 tons for 619 oz., and other mines have yielded various amounts. At Gympie the No. 1 North Phoenix keeps steadily on. For some six years past this mine has crushed 1,800 tons of stone per month with only a break once a year for cleaning, while the yield has varied from 1,200 oz. to 2,000 oz. per month. Now No. 2 has come into the gold yielding class, a crushing of 86 tons, having yielded 130 oz. gold. In addition to these good reports from the old gold-yielding colonies, a report has come to hand that gold has been found at Alice Springs in South Australia. Alice Springs is almost in the center of the Island Continent, and such a report must be received with some caution.

BRITISH COLUMBIA.

A promising discovery was recently made by Joseph Bourgois in the Kootenai region. The claim is situated on the north side of St. Mary's River, opposite Fort Steele, about twenty miles from the latter by the present trail and about nine miles from the Kootenai River. The vein runs across the face of the hill, and can be traced distinctly for some thousands of feet by strong iron surface indications and heavy masses of float galena. The work so far done consists of an open cut run across the indications. Immediately under the surface dirt a body of carbonates about 8 ft. in width was uncovered, and on crossing it the body of solid ore was struck. This was stripped for a further distance of 23 ft. without meeting with the hanging wall, which is supposed to be yet several feet distant, and a mass of steel galena, perfectly solid and entirely unmixed with quartz, was exposed. The discoverers then sunk a shaft on the lower side of the mineral, a distance of 8 to 10 ft., the lode being found solid and compact as on the top. The sides and top of the mineral body were found to be very heavily charged with carbonates and large masses of galena, so much so that making the open cut mineral to the extent of about 100 tons has been removed, and the dump itself is composed almost entirely of valuable carbonates. The two discoverers worked only eighteen days; yet in that time they have taken out a large amount of ore and have exposed in their cut a body of mineral, aggregating by careful measurement, about 300 tons.

Mr. Bourgois came to Golden last month with a number of specimens of ore picked from various parts of the lead, from which several assays for silver were made, the average result from which ran to over 40 oz. per ton.

(From our Special Correspondent.)

The Texada Gold and Silver Mining Company.—The company holds four claims and acreage property on Texada Island, has given a bonded lease to American capitalists. The amount involved in the

transaction is reported at between a quarter and half a million of dollars. Details of the transaction are not yet at hand.

CANADA.

Province of Quebec.

The steam schooner "Diver" passed Pointe aux Esquimaux October 20th on her way up to Quebec. She left Quebec about three weeks ago for Natashquan with three English engineers, who were sent to examine a deposit of magnetic sand. They had 150 tons of this sand put up in bags to be shipped to Europe this fall.

GERMANY.

The Heinitz colliery, in the Saar district, is burning. A late cable dispatch states that five miners have perished in the flames.

MEXICO.

The Mexican Portland Cement Works, it is expected, will be running soon. They are situated about half way between El Salto and Tula, on the Mexican Central Railway. The capacity of the works is sufficient to produce 120 tons of cement per week. All the material required in the composition of the cement is close to the establishment, and fuel is the only article which will have to be brought from a distance; for the moment coal has been contracted for in the United States.

Chihuahua.

New Almaden Quicksilver Mining Company.—This company has been incorporated in San Francisco. Directors: W. A. Keeler, John C. Quinn, Chris Dunker and James A. Downing. This mine was examined and unfavorably reported upon by a well known expert.

Santa Eulalia Mining Company.—The El Paso Public Ore Sampling Company received recently 1,000 tons of ore, according to the "Two Republics," from the Santa Eulalia Mines, situated 14 miles east of the city of Chihuahua, Mexico.

Coahuila.

There is almost a coal famine in Northern Mexico, owing to the tremendous demand occasioned by railroad extensions and developing smelting and manufacturing industries. The mines are increasing their forces, but are unable to supply the demand.

Jalisco.

(From our Special Correspondent.)

El Leopoldo Gold and Silver Mining Co.—This company has purchased the El Bagre mine, situated about 30 miles from Tepe, on the west side of the Arroyo Chiristlan, a tributary of the Santiago River. The mine is an old Spanish property. Some of the upper levels have been worked when Mexico was dominated by Spain. The ore runs from \$50 upward in gold and silver, and in some instances assays have run very high. The property has been opened to a depth of 700 ft. by means of tunnels, and recently a 90-ft. shaft was sunk. All the water power necessary is at hand, and modern machinery will at once be put in. We are informed by experts who have examined this property that it was worthless at the time of their examination in 1889.

Michoacan.

Pittsburg and Michoacan Mining and Milling Company.—This company, organized in Pittsburg, but with many of its stockholders residents of Michigan and Wisconsin, has secured a concession 32 kilometers by 23 kilometers of placer ground on the Ostula River, in the district of Guacoaman. These placers, which have been investigated by Messrs. W. F. Miller, of Pittsburg, and Geo. Maxwell, of Wisconsin, in a four-month examination, are said to average 45c. a cubic yard after eliminating the richer portions. The water supply is said to be ample, the river falling over 2,000 ft. Water will be taken some five to ten miles above the ground to be worked and will then then have sufficient force to hydraulic the gravel.

There are said to be excellent opportunities for dumping purposes, the tailings being discharged into the Ostula River. The gravel is said to be several hundred feet in thickness in many places. Veins of gold, copper and iron are known to exist upon the property. A hydraulic plant will be shipped from San Francisco to the coast of Michoacan, on which the property fronts. The company is capitalized at \$2,500,000, in shares of \$5. Mr. B. F. Bivins, formerly of San Francisco, secured the property for the company.

Sonora.

Creston Mining Company.—Mr. Howell Hines, of Minas Prietas, manager for Chamberlain & Price, of the Creston mines, has been in El Paso for several days. While there he purchased a large compressor plant, with drills, from Fraser & Chalmers, of Chicago. It is his intention to sink his main shaft to a much greater depth and also to utilize the drills in the exploitation of the property under his charge. His company has also decided to largely increase their facilities and also adopt the cyanide process in the treatment of their tailings of which they have about 60,000 tons.

Zacatecas.

It is announced that the famous Cedros hacienda, embracing 1,200,000 acres, has been sold to a syndi-

cate for \$5,000,000. The new owners will develop the mines on the property.

NOVA SCOTIA.

Nova Scotia Gold Mines, Limited.—During September the tons crushed amounted to 170, yielding 280 oz. of smelted gold. Mill owing to repairs to mine only ran half time. The bottom of mine 238 ft. from old deck has been leveled east and west of No. 4 shaft and rails will be laid in a few days, when drifts will be started on course of quartz vein, while cross-cuts will be made north and south to intersect the other leads. Increase of sulphides is found with greater depth, more especially those of copper and lead. Attention has been given to the amalgamation of free gold, and several alterations have been made which answer well in reducing loss to a minimum. Experiments with the old tailings have been carried out by means of a straight throw Australian percussion table having a 1/2-in. stroke and 260 throws per minute. Quicksilver and amalgam have been recovered, besides a concentration of the sulphides; 15 cwt. of concentrates and 1 ton of tailings have been sent to England for trial. An assay laboratory has been built and fitted up where value of ore, etc., will be carefully followed.

SALVADOR.

San Sebastian Gold Mining Company.—This company's property will be offered for sale at public auction on the 31st inst., the bondholders having determined on such a course. The company executed its mortgage on July 2d, 1888, to the Atlantic Trust Company of New York, as trustee, and according to the terms and stipulations, expressed in the mortgage and bonds issued thereunder, the entire sum of bonds and interest thereon from July 2, 1888, became due and payable to Atlantic Trust Company as trustee for all the holders of bonds. The Trust Company has foreclosed the mortgage and will cause to be sold on the date given above all that tract of land and the gold mine therein situate known as the San Sebastian Gold Mine, and the farm adjacent thereto, together with all the buildings, machinery, tools, etc., under the jurisdiction of the city of Santa Rosa, department of La Union. The mine comprises three "pertenencias" of 400 meters in length and 200 meters in width, each; the first measurement made horizontally on the line of the vein, and the second measurement made on its pitch; the farm consists of four "caballerias of land," say 180 hectares. The mining property and farm were sold and conveyed to the San Sebastian Gold Mining Company by Gen. Lisandro Letona, by deed of conveyance dated July 9, 1886. The terms will be made known at the time of sale.

SPAIN.

The semi-annual dividend of the English-owned Rio Tinto Copper Company of Spain, payable this month, is 7s. per share, 3 1/2% against 8s. in April, 12s. in October, 1891, and 15s. in October, 1890. This month's payment is at the rate of 7% per annum, against 10% paid last year and 16 1/2% the year before that. For the last nine years the company has paid an average of 10 1/2% per annum, the smallest payment in any one year having been 3% in 1886-87, the largest 17% in 1888-89. The directors report that the deliveries of pyrites in the United Kingdom, Germany and the United States promise to attain 430,000 tons, which is practically the same as the deliveries of last year. The present contract under which pyrite sales are made to German buyers expires this year, and a contract has been made to supply them for a further period of three years. The pyrites contracts for England for 1894, 1895 and 1896 are in process of settlement. The contracts with buyers in the United States are working satisfactorily. The company has joined the combination between European and American copper producers, which has for its object the regulation of the supply of copper. The arrangement took effect July 1st, and it confidently is expected that the desired result will be obtained.

