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The dissenting opinion delivered by Justice FIELD (Justices HARLAN and BROWN concurring) in the Mike Starr cases, in the United States Supreme Court, is excluded from our columns this week for lack of room. It will be published at an early day, together with Dr. RAYMOND's further discussion of the subject.

THE CARSON MINT AND THE LOOT OF THE COMSTOCK.

The readers of the ENGINEERING AND MINING JOURNAL are quite familiar with the shameful actions of the Comstock mill rings which have for so many years swindled the stockholders of the Comstock mines. We have on several occasions called attention to the fact that developments had shown a close connection between the thieves and the United States mint at Carson. There is no longer any secret as to this connection. It has been fully shown in the progress of the Hale & Norcross suit in San Francisco that the bullion from some of the mines, which was never credited to them, had been delivered to the Carson mint, its chief clerk being also an officer of the Bullion & Exchange Bank, which it was openly asserted was merely a "fence" for disposing of the bullion wrongfully taken from the mining companies.

The matter has now reached Congress, charges having been prepared by the Mining Stock Association, of San Francisco, and forwarded to Washington, where they will be presented by Congressman CAMINETTI. Undoubtedly Congress will appoint a committee to investigate the matter, and it seems probable to us, from a great mass of information now in our possession, that this investigation cannot result otherwise than in a very unfortunate and serious scandal to the mint. The administration of the United States mint has always been so honorable and so able that in has well deserved and has received the respect and admiration of our entire people. We have ourselves testified, and again testify, our admiration for it and our conviction that, so far as the Washington administration is concerned, it is above suspicion. Nevertheless it is, we believe, equally true that the Carson mint has for many years been a discredit and a shame to our Treasury Department. The cause of this is not difficult to find. Every one knows that Nevada is a "rotten borough," controlled absolutely by the Comstock rings, of which Senator JONES is the official head, and the appointments to the Carson mint are made in the interest of these rings. These appointments are probably the price paid for political support, and they are used in furtherance of the objects of the rings. These facts will undoubtedly be shown still more clearly should a congressional investigation take the subject up, but in the interest of the United States Mint we trust that the Secretary of the Treasury will see to it that the staff of the Carson Mint be entirely reorganized or that the mint be closed altogether, if the scandal which it is bringing upon the Treasury Department cannot otherwise be prevented.

The exposures in the Hale & Norcross suit have been so disgraceful that there is now a fair prospect that justice will ere long overtake the "honorable" thieves who have for so many years defrauded the Comstock mine shareholders. The Western newspapers are commencing to denounce freely the actions they have long known, but were afraid to condemn. The rats are abandoning the sinking ship, and soon the thieves will fall out and honest men and the mining industry will profit thereby—so mote it be.

THE MARKET PRICE OF SILVER.

During the past week the price of silver reached the lowest point ever recorded. On Monday the London quotation was 39 pence per troy ounce, which was equivalent to 85.6 cents here, but the metal was offered by New York dealers at 85 cents per ounce, at which price the gold value of the silver in a silver dollar was worth 65.7 cents. Since then the price has risen slightly, being quoted to-day at 87 1/2 cents. It is absurd to say that silver is suffering any "injustice," or "demonetization," or that any "crime" has been committed against it, to account for the decline in value to these figures. The value of silver, as of everything else, is governed by the law of supply and demand.

The production of silver has been going on for the past ten years at a constantly increasing rate, and while the consumption has increased, both for coinage and industrial purposes, and by the hoarding of the United States Government (under the act of July 14, 1890), it has been far outstripped by production. In 1890 the United States produced about 54,500,000 ounces of silver; in 1891, the output was probably about 58,000,000 ounces. No statistics of the production of silver elsewhere in 1891 have been issued, but Mexico and Australia, the two most important countries after the United States, undoubtedly made an increase. In New South Wales, alone, the Broken Hills Proprietary Company turned out 9,599,932 ounces of silver in 1891, against 7,785,000 ounces in 1890.

The future course of the silver market may be predicted with as much certainty as that of any other metal, whether the United States Govern-

ment continues to buy 54,000,000 ounces per annum or not. The price will decline until the output is restricted, by the weaker mines closing down, and production more nearly approximates consumption. How much of a decline will be possible cannot be foretold, because there are no figures in existence of the average cost of producing an ounce of silver. Already many of the least favorably situated mines and some with low grade ores, like those of Butte, Mont., are closing down. But such a great producer as the Granite Mountain Mining Company, of Montana (which yielded 2,905,158 ounces of silver in 1891), produces it, according to the reports of its directors, at a cost of 51 cents per ounce, while it is well known that the rich mines of Aspen and the San Juan district of Colorado, and the Park City mines of Utah, produce silver for less than 50 cents per ounce. The famous Mollie Gibson mine of Aspen, Colo., produced over 2,000,000 ounces of silver up to December 31st, 1891, at a cost of 48 cents per ounce! The Broken Hills Proprietary Company, of New South Wales, produced 9,947,038 ounces of silver during the fiscal year ending November 30th, 1891, at an expense of 52.6 cents per ounce (including depreciation of plant, etc.), and altogether omitting the lead product of 41,687 tons. We shall not be surprised to see the price of silver decline to 80 cents per ounce before the end of this year, and, should this country adopt free coinage, it would in time go below this, for that would remove the largest purchaser for the metal who would pay gold for it.