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 430 and 432.]

NEW YORK, Friday Evening, Oct. 28.

During the past week the mining market has shown that dullness and depression which we have grown accustomed to look for. The lack of interest in mining shares seems to increase daily. After the momentary semi-activity of the early part of this month trading has settled down again to a small and unimportant business.

The Comstocks were quiet during the week and, generally speaking, show a decline in prices. Consolidated California & Virginia has dropped to \$3; total sales for the week, 260 shares. Of Gould & Curry there was a solitary transaction of 100 shares at \$1.20, and another of Hale & Norcross at \$1.85. Sierra Nevada shows a sale of 100 shares at \$1.25. Yellow Jacket this week was very quiet, only 200 shares being sold at \$1.20@1.40. Of Comstock Tunnel stock 1,200 shares were sold at 11@12c.; of the bonds, sales amounted to 3,000 at 17. Other sales were 100 shares of Potosi at \$1.20, and 100 shares of Union Consolidated at \$1.25.

Of the California stocks Bodie Consolidated shows sales of 300 shares at 30c., and Plymouth Consolidated of 200 shares at 90c. There was a single transaction of 100 shares of Standard Consolidated at \$1.30. According to the official sales lists of the Consolidated Stock and Petroleum Exchange transactions in Brunswick Consolidated this week aggregated 1,800 shares at 7@12c.; in our mining news column will be found the latest weekly letter from the superintendent of this company.

The Colorado stocks continue quiet. During the week there were sales of 200 shares of Breece at 40c.; 300 shares of Chrysolite at 15@16c.; 300 shares of Leadville Consolidated at 17@19c.; 100 shares of Robinson Consolidated at 35c.; 400 shares of Silver Cord at 35c., and 250 shares of Lacrosse at 4@5c.

The Tuscaroras were neglected. There were sales of only 500 shares of Belle Isle at 19c.

Horn Silver was quiet this week; only 200 shares were sold at \$3.00. At this company's property connection has been made in the 7th level between the drift and the new shaft (No. 5). In the northern part of this drift there is a breast of ore 75 ft. wide. Alice shows a sale of 100 shares at 65c.

Phoenix of Arizona was the most active stock in the list this week; 3,000 shares were sold at 51@55c.

There was one sale of 100 shares of El Cristo at 35c. Judgment has been entered against the El Cristo Gold and Silver Mining Company by D. Stewart for \$4,079.69. This judgment was entered on October 22d. Mr. A. Harpending, when spoken to concerning this matter, stated that it had been deemed advisable to take this course, but that it has not interfered seriously with any plans of the company.

The property of the San Sebastian Gold Mining Company will be offered for sale at public auction next Monday. We call the attention of the Committee on Mining Securities of the Consolidated Stock & Petroleum Exchange to this matter. Full details will be found in our mining news column.

Boston.

Oct. 28.

(From our Special Correspondent.)

The occurrence of two holidays the past week tended to restrict operations in copper stocks, and we note a greater disposition to sell, many believing that the recent advance was not wholly warranted by the situation and future outlook. As a result, prices have declined throughout the list, the Montana stocks leading, and the others following suit to a greater or less extent. Boston & Montana, after selling at \$36, dropped to \$33. The short interest in this stock has apparently been covered, and this support being withdrawn, the price falls from its own weight.

Butte & Boston has shown a little more firmness, but buyers are not numerous, and if any considerable amount of stock should be put upon the market it would probably go much lower. Sales early in the week were at \$9 1/2, but later it sold at \$9 1/4.

Calumet & Hecla declined from \$2.94@2.89 with later sales at \$2.90; only small lots were sold and they were taken for investment.

Tamarack declined from \$1.60@1.57, with rather more activity than usual.

Osceola advanced to \$35 1/4, but lost the advance and sold at \$31 1/2, with latest sale at \$34 1/4.

Centennial showed considerable weakness. The conflicting reports from the mine does not inspire much confidence in its future. The stock after selling in a small way at \$9 1/4 declined to \$7 1/2 on sales of about 400 shares, and was heavy at the close.

Franklin was only dealt in moderately, but price was steady, selling at \$14, a loss of one-quarter only.

Kearsage was neglected, only a small lot being sold at \$11, a decline of three quarters.

Atlantic sold at \$11 for 50 shares, the only sale for the week.

Tamarack, Jr., advanced from \$19 to \$21 1/2, reacting to \$20.

Wolverine declined from \$2 to \$1 1/4.

Allouez, after selling at 1 1/4, declined to \$1, and Arnold lost 1/4, selling at \$1 1/4.

Santa Fe is in fair demand at 10c. per share.

Napa Quicksilver is firm at \$5 1/4@5 1/2, again of 1/2. 3 p. m.—Owing to the sudden death of Ralph Abl on the floor of the Exchange, the board adjourned at 1:25 p. m., and no further business was transacted.

San Francisco.

Oct. 21.

(From our Special Correspondent.)

The mining stock market has been rather hadly demoralized this week by large lots of marginal stocks being thrown on the market. Prices have consequently dropped back to where they started from. Information is being kept back, also, regarding important work being done in the mines, the stock of which has been leading the market during the past few weeks. Insiders are clearing up preparatory, in all probability, for a new deal, albeit it is not likely that anything very startling will take place now during the remainder of the year. Certain it is that the inside contingent did not clear up much on the recent deal. Chippers, and other small fry about Pine street, jumped in and out on a small margin of rise or fall and some large holders let go their stock at top prices, and the insiders had to take them up or else let the market break. This, of course, has been unsatisfactory to them and as money is needed—money for assessments and also money to make things run smoothly in Nevada next month at the elections where things are rather mixed up at present—it is within the bounds of possibility that a spurt

may be made in prices and another attempt made to force stocks on substantial holders.

When the bond of the Hale & Norcross defendants is filed, pending an appeal to the Supreme Court, that stock might very easily advance 200%, and even then be a good buy, for in Hale & Norcross, Consolidated California & Virginia and Belcher, not to mention others, the ruling powers can put their hands on an ore body at any moment and send these stocks booming. What will be done, however, it would be unsafe to say; the unexpected always happens.

The Stock Exchange adjourned yesterday (Thursday) and will not reopen until Monday next at the usual hour. It seems reasonably certain that there will be a reaction, however small it may be, from the values of this week. The North End Comstocks have suffered the most. A week ago Consolidated California & Virginia ruled at \$4.05, but since the annual meeting, when that notable protest was filed, the price has steadily declined until yesterday the stock sold for \$3.00, with \$2.00 bid at the close. Mexican sold down to \$1.35; Ophir to \$2.50, and Union Consolidated to \$1.30. The heaviest sales of these stocks have taken place in the Pacific Board, the bonanza stock selling at the reduced value.

In the middle group of Comstocks Hale & Norcross has not been at all active, although it is the most interesting stock, and the one of the greatest possibilities, in the group. Last week it sold on Friday for \$2.10, but yesterday had dribbled down to \$1.53 with little trading. Best & Belcher sold for \$1.60; Chollar, for 75c.; Gould & Curry, for \$1.05; Potosi, or \$1.00, and Savage, for 85c.

Of the South End and Gold Hill stocks, Belcher, while still leading, has proved rather an exciting stock to deal in. The reports from the mine that when they are not overborne by water they are in porphyry and quartz of no value has been given currency by the daily papers, and has sufficed to serve the purpose of the "ring" in depressing the value of the stock. A week ago Belcher sold for \$3.95, but during the current week, with the cry of the prophets of evil in their ears, buyers have been shy and the price has slid down until on early call Wednesday the ruling rate was only \$3.05. Later in the day a block of nearly 3,000 shares was thrown on the market and a further decline took place to \$2.80, and at the close yesterday it was quoted at \$2.65 asked. For this decline there has been no reason whatever, the prospect in the mine having been deliberately misrepresented. Bullion sold for 60c.; Caledonia for 20c.; Challenge for 70c.; Imperial for 5c.; Confidence for \$1.90; Crown Point for \$1.35. Exchequer for 20c.; Kentucky for 10c.; Overman for 50c., and Yellow Jacket for \$1.20. All all these prices show a very decided decline during the week in sympathy with the leaders.

Little trading has taken place in the outsiders, but small sales of the Quijotoa stocks. Peer, at 75c., and Peerless, at 10c., were quoted.

Of the Tuscarora stocks, Belle Isle sold for 10c.; Navajo, for 15c.; Nevada Queen for 10c., and North Belle Isle for 15c.

Of the Bodies, Bulwer Con. ruled at 30c.; Bodie Con., at 30c., and Mono, at 25c., with sales very light.

SAN FRANCISCO, Oct. 28.—(By Telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$1.50; Bodie, 25c.; Belle Isle, 5c.; Bulwer, 25c.; Chollar, 75c.; Consolidated California & Virginia, \$2.95; Eureka Consolidated, \$2; Gould & Curry, \$1; Hale & Norcross, \$1.35; Mexican, \$1.25; Mono, 25c.; North Belle Isle, 15c.; Navajo, 10c.; Ophir, \$2.45; Savage, 80c.; Sierra Nevada, \$1.30; Union Consolidated, \$1.15; Yellow Jacket, \$1.15.

MEETINGS.

Colorado Coal and Iron Company, at the office of the company, No. 45 Wallstreet, New York, November 14th at 3 P. M.

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'ng't in office.	Day of sale.	Amt per share.
Atlas, S. Dak.	6	Sept. 26	Oct. 31	Nov. 21	.01
Bullion, Nev.	40	Oct. 20	Nov. 24	Dec. 14	.25
Brunswick Con., Cal	4	Sept. 29	Oct. 31	Nov. 17	.02
C'm'n'we'lth Con., Nev.	9	Sept. 7	Oct. 13	Nov. 9	.10
Con. St. Gothard, Cal.	6	Oct. 13	Nov. 17	Dec. 7	.05
Crown Point, Nev.	58	Sept. 15	Oct. 20	Nov. 10	.25
Dalton, U. ah.	3	Oct. 7	Nov. 3	Nov. 29	.01
Derbec BlueGravel, Cal.	10	Sept. 14	Oct. 17	Nov. 7	.10
Eureka Con. D., Cal	5	Sept. 19	Oct. 24	Nov. 14	.07
Golden Fleecs, Cal.	18	Oct. 10	Nov. 16	Dec. 7	.800
Jack Rabbit, Cal.	1	Sept. 17	Oct. 19	Nov. 8	.05
Justice, Nev.	52	Oct. 14	Nov. 18	Dec. 8	.15
Kentuck Con.	5	Oct. 5	Nov. 2	Nov. 29	.10
Mexican, Nev.	46	Oct. 13	Nov. 17	Dec. 7	.25
North Belle Isle, Nev.	2	Sept. 11	Oct. 24	Nov. 17	.10
Northwestern, B. C.	5	Aug. 27	Oct. 24	Nov. 19	.20
Overman, Nev.	65	Oct. 5	Nov. 10	Nov. 30	.30
Savage, Nev.	79	Oct. 7	Nov. 9	Nov. 29	.50
Silver King, Ariz.	8	Aug. 6	Oct. 7	Nov. 4	.25
Tierakoff, Cal.	9	Oct. 11	Nov. 11	Dec. 20	.02
Yellow Jacket, Nev.	52	Sept. 5	Oct. 7	Nov. 10	.25

DIVIDENDS.

Cook's Peak Mining Company, dividend No. 8, of five cents per share, \$5,000, payable November 5th at the office of the company, Bank Building, Colorado

Springs, Colo. Transfer book will close November 5th and reopen November 11th.

Enterprise Mining Company, dividend No. 9, of ten cents per share; \$50,000, payable November 5th at the office of the company, 33 Wall street, New York. Transfer books close November 1st and reopen November 7th.

METAL MARKET.

NEW YORK, Friday Evening, Oct. 28, 1892.
Prices of Silver Per Ounce Troy.

Oct.	Sterling Exch'ge.	London.	N. Y. Cents.	Value of sil. in \$.	Oct.	Sterling Exch'ge.	London.	N. Y. Cents.	Value of sil. in \$.
22	1.85 1/2	39 7/8	86	.660	26	1.85 1/4	39 1/4	85 3/4	.653
24	1.85 1/2	39 7/8	86 1/4	.661	27	1.85 1/4	39 1/4	84 3/4	.649
25	1.85 1/2	39 7/8	85 3/4	.661	28	1.85 1/4	39 1/4	84 3/8	.649

Silver has not maintained its advance owing to the much larger percentage of awards by the India Council on Wednesday, and also to the large purchase by our government on the same day and completion of this month's quota. Market closes quiet at the decline.

There were sold during the week ending Friday, October 28th, 332,000 ounces in silver bullion certificates, at from 85 1/2 to 86 3/4 cents per ounce.

Government Silver Purchases.

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

October 24th, 313,000 oz. at 86 1/2 to 86 5/8.

October 26th, 840,000 oz. at 85c. to 85 1/8c.

The department having purchased the amount required by law for the current month, no further offers will be considered until Wednesday, November, 2d.

Gold and Silver Exports and Imports at New York for Week Ending October 22d, 1892, and for Years from January 1st, 1892, 1891.

Week.	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1892...	\$257,220	\$254,530	\$292,775	\$191,268	\$104,207
1891...	59,043,273	7,285,981	17,231,519	2,322,079	66,686,822
1891...	75,369,944	21,997,542	15,388,178	1,805,898	66,951,662

During the week ending October 29th, the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$25,397; silver, \$250,954. Imports, gold, \$224,868; silver, \$102,834. As usual of late the greater part of the silver exported was foreign, principally Mexican coin, and it went to England.

NOTES OF THE WEEK.

A short time ago it was noted in our columns that the amount of silver held by the Mercantile Safe Deposit Company was rapidly diminishing. Since then, the amount has increased owing to the increased price of silver bullion. Silver is deposited and has been since the passage of the Sherman Bill of 1890 in this institution for purposes purely and entirely speculative. The practical result of this speculation has been great and unnecessary fluctuation in the value of silver, which in turn has compelled the Treasury Department to at times buy silver at much more than its true market value.

According to a late London dispatch the Rothschilds have succeeded in securing gold to the amount of \$7,500,000 for exportation to Russia without calling upon the Bank of England. The same dispatch states that a strong demand for gold still exists. Austria has not yet completed the purchases of gold required to carry out her currency reform, but it is probable that this gold will now be obtained either from England or France, the present rate of exchange rendering the shipment of gold from this country unprofitable.

It has been feared that the wants of Russia and Austria, coupled with the unwillingness of English and French bankers to part with their gold, would cause a still further outward movement of the yellow metal, but owing to shipments of cotton and wheat the danger is believed to be over for some time to come. In regard to the silver conference, it is now stated that Mr. E. O. Leech, the able Director of the United States Mint, will attend conference as its statistician.

Regarding the progress of bimetalism in the manufacturing districts of England, a recent dispatch from Manchester is of importance. It states that the Mayor called a public meeting of the citizens at which a memorial was drawn up, urging the government to co-operate in an international agreement to secure bimetalism. The petition states that business with the Orient and Mexico is seriously affected owing to fluctuations in the exchange value of silver.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars	\$.66 3/4	\$.67 1/4
Peruvian soles and Chilean pesos	.61	.63
Victoria sovereigns	4.85	4.90
Twenty francs	3.86	3.90
Pwenty marks	1.74	1.78
Spanish 25 pesetas	4.78	4.81

Copper.—Not much business has been doing but prices are pretty well sustained and the small contracts closed during the present week for Lake were concluded at from 11.75@11.85. The large companies are entirely out of the market, and evidently consumers have bought pretty heavily of late and can go on without coming into the market for some time. Casting copper is obtainable at from 10 1/2@10 3/4, according to brand and quality. The quotation for Arizona pig copper, 96%, remains at 10 1/4. On the whole we hear that consumers are rather busy, and that the consumption of the metal is very large. The exports of fine copper during the past few weeks have been somewhat heavier than during the preceding month, but they are still comparatively light.

In Europe values have been fairly well sustained, and although prices gave way somewhat in the early part of the week they have recovered and close now at almost the best, spot at £45 15s. and three months at £46 5s. Manufacturers are still hesitating to lay in heavy stocks at the higher prices asked and business there has also been light. For manufactured sorts we quote: English tough, £49. @ £49 5s.; best selected, £50 5s. @ £50 15s.; strong sheets, £57 10s. @ £58 10s.; India sheets, £52 @ £53; yellow metal, 5d.

Messrs. James Lewis & Son, of Liverpool, in their circular of the 17th instant report as follows: The statistics show an extraordinary reduction in the English home consumption of copper, 15,839 tons, or over 30%, during the nine months ending the 30th September last. While a portion of this is probably due to the dullness of trade generally, to diminished shipbuilding and export of machinery, a considerable portion is due to the greatly diminished manufacture of sulphate of copper, while a further portion may be accounted for by the small stocks of copper held by consumers, manufacturers and smelters.

It is rather astonishing that the deliveries should show such a large falling off, but we believe that a good deal of the trade formerly done in England has been transferred to the Continent.

Tin is obtainable here below the European parity, and with heavy arrivals prices have declined from 20.80@20.65, large transactions taking place, and over 600 tons changing hands during the week. The market in London showed a declining tendency, prices being about £1 lower than last week, but each decline brought out buyers for round quantities. The closing prices are £94 2s. 6d. for spot and £94 12s. 6d. for three months.

Lead is still in a very unsatisfactory condition and prices are slightly easier. We have to quote 3.95@4c. New York, the bulk of the business being done at the former. Abroad there is also a slight decline and Spanish lead is quoted at £10 5s. and English lead at £10 7s. 6d.

Chicago Lead Market.—The Post, Boynton Strong Company telegraph us as follows: "The market has been lifeless during the past week. Offerings have been light, but as there is no inquiry, values show no improvement. The close is very quiet at 3.75c. to 3.71 1/2c.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: "Lead is slowly declining; the last sales were at 3.70c. The metal seems to have few friends, even at the decline."

Spelter is quiet but firm. Very little is offered, but the demand is also not brisk, the ruling price being 4.45 New York. From the mining district a firmer tendency for ores is reported, but so far this has not reacted on the metal itself. In London, good ordinaries are quoted at £19 and specials at £19 2s. 6d.

Antimony is very firm and somewhat higher, Cookson's being held for 12c., L. X. for 11 1/2@11 3/4 and Hallett's for 10 1/2c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Oct. 28, 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, October 24th, 1891, and for the corresponding week ending October 22d, 1892. Also the total estimated production from January 1st of last 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 each year. The figures are in gross tons:

Pig Iron Production During Week Ending October 24th, 1891, and October 22d, 1892, and During Both Years to Date.

Fuel used.	Week ending—				From Jan. '91.	From Jan., '92.
	Oct. 24, '91.	Oct. 22, '92.	Tons.	Tons.		
Anthracite..	86	33,509	67	29,500	1,507,340	1,415,296
Coke.....	162	135,900	129	120,000	4,393,900	5,552,700
Charcoal....	59	12,900	40	9,200	453,027	433,523
Total.....	306	181,700	236	158,700	6,349,227	7,401,621

The pig iron market is still very quiet and uneventful, and no signs of any change are to be noted. The improvement in western Pennsylvania is well

sustained, but otherwise the market is very even and the supply is about equal to the demand. The stocks are decreasing but the production is also increasing, so that the balance will be fairly evenly preserved. The increase in consumption encourages producers to increase their output. The former state of the market has not had any effect on the prices and it is not likely to have for some time.

In this district the buyers cannot be induced to believe in a higher range of prices and consequently still adhere to their policy of restricting their purchases to immediate wants. They are right in this policy, for prices are not likely to go higher for many months to come. If stocks should go down very rapidly and production not keep pace, a panic might set in among buyers that might send prices up, but from all indications this is not likely to be the case, for the output of the furnaces is increasing with the increased demand and incipient diminution of stocks. The Southern iron men are holding out still for better prices and are marking up their rates for foundry and forge some 25c. This action on the part of Southern producers is having an additional strengthening effect on the market. Prices continue at \$15 for No. 1; \$14 for No. 2; \$13 @ \$13.50 for gray forge at tidewater.

Spiegeleisen and Ferromanganese.—As we expected last week, there has been quite an active trade in imported ferromanganese 80% quality. No large lots were sold, but a considerable number of transactions have taken place. In some cases the imported article has been sold in Western Pennsylvania in competition with domestic ferro. The price has averaged \$60.50. A sale of 300 tons spiegeleisen 20% quality is reported to have taken place at \$26.50. This is the only sale during the week.

Steel Rails.—There is nothing in the way of new business to report in the steel rail trade. With the exception of a small new order expected soon, there is nothing on the horizon and very soon the mills will be engaged on nothing but renewal orders. A meeting of the producers will take place next week, but nothing of importance is likely to come of it. Prices are still \$30 at mill and \$30.75 at tidewater.

Rail Fastenings.—No new orders are reported this week and nothing is being done except in the usual renewals. 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.—The various sorts of merchant iron and steel are having a fairly satisfactory sale at present although the lots are small. There is no variation in prices, which stand as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6 1/2 @ 7 1/2 c.; special grades, 13@18c.; crucible machinery steel, 4.75c.; crucible spring, 3.75c.; open hearth machinery, 2.25c.; open hearth spring, 2.50c.; tire steel, 2.25c.; toe calks, 2.25 @ 2.50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Iron and Steel.—There are no new orders of note to be recorded this week, but plenty of ordinary orders are coming to hand. The mills will be fully occupied for sometime to come and there is every prospect of a busy winter. The orders are not very evenly distributed in some branches of the industry; some mills report a plethora and are asking for higher prices while others are seeking for work. This is notably the case with plates. Taking it all round, the market for structural material is the best throughout the iron and steel trades. Prices in structural material vary a good deal, according as to whether the deliveries are to be quick or to be spread over the winter months. The following list shows a considerable latitude accordingly: 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. Oct. 23.
(Special Report by Rogers, Brown & Co.)

The interest of consumers of pig iron in this vicinity has at last been awakened. The inquiry has largely increased, though it is by no means as large as it would be if the real situation were understood. Further than this, buying seems to have begun in earnest, and some good sized sales have been consummated during the last few days. Southern iron has still further stiffened, being very firm at advanced prices. There have been some slight advances in Lake Superior coke irons, with indications of further advance. Lake Superior charcoal is in some instances held at 50 cents above prices quoted in our last bulletin. We quote for cash f. o. b. cars Buffalo. No. 1X Foundry Strong Coke Iron Lake Superior ore, \$15.25; No. 2X Foundry Strong Coke Iron Lake Superior ore, \$14.25; Ohio Strong Softener No. 1, \$15.25; Ohio Strong Softener No. 2, \$14.25; Jackson County Silvery No. 1, \$17.30; Jackson County Silvery No. 2, \$16.80; Lake Superior Charcoal, \$17; Tennessee Charcoal, \$17; Southern Soft No. 1, \$14.40; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

Chicago. Oct. 27.
(From our Special Correspondent.)

Not only the general public, but the business world, took profound interest in the dedicatory ceremonies and festivities attendant on the presentation by the National Commissioners of the Columbian Exposition Buildings at Jackson Park to the nation, and their acceptance by its chief executive. We

think it is not too much to say that the celebration just closed will have, as it should, a distinct effect for good upon business affairs. It has sharply reflected the greatness, prosperity and rapidity of the growth of these United States, and will doubtless lead to a better understanding and appreciation of the flourishing condition of the nation.

The characteristic features of the situation in the iron and steel market here are: Large volume of trade, heavy consumptive capacity, fairly remunerative prices. The car works, rolling mills, jobbing foundries and agricultural implement makers are all busy and taking large quantities of supplies of crude and finished material. Pig iron continues in good demand and some increase in strength is noticed in both coke and Lake Superior charcoal. It is now generally conceded by consumers that the low prices prevailing some weeks ago are no longer obtained. Manufactured products are also firmer, particularly structurals. Old material is looking up under the influence of improved inquiries.

Pig Iron.—The condition of the market is sounder and healthier than it has been for some time, and the elements of strength noted in our reports lately are well sustained, not only on Northern irons, but also on those of Southern make. The latter part of the past week was quiet on account of the dedication, but this week has seen the closing of a number of contracts for local coke iron, ranging from 200 to 1,200 or 1,500 tons, and the mail order and carload trade is also quite good. The steady enlargement of consumption in this vicinity is noteworthy, and it is known to be in excess of the production of local furnaces. The firmness in Lake Superior charcoal continues, and it would be difficult to obtain standard grades at less than \$17; some refuse orders for the high chilling numbers under \$17.25. Southern coke iron is in brisk inquiry from all sections tributary to this market for round lots of 1,000 tons and upward. Several agents report that sales of Southern iron during October have been larger than any previous month this year.

Quotations per gross ton f. o. b. Chicago, are: Lake Superior charcoal, \$16.55@17.00. Lake Superior coke, No. 1, \$14.25@14.75; No. 2, \$13.50@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$15.50; Lake Superior Scotch, \$15@15.50; American Scotch, \$16.50@17.00; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.25; No. 3, \$12.50; Southern coke soft, No. 1, \$13.25; No. 2, \$12.75; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

Steel Billets and Rods.—Billets are in fair demand and sales more frequent at \$24.50. Rods are in good inquiry at \$34.50.

Structural Iron and Steel.—The large contracts placed East have affected prices, and quotations here on small and large quantities for forward delivery are higher. Inquiry is brisk. Quotations, car lots f. o. b. Chicago, are as follows: Angles, \$2@2.10; tees, \$2.35@2.45; universal plates, \$1.95 @ \$2; sheared plates, \$1.95@2; beams and channels, \$2.35@2.50.

Plates.—Marine business is looming up and some large orders are in sight. Boiler shops are all busy and warehouse trade is active. The outlook is promising. Steel sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets \$4.00@4.15; boiler tubes, 2 1/4 in. and smaller, 60%; 7 in. and upward, 70%.

Merchant Steel.—A number of good sized contracts from 100 to 400 tons of soft steels were placed during the past week by the implement trade. Demand for merchant steel for early shipment continued quite good. 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 and Sheet Iron.—Stocks are low, standard sizes hard to get, and business would be active if material could be had from mills. Large lots are quoted at 70% off on Juniata and 70 and 10% off on charcoal, and jobbing quantities at 67 1/2% off on the former and 70% off on the latter.

Black sheet iron.—There is still a good demand for heavy and light gauges of black sheets and sheet steel, and quotations are unchanged at 2.85@2.95c. for No. 27 common. Soft steel sheets are 10c. higher. Dealers quote 3.10c. from stock.

Bar Iron.—Local mills now name 1.65c. rates, half extras as bottom. Miscellaneous consumers orders are fair for 100 to 200 ton lots. Demand for car iron is not active at present, but some car orders are looked for shortly. Outside mills quote 1.67@1.70c. Jobbing price is unchanged at 1.80 @1.90c. Rates and business good.

Nails.—Wire nails continue to lag, despite the advance in steel billets, and have been sold in round lots as low as \$1.55, base, delivered here. Steel cut nails are a little more active, and local makers report inquiry better, but prices are no stronger than they have been—\$1.60@1.60 1/2 for mill quantities. Jobbing trade is fair at \$1.70 in less than carloads.

Steel Rails.—While the steel companies cannot boast of any large work ahead for future shipment, they are well supplied with orders for immediate

delivery. It is apparent that railroads when ordering leave it to the last moment, thus giving a constant demand for standard sections. Business has been fully up to expectations, though purchases have been made on the hand to mouth policy. Price steady at \$30@32.

Scrap.—Improved demand and better prices are generally reported. No. 1 railroad, \$15.50; No. 1 forge, \$15; No. 1 mill, \$9.50; fish plates, \$17; axles, \$19; horseshoes, \$16.00; pipes and flues, \$7; cast borings, \$6.00; 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.—Inquiry is more active for old iron rails and a round lot of 1,200 tons sold for \$18.75. Demand is fair for steel rails for relaying at \$14.50, mixed lengths \$13.50. Car wheels are very dull at \$14.50@15.

Louisville. Oct. 22.
(Special Market Report by Hall Brothers & Co.)

The market has ruled more quiet during the past week. Trading has been on a smaller scale, though the demand is well distributed. The car works, rolling mills, jobbing foundries, and sheet mills all report excellent demand for finished goods, which is but natural for this time of year. The outlook is promising, but it is feared prices may be too hastily advanced and the permanency of the natural improvement thereby be greatly impaired.

Hot Blast Foundry Irons.—Southern coke No. 1, \$13@13.50; Southern coke No. 2, \$12.25@12.50; Southern coke No. 3, \$11.75@12; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.00@15.50.

Forge Irons.—Neutral coke, \$11.50@12.00; cold short, \$11.25@11.50; mottled, \$10.75@11.

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

Philadelphia. Oct. 27.
(From our Special Correspondent.)

Pig Iron.—The general condition of the market has changed very little. The nearness of the Presidential election is given as an excuse for some of the delay in ordering. Actual consumption of both forge and foundry iron is as heavy as it has been at any time for months. Most users are letting stocks run a little close. At the same time they are keeping a sharp eye on the market. Inquiries are being made and they show that there is no change in prices for large orders, notwithstanding statements made in some papers that higher prices are being obtained. Occasionally a small lot of special iron does bring a little more money. This has been true for two or three months. Agents for furnace companies have been canvassing all through this territory and New England without meeting with much success. The average quotations for No. 1 continue at \$14.50@15; No. 2, \$14; forge iron is \$13@13.25; Bessemer iron has been quoted at 25c. lower.

Foreign Material.—Brokers have failed to secure anticipated business for ferromanganese, and the market is flat.

Steel Billets.—It is not true to say that there is much doing in billets. There is a disposition to do a great deal, but a wide difference prevails as to what billets are worth, and makers are having their own way. Average quotations, \$25@26, but much depends upon date of delivery. The consumption is heavy, and that is the strong point. Manufacturers are extremely anxious for business, which is their weak point.

Muck Bars.—A great deal of business could be done if buyers could have their own way as to prices; but as the mill owners are pretty well sold up, they refuse to give some of the quotations made a month or six weeks ago. In that sense, prices have advanced; but buyers say they will get all they want at the old figures.

Merchant Iron.—The reports from all points are to the same effect—that business is good, though not crowding the mills at all. It does not require any effort to keep mills fairly supplied with business at \$1.65 as a minimum price to \$1.80.

Nails.—There has been, and still is, a surprising activity in nails. Buyers have been predicting a collapse in prices; but manufacturers seem to have the market under pretty good control, though prices are low.

Sheet Iron.—The mills are everywhere busy, and the demand covers all kinds of sheet iron products. The orders of the past week have not been large; but there are a good many parties in the market looking for early winter stock.

Skelp Iron.—Two or three quite large orders have been booked for skelp this week, and if the manufacturers are half accommodating, there will be a good deal more business in a few days.

Wrought Iron Pipe.—The pipe makers have gathered up a great deal of business and the projects in hand indicate that there will be a continuous activity all winter at nearly full discounts.

Merchant Steel.—The same reports are repeated as to a heavy demand for nearly all kinds and qualities of merchant steel.

Plate and Tank Iron.—Large buyers have completed orders which were partially provided for a month ago, and this added business has served to strengthen prices on early deliveries. The quota-

tions for large lots remain where they have been for a month, viz., \$1.90 for tank.

Structural Material.—All of the managers of structural mills are watching the progress of negotiations in new enterprises, which, if favorably terminated, will lead to what some of them consider an immense amount of business this winter. The mills are all crowded with order, and prices are firm on a basis of 2-20 for beams, tees and channels.

Steel Rails.—It is impossible to gather any encouraging information in regard to steel rail prospects. Quotations are \$30@31.

Old Rails.—There is a liberal supply of old rails within easy reach, and they will be kept there until customers are willing to pay the price, plus freight.

Pittsburg, Oct. 27.

(From our Special Correspondent.)

Raw Iron and Steel.—Trade since our last report, taken as a whole, could not be termed very active. For certain descriptions of material activity was the rule, not the exception, while for others the reverse was the situation. The heavy advance in soft steel caused considerable excitement among dealers. Spot billets were out of the question, while near-by deliveries were eagerly sought for. Sales books and contracts were carefully examined in order to take in the situation; parties who sold large blocks short were far from being pleased with the outlook.

During the past six weeks a large amount of billets were disposed of at prices varying from \$21.75@ \$22.75 up to \$23.25 per ton, according to time of delivery; these prices are the lowest that steel billets were ever disposed of. In conversation with a leading steel manufacturer, one who was raised in the business and is still making steel, he said: "I am satisfied that good steel billets can't be made at a profit below \$23, and in many cases they cost more. Of course selling material below the actual cost of production can't hold out long, hence the sale of cheap billets is a thing of the past."

It can safely be said that the improved tone of the steel trade has been fully maintained the past week and the impression is becoming stronger that the improvement will be permanent. Since the financial panic of 1890 but few new development schemes requiring iron have been launched, because of the difficulty of enlisting capital, but now that the monetary situation is easier and confidence has returned, new projects are being taken in hand. A considerable amount of work is in sight already and the prospects are such that activity for a long time would not be surprising. The situation has not yet developed sufficiently to warrant confident predictions on this score but it is not regarded as a very hopeful one. It is certain that consumption is now very large and steadily increasing; the low prices ruling no doubt stimulated the demand. Pig iron—the inquiry is improving, but buyers are not quite convinced that prices are likely to advance much very soon. They are still taking iron in comparatively moderate quantities, but would make large contracts at present prices if the producer would agree. This cannot be effected, however, as the sellers seem perfectly satisfied with the situation.

A dispatch from Youngstown says: "Ground was broken on Monday the 24th, in the western part of the city, for the steel plant to be erected by the Ohio Steel Company, and a large force of men were put to work excavating for the extensive foundations for the heavy machinery and large structure." What an Eastern iron dealer has to say about steel billets: "In some specialties there is a good deal of nervousness, as shown by the recent erratic quotations in steel billets in Pittsburg. Not more than a couple of weeks ago prices in that market were considerably less than \$22, but a few days later, without any perceptible change in the general situation, \$23 and upward was asked. The only way to account for such a sudden change is that the trade there is governed by notions; if there is a large inquiry one day they appear to get the idea that prices ought to be higher, then if they lose an order, prices are soon back to the old figures."

Steel billets very firm, with sales at a further advance. Bessemer is also firmer. Grey forge shows no change. Skelp iron and steel firm, some grades a shade higher. New steel rails, demand light, prices unchanged.

Coke Smelted Lake and Native Ore.

5,000 Tons Bessemer, Nov., Dec.	13.75 cash.
3,000 Tons Grey Forge, Nov., Dec.	12.50 cash.
3,000 Tons Bessemer, Jan., Feb.	13.75 cash.
2,000 Tons Bessemer, Dec., Jan.	13.85 cash.
1,000 Tons Grey Forge, Nov., Dec.	12.50 cash.
1,000 Tons Bessemer, Jan., Feb.	13.90 cash.
1,000 Tons Grey Forge	12.50 cash.
1,000 Tons Bessemer, Nov., Dec.	13.80 cash.
1,000 Tons Grey Forge	12.50 cash.
700 Tons Grey Forge	12.50 cash.
500 Tons Bessemer	14.00 cash.
300 Tons No. 1 Foundry	14.50 cash.
250 Tons No. 2 Foundry	13.50 cash.
100 Tons No. 1 Silvery, extra	16.25 cash.
100 Tons No. 2 Silvery	15.50 cash.
100 Tons White and Mottled	12.00 cash.

Charcoal.

200 Tons Cold Blast	26.00 cash.
100 Tons No. 2 Foundry	18.90 cash.
100 Tons No. 1 Foundry	20.50 cash.
50 Tons Warm Blast	18.00 cash.
50 Tons Cold Blast	26.50 cash.
50 Tons No. 1 Foundry	20.00 cash.

Steel Slabs and Billets.

3,000 Tons Steel Billets, Nov., Dec., Jan., Feb.	24.00 cash.
3,000 Tons Steel Billets, Jan., Feb., March	23.75 cash.
3,000 Tons Steel Billets, Nov., Dec., Wheeling, Del.	24.00 cash.

2,000 Tons Steel Billets, Nov., Dec., Jan.	24.50 cash.
1,800 Tons Steel Billets, next 4 months	24.25 cash.
1,000 Tons Steel Billets, Oct., Nov.	24.50 cash.
1,000 Tons Billets and Slabs, Jan., Feb., March	24.00 cash.
500 Tons Steel Billets, Nov., Dec.	25.00 cash.
Muck Bar.	
1,000 Tons Neutral, Nov.	24.75 cash.
600 Tons Neutral, spot	24.70 cash.
500 Tons Neutral, prompt	24.65 cash.
Iron Skelp.	
650 Tons Narrow Grooved	1.62 1/4 4 m.
500 Tons Wide Grooved	1.65 4 m.
475 Tons Sheared Iron	1.85 4 m.
Steel Skelp.	
650 Tons Wide Grooved	1.52 1/4 4 m.
Sheet Bars.	
1,000 Tons Sheet Bars at mill	31.00 cash.
Steel Wire Rod, five-gauge American.	
700 Tons Steel Wire Rods, Five Gauge at mill	32.00 cash.
Ferromanganese.	
300 Tons, 80 per cent. delivered	62.50 cash.
Old Iron and Steel Rails.	
500 Tons American T's	20.75 cash.
500 Tons American T's	20.50 cash.
Scrap Material.	
500 Tons No. 1 R. W. Scrap, net	16.00 cash.
500 Tons No. 1 R. W. Scrap, net	16.10 cash.
250 Tons Country Mixed Steel Scrap, net	14.50 cash.
250 Tons Iron Axles, net	24.80 cash.
200 Tons Wrought Turnings, net	10.50 cash.
100 Tons Cast Borings, gross	8.50 cash.
80 Tons Iron Axles, hammered, net	26.00 cash.
50 Tons Coil Springs, gross	18.00 cash.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Oct. 28.

Statement of shipments of anthracite coal (approximate) for week ending October 22d, 1892, compared with the corresponding period last year.

Regions.	Oct. 22, 1892.	Oct. 24, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region	463,576	518,477	Dec. 54,901
Lehigh Region	141,496	146,946	Dec. 5,450
Schuylkill Region	261,462	333,230	Dec. 71,777
Total	866,534	998,653	Dec. 132,128
Total for year to date	33,406,902	31,617,765	Inc. 1,789,137

PRODUCTION OF BITUMINOUS COAL for week ending October 22d, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

Phila. & Erie R. R.	1892.		1891.
	Week.	Year.	Year.
Cumberland, Md.	2,236	71,269	138,409
Barclay, Pa.	75,809	3,057,842	3,363,177
Broad Top, Pa.	810	56,720	152,737
Bearfield, Pa.	15,487	499,728	402,531
Clearfield, Pa.	67,011	3,193,789	3,227,832
Allegheny, Pa.	22,092	1,026,925	1,027,929
Beach Creek, Pa.	31,108	1,878,730	1,953,126
Pocahontas Flat Top	56,353	2,110,378	1,859,271
Kanawha, W. Va.	*60,107	1,992,620	1,918,308
Total	331,013	13,886,001	14,043,420

* Week ending October 14th.

WESTERN SHIPMENTS.

Pittsburg, Pa.	1892.		1891.
	Week.	Year.	Year.
Westmoreland, Pa.	23,084	1,021,998	1,015,296
Monongahela, Pa.	35,596	1,389,147	1,575,913
Monongahela, Pa.	15,854	530,215	469,233
Total	74,534	2,941,360	3,060,447
Grand total	405,557	16,827,361	17,103,867

PRODUCTION OF COKE on line of Pennsylvania R.R. for the week ending October 22d, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 107,691 tons; year 4,343,539 tons; to corresponding date in 1891, 3,407,280 tons.

Anthracite.

The anthracite coal trade is still showing signs of overproduction. The demand is slow, and not equal to the supply, and consequently the stocks are as full as ever. There is no forward buying, and the prevailing warm weather has made the consumption much smaller than is usual at this time of the year. There is no change in schedule rates, but many rumors are rife in the market that the rates are being cut. A meeting of the Eastern and Western sales agents was held yesterday. The Eastern agents agreed without any discussion that even the mention of an increase in prices would be out of the question at present.

The meeting of Western sales agents was not marked with the same absence of business, for some of them proposed that an advance of 25c. should be made to cover the advance of all-rail rates west of Buffalo which went into force on the 12th of the present month. This proposition caused a heated discussion and eventually it was overruled, so for the next month the prices at Western points will be the same as before. Most of the companies laid in a good stock of coal at Western points in anticipation of this increase in freight rate, so they will not feel its effects just yet. When these stocks are worked off, however, the selling price will be virtually 25c. lower than last month, and the net revenues of the companies will be smaller accordingly. The authorities at the meeting yesterday also considered the question of output for November, and they fixed it at 3,500,000.

Last month, it will be remembered, the output for October was not specified at all, as the agents agreed that the restriction hitherto had only been nominal. Whether the return this month to a fixed figure

means that they are going to do something to enforce the restriction or not we are not prepared to say, but we do not see how they are in any better position to restrict the output now than they have been hitherto.

The mines are all being worked as long as there are cars to put the coal into. The consequence is that the lines of rail are all crowded to their uttermost. The output from the mines this month will certainly be very great, and may beat the record, but the consumption remains much the same. The stocks have been getting gradually fuller, and the amount of coal stored in cars and at inland points has been gradually increasing, until at last all the cars are full, and only as they empty and are returned to the mine can the process of mining be continued. This crowding of the rails with coal trains led to a serious collision on the Reading outside Philadelphia early this week when an express passenger train crashed into a coal train ahead. This accident has evidently shown the Reading authorities how absurd it is to crowd their lines in this way, for they have already given orders that their collieries round Pottsville shall be shut down for a few days in order that stocks shall be cleared off a little. It appears probable that the collieries will be worked about three days a week or less for some time to come. The scarcity of water supply in the Lehigh and Schuylkill regions is also causing a good deal of anxiety, as many collieries have the greatest difficulty in obtaining water for their winding engines. If the drought continues much longer these mines will have to close down, and in this way a relief may be obtained from the plethora of stocks.

We said above that many rumors are afloat of a cutting of circular rates. We have made inquiries in various quarters, and though naturally no definite information is offered, we are disposed to think that cutting is being done. Commissions are being more freely given to all agents in order to expedite business, and one at least of the companies in the "combine" are cutting stove coal 20c. Coxie Bros. are said to be cutting considerably, but they have always considered it the best policy to arrange their prices on the law of supply and demand and to move coal instead of storing it, and so the announcement is nothing fresh. As a matter of fact Coxie Bros. and the other outside concerns are at present in a much better position to congratulate themselves than are the companies in the "combine." Their policy is, while the present high schedule rates are sustained, to mine all the coal they can and sell it at a slight rebate. Seeing that even with a rebate of 25c. they make \$1 a ton profit, the policy is of course an excellent one.

The Philadelphia & Reading Railroad Company has added to its strength very greatly by allying itself with the Boston & Maine Railroad. The chief stockholders in the Reading have bought a controlling interest in the Boston & Maine, and Mr. McLeod has been elected president of the latter. This move will open up a new coal market for anthracite coal in New England.

The legal cases against the Reading combine have not progressed at all during the week. On Thursday, the 27th, Chancellor McGill's Court of Chancery, of New Jersey, met to receive the replies [of the railroad companies in that State that are connected with the deal to the motion to show cause why a receiver should not be appointed. At the sitting of the court, however, the counsel for the railroads stated that they were not ready with their answers so the case was adjourned until the 15th of November.

Bituminous.

The state of the market in bituminous coal is not any different from what it was a week ago. The demand is just about double the capabilities of the producers to get their coal to market. During the last month or so the average time consumed by a round trip of a car from mine to shipping point and back again has been about 30 days. As eight days is quite sufficient for such a round trip it will be seen that the freight transport is much disorganized. During the present week some companies report that the transport over the Pennsylvania has been rather better, but they do not know how long the improvement will last. On account of the delay in rail transport the vessels at all ports are becoming very impatient and many are turning their attention to other business. It is extremely hard to get the captains to wait for the freight. Captains are very independent and stand out for higher rates. Last week we reported an all round advance of 10c@15c., and this week the rates are 5c. higher still at Philadelphia. Rates at present are as follows: From Philadelphia to Boston, Salem and Portland, 80c@85c., and to Sound ports, 75c. From Baltimore, Newport News and Norfolk the rates are to Boston, Salem and Portland, 85c., and to Sound ports, 80c.

Nothing more has been heard about the attempted "combine" in the bituminous trade.

Buffalo.

Oct. 27.

(From our Special Correspondent.)

Nothing new in the anthracite coal trade; business fair for household consumption, with moderate amount of orders from nearby towns and villages. Prices unchanged. The movement of anthracite coal by lake the past week exceeded 180,000 net tons, and demand at close large for vessels at full quotations for freights. Bituminous coal in good demand for vessels, manufacturers and home purposes. Market very firm, with limited supply; quotations with upward tendency. Cars continue very scarce here,

eastward and westward, much to the annoyance of dealers and purchasers. Plans are now being perfected here for the erection of a mammoth car wheel works. The concern will be known as the Buffalo Car Wheel Foundry Company, and have a capacity of 500 car wheels per day.

The most expensive cargo that ever left Buffalo by canal was 200 tons of copper from the Buffalo Smelting Works last week, consigned to New York. The value of the cargo was \$46,000. The product of the concern has hitherto been shipped by rail.

Taking into account the quantity of anthracite coal in Chicago on January 1st, 1892, viz., 493,972 tons, and the receipts since by lake and rail at 1,286,000 tons, the available supply is shown from January 1st to October 1st to have been 1,779,972 tons.

Tonnage recently contracted for or now under construction at our inland lake ports comprises 34 vessels of 69,105 tons, at a valuation of \$5,899,000. There is talk of eight large propellers in addition to the foregoing, besides quite a few craft on Lake Ontario ports not enumerated in detail.

The Canal Convention and the Mass Centennial Canal Meeting, held in this city on October 19th, were eminently successful, as 53 organizations were represented by 500 members from all parts of the State, from Brooklyn and New York to Buffalo and Oswego. Public opinion is emphatically pronounced that the canals of the State must be saved from destruction. The platform of the convention may be briefly stated thus: The completion of the double locks, as planned by Mr. Horatio Seymour, and the deepening of the Erie Canal two feet immediately. These propositions are reasonable and just, because the canals have repaid a hundredfold all money expended, and the commercial supremacy of New York depends to a great extent upon the maintenance and enlarged capacity for freight carrying. The evident design in some quarters to destroy the canals by neglect must be stopped at once.

The movement of coal by lake westward from Buffalo, from October 18th to 25th, both days inclusive, aggregated 184,915 net tons, distributed about as follows: 66,700 to Chicago; 47,275 to Milwaukee; 16,625 to Duluth; 4,490 to Toledo; 13,300 to Superior; 19,500 to Detroit; 1,075 to Lake Linder; 1,900 to Fort William; 3,600 to Racine; 200 to Bay City; 1,500 to Ashland; 1,700 to Port Arthur; 600 to Kin cardine; 350 to Bay Mills; 3,000 to Gladstone; 1,400 to Green Bay; 1,700 to Washburn. The rates of freight were: 75c. to Chicago; 70c. to Milwaukee and Green Bay; 80c. to Racine; 50c. to Sault Ste. Marie, Bay Mills and Kin cardine; 45c. to Sarnia, Bay City and Gladstone; 35c. to Fort William and Port Arthur, and 25c. to Duluth, Superior, Washburn, Toledo and Detroit.

The canal movement to and from Buffalo of coal for third week in October was as follows: Receipts, 5,574 net tons; shipments, 463 net tons.

Chicago. Oct. 27.

(From our Special Correspondent.)

Some shippers are free to express themselves that it is really fortunate that country demand is quiet, for was it otherwise they would be at their wit's end to find box cars for the transportation of anthracite coal. One large shipper states that not in his ten years' experience in the Western hard coal trade has he known cars to be so scarce as they are and have been during this October month, it being a matter of difficulty to fill even the few orders which are received.

The falling off in tonnage at Southwestern Missouri points promises to be very large, judging from sales made in that territory so far this season. There seems to be more than an impression that some of the larger shippers are protecting their dealer customers against some of the past and any possible future advances. Rumor also has it that some of these same dealers are permitting "middle men" to take contracts which were only supposed to be filled by the shippers themselves, thus protecting the dealers in their contracts. These rumors are entirely against parties who are not strictly in the so-called Reading combine, and indicate, as we have said before, that the prices of coal in this market are high enough, if not already too profitable for all the dealers to be honest and truthful in their reports to their respective companies of their transactions.

There seems to be some reason to believe that a number of quite large sales to consumers have been made at dealers' prices in the yard with cartage added, and reports made to the respective companies of these sales as being to dealer. Hence it is plain to be seen that prices are not held as firmly as shippers would like to have the public believe. Wholesale trade is quiet, only a few scattering orders, and they for small amounts. Retail trade is again picking up under the influence of the cooler weather, and the more thorough realization that the advanced prices have come to stay for at least this season, whatever may happen next. There appears to be a marked diversity of opinion as to an advance November 1st, and to the wisdom of such a course. As we have said frequently before, and in this article, prices are too high now to be strictly maintained, and the desire of certain interests to contract and get rid of their supplies, even at slight concessions, bears out this statement.

Bituminous coal is in strong demand, prices well maintained and scarcity of cars alone preventing large and profitable sales at full circular prices. All railroads reported a very large and extraordinary car demand for soft coal, and their utter inability to fill one-half of their requisitions for coal cars. Many shippers of both Eastern and local coal don't hesitate

to say that it is either through gross mismanagement on the part of the railroads, or that the business offering is greater than their facilities to handle. But, whatever the cause, it is occasioning serious annoyance and trouble to shippers and consignees. Marine demand for coal is exceedingly active, not only here, but at Milwaukee and other ports on Lake Michigan. Spot Hocking and Pittsburgh coal is not to be had in any quantity, and demand is far in excess of the visible supply. Coal rates from Chicago and Illinois mines to St. Paul are to be advanced November 1st.

Coke is gradually but steadily assuming better shape, demand good and promises to be better, but shippers are annoyed by scarcity of cars.

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: Pittsburgh, \$3.40; Hocking Valley, \$3.20; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.50@2.60.

Pittsburg.

Oct. 27.

(From our Special Correspondent.)

Coal.—River miners on the Monongahela may accept the reduction and go to work at 3 cents. In case they do very mine in the four pools will start up at an early day. Natural gas will be further advanced on the 1st of November. A large number of consumers refuse to pay the advance and are returning to coal, which has increased the local demand very materially. A leading miner, from an up river point, said he understood that the sentiment among the men at Brown's Station was in favor of returning to work at the three cent rate. So far as could be ascertained, the only work being done along the river, when men are at work at all, is in turning rooms and driving entries. This class of work is paid for by the yard. The expectation along Water street is that mining would be resumed at the new rates if there was sufficient water in the river. A dispatch from Cincinnati reports coal advanced 25 cents per ton and another advance expected inside a week. The local markets have not made any advance in Pittsburg so far.

Connellsville Coke.—Production is steadily increasing, and the outlook continues to brighten. Shipments from this region would show up much better if sufficient cars could be obtained to fill orders. As it is, some of the producers are obliged to divide their orders equitably in order that their customers may not run short. The scarcity of water still continues a serious drawback at several of the plants that would otherwise make full time. During the past week 264 idle ovens have been added to the active list, making a total of 1,340 active ovens, leaving only 3,780 idle ovens in the region.

Most of the plants in this region are working five and six days. The shipments from the regions for the week were 121,000 tons, distributed as follows: To Pittsburg, 1,800 cars; east of Pittsburg, 1,160 cars; points west of Pittsburg, 3,440 cars; total, 6,400 cars. Western shipments increased 34 cars, Pittsburg shipments 42 cars, while Eastern shipments fell 165 cars, making a total decrease over the previous week of 89 cars. Prices reported firm, unchanged.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Oct. 28.

Heavy Chemicals.—There is no change to report of the market for heavy chemicals; the features which have characterized it for some time past have prevailed during the week. Caustic soda was quiet and unchanged. Carbonated soda ash was scarce, and most of the sales made were for future shipments. Bleaching powder is lower; during the week there was a fair consumptive demand. Other heavy chemicals were quiet, and whatever trading there was was devoid of interesting features. Quotations this week 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%, 1-55@1-60c.; 58%, 1-55@1-65c. Sal soda, English, 1-07½@1-15c.; American, 1-05@1-10c.; bleaching powder, 2-75c.

Acids.—During the week a good business has been done in acids. The demand has been steady and manufacturers report a busy time. Prices, however, are unchanged 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, 55c.@1.10; mixed acids, according to mixture; oxalic \$7.25@7.75. Blue vitriol is quoted all the way from \$3.50@3.75; Glycerine for nitroglycerine, 11¼@12½c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone was very quiet during the week. Prices have undergone little or no change since our last report. Quotations for November-December shipments were \$22.50@23 for best unmined seconds and 75c. less for thirds. Goods on the spot are quoted at \$21 and \$23 for seconds and thirds respectively.

Fertilizers.—The feature of the week, so far as the general fertilizer market is concerned, has been

the advance in the ammoniates. This is due to various causes, chiefly to the short fish catch, the advance in cotton, the small killing of hogs in the West, and to the buying up of most of the available dried blood and tankage by two or three firms here. During the week there was quite a demand for ammoniates. Our quotations are as follows: Sulphate of ammonia, \$2.90@2.95 for bone goods and \$2.95@3 for gas liquor. Dried blood, \$2.25@2.35 per unit for high grade and \$2.15@2.20 for low grade; acidulated fish scrap, \$13.50 f. o. b. factory; dried scrap, \$24@24.50. Azotine, \$2.10@2.15. 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: \$1.13¼ cwt., basis 48@53%, 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@62% 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.

We are in receipt of Messrs. Couper, Millar & Company's interesting monthly report on the phosphate market of the United Kingdom, dated London, October 17th. "The position set forth in our last circular remains practically unchanged. Phosphate continues to be hawked over the market, both here and on the continent, at ruinous figures; with what object it is hard to say, but that there is an object we cannot doubt. The prices ruling can have but one result, namely, disaster to the raisers, while the superphosphate manufacturers reap no benefit owing to the keen competition through over-production of the manufactured article.

Mineral Phosphates.—Canadian phosphate; we hear of no sales. South Carolina offering at 6¼d., and even at less. Florida hard rock 75% selling at 8d. to 8½d., pebble 60% at 7d. Ground Somme not in request and quotations are 10¼d. for 70% and 11¼d. for 75%, basis c. i. f. London. Ground Belgian offering for forward at a shade under 5d. per unit, f. o. b. Osso we have no inquiry for. Cambridge and Bedford coprolites only of local interest, other phosphates being offered so cheaply."

Kainit.—During the week 1,800 tons were sold. 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 has been a better inquiry from the South. Arrivals during the week amounted to 900 tons, all of which went into consumption. New sales were 100 tons, future shipments. Prices are: For 50 tons or over, New York or Boston, \$1.81¼; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.86¼.

Nitrate of Soda.—The nitrate market is strong, and shows an advancing tendency. Quotations this week are: Ex-store, \$2.10@2.12½; to arrive, \$2.10. Quite a fair business has been done during the week.

Liverpool.

Oct. 19.

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

Since our last report bleaching powder has continued to drop, while chloride of potash has taken an upward turn; other lines about unchanged.

Soda ash—Leblanc makes scarce and only obtainable in a retail way. Quotations are nominal as follows:

Caustic ash, 48%, £5 6s. 3d. per ton and upward; 57@58%, £6 7s. 6d. per ton and upward, net cash. Carbonate ash, 48%, £5 9s. 9d. per ton and upward; 58%, 12s. 9d. per ton and upward, net cash. Ammonia ash, 58%, £6 4s. 6d. per ton and upward, net cash. For 1893 deliveries, bids invited by "Union." Soda crystals in fair request but not active, at £3 5s. to £3 7s. 6d. per ton less 5%.

Caustic soda in light demand and stocks accumulating. Quotations, however, are unchanged, as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s.@12 10s. per ton net cash. For parcels under 10 tons, 5s. per ton extra is charged. Shipments to United States and Canada barred to buyers on this market by "Union." For contracts over 1893, 10s. under spot quotations would be accepted, but there is no inducement to operate ahead, as much lower prices are anticipated.

Bleaching powder, in the absence of orders, continues to decline, and £8 5s.@8 10s. per ton net cash are nominal spot quotations for hardwood casks. United States and Canada barred by "Union." For 1893 delivery £7 15s.@£8 are about normal quotations for hardwood.

Chlorate of potash has been in active demand and market practically cleared of second hand lots for this and next month. Makers are behind with their deliveries on contracts, and 7¼ d. less 5% is newest value for any position to end of this year, while it is difficult to buy anything for earlier delivery than December.

For 1893 delivery, a good business is reported at 6¼d. for first six months and 6½d. over the whole year. For January to March 6¼d. is now quoted and for January to June 6¼d.@6½d.

Bicarb. soda in request at £6 15s. ton per less 2¼% per one cwt. keg, with usual allowances for large packages.

Sulphate of Ammonia.—There is a fair inquiry, without much actual business reported. We quote £10 5s. per ton for good gray 24% and £10 7s. 6d. per ton for 25%, both in double bags less 2¼% f. o. b. Liverpool.

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

Main table of New York Mining Stocks Quotations, listing company names, locations, and stock prices for dividend-paying and non-dividend-paying mines across various dates from Oct. 21 to Oct. 28, 1892.

*Ex-dividend. +Dealt at in New York Stock Ex. Unlisted securities. †Assessment paid. ‡Assessment unpaid. §Dividend shares sold, 6,760 Non-dividend shares sold, 7,150. Total shares sold, 13,710 | Holiday.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names, locations, and stock prices for various dates from Oct. 21 to Oct. 27, 1892.

Dividend shares sold, 3,862. Non-dividend shares sold, 4,565. Total shares sold, 8,427.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

Large table detailing mining company information, including Name and Location of Company, Capital Stock, Shares (No., Par), Assessments (Total levied, Date and amount of last), Dividends (Total paid, Date & amount of last), and a list of 54 companies with their respective financial details.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Name and Location of Company, Capital Stock, Shares, Assessments. Includes entries for Dexter, g. s., Dunkin, s. L., Elkhorn, s. L., etc.

G. Gold, S. Silver, L. Lead, C. Copper, B. Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42, 90,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Kly 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 Name, Price, Date. Includes Aspen, Oct. 22, and Baltimore, Md., Oct. 27.

Table with columns: Company Name, Bid, Asked. Includes Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Table with columns: Company Name, H, L. Includes Bridgewater Gas Co., Clartiers Val. Gas, Luster Mining Co., etc.

Table with columns: Company Name, Bid, Asked. Includes American & Nettie, Bi-Metallic, Central Silver, etc.

Table with columns: Company Name, H, L. Includes Bald Butte, Benton Group, Bi-Metallic, etc.

Table with columns: Company Name, Bid, Asked, Sales. Includes Carthage, Golden Reward, Harmony, etc.

COAL STOCKS.

Table with columns: Name of Company, Oct. 23, Oct. 24, Oct. 25, Oct. 26, Oct. 27, Oct. 28, Sales.

Foreign Quotations.

Table with columns: Location, Highest, Lowest. Includes London, Oct. 15, and Paris, Oct. 13.

CURRENT PRICES.

Table listing various commodities and their prices, including acids, alcohols, ammonias, antimony, argols, arsenic, asphaltum, barium, bauxite, bichromate of potash, bromine, cadmium, calcium, china clay, chlorine water, chrome yellow, chrome iron ore, chromalum, cobalt, copper, vitriol, fulfur, gaulther's salt, glass, gold, kaolin, kieserite, lead, lime acetate, litharge, magnesite, mercury chloride, marble dust, metallic paint, mineral wool, nitre cake, ochre, phosphorus, plumbago, potassium cyanide, sal ammoniac, salt, soapstone, sodium, stannate, tungstate, vermillion, zinc white, zirconium.

THE RARER METALS.

Table listing prices for rarer metals: Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Glucinum, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Osmium, Palladium, Platinum, Potassium, Rhodium, Ruthenium, Selenium, Strontium, Tantalum, Tellurium, Thallium, Titanium, Thorium, Tungsten, Uranium, Vanadium, Zirconium.

*No sales. Total sales resold, 421,717.