THE SITUATION IN THE COPPER MARKET.

Since the rise in the market price of copper to 12 cents, and higher, there has been very little talk concerning the combination of the copper producers. Having accomplished what it was intended to do—increasing the price of the metal by frightening consumers pell-mell into the market—this very engaging scheme has been allowed to drop quietly out of sight. We have never had much faith in this proposed combination, as we have said, repeatedly, in previous issues. Indeed, there has been something rather ludicrous in the whole project of restricting production by allotting mines an output of 224,000,000 pounds, which supplied the market by producing about 197,000,000 pounds in 1891. Moreover, many of the important copper producers were left out of the combination altogether.

All that there seems to be in this combination is that the officers of the principal copper mining companies have met and united in a declaration of the maximum amount of copper which their mines can produce, for the purpose of allaying the fears of the European producers concerning largely increased exports from this country. They may also have agreed among themselves to limit production provided the price of copper should continue low, but at the present time this is not necessary. We do not think that the combination will amount to more than this, for the directors of the Michigan copper mining companies are well aware of the penalty which they are likely to incur under the Michigan law, should any such arrangement be made. It is altogether improbable, therefore, that they would commit themselves in writing. An "understanding" of this kind between "gentlemen," which was not supported by a written document of some kind, but based simply upon the verbal assurances of the presidents or other officers, would be, obviously, of the weakest possible nature. In further support of this supposition it may be cited that according to the figures published none of the principal mining companies which have come to an understanding have been allotted amounts much below their product in 1891, with the sole exception of the Anaconda, about whose ability to reach the figures assigned there is at least considerable doubt.

The recent rise in the value of copper has been due apparently to perfectly natural causes. Production probably fell off somewhat with the metal at the low rates ruling at the end of last year and the beginning of this. In the meanwhile consumption has increased enormously, as is always the case when the price of copper falls below 12 cents. The result of this has been that stocks both in Europe and the United States have been very materially reduced. Indeed, it is said by well informed men in the copper trade that stocks at Lake Superior have never been so small at this season of the year as they are now. Unusually large shipments have been made from the lake by all rail throughout the winter, which shows the strong demand that there has been for the metal among consumers.

The increase in consumption has been noted in all branches of the trade. Brass manufacturers are very busy and the demand for wire bars from the electrical manufacturers has been exceedingly large, and there is good prospect that the consumption from the latter source will undergo further expansion. The decline in the value of copper last year was largely due to the falling off in demand from the electrical manufacturers, the financial condition of the country being such that it was next to impossible for promoters to float the bonds of new local electric lighting and tramway companies. Now, however, conditions have improved, and the indications are that the electrical business will be much better this year than it was in 1891. We think that the recent rise in the value of copper was well founded and will be maintained.

THE THREATENED BOOM OF COLUMBUS CITY, ALA.

The series of articles on "Failures in Boomed Towns," which we are now publishing, is highly interesting reading, although not remarkably encouraging to the hundreds of stockholders who were deluded into investing their money in them by colored advertisements, splendid excursion trains, good dinners, eloquent speeches and by general misrepresentations. The history of the land booms in Southern California (so well described in an interesting little book, "Millionaires of a Day") and in Kansas, Tennessee and Alabama, ought now to be well known, and should be enough to discourage promoters from attempting any new booms for some years to come. But every year there is a new crop of lambs, or fools, to use plain English, waiting to be fleeced, who have not read or profited by the history of past failures.

We are led to make these remarks from the appearance in the New York *World* of Sunday, March 6th, of three pages of eloquence and illustrations and a half page more advertisement in the advertising columns which give a prospectus of a new town in Alabama, called Columbus City, in honor of the discoverer of America, and founded on Washington's birthday in the 400th year after the great discovery. The prospectus is a literary gem. Here is a sample:

"Here Columbus City shall rise. Its site has been chosen, its foundations laid. Concentrated here already are energies sufficient to found an empire, working together harmoniously, untriflingly inspired by a faith in the future which reaches sublimity. By such men, resourceful, daring, patient, forceful, basing their hopes on carefully reasoned inductions from established facts, is the ever enduring monument to their prototype, Christopher Columbus, being built."

The city was founded on February 22d by a palace car load of people from Boston and New York. The article in the *World* gives the grandiloquent speeches of the founders on the occasion and prints wood-cuts of the faces of the governors of the States of Massachusetts, Rhode Island, Pennsylvania, Ohio, Iowa, Missouri, South Dakota, North Carolina and Florida, who sent letters of regret that previous engagements, etc., would prevent their attendance. The advantages of the location and the purposes of the speakers were set forth as follows:

"We are here to join forces to those south of the river and wrest from the secret vaults the hidden treasures that shall set Marshall County at the front rank of iron and coal producing counties in this grand State of Alabama, the future coal and iron empire of the United States and of the world. The time will yet come when Columbus City shall stretch its hand southward, and clasping that of its sister city, build the largest industrial city of our grand home land. At our hand lies coal, abundant forests, manganese deposits and all the crude material required to make the industrial center of which I speak. We must not rest till its name is a household word from Maine to California, from the Great Lakes to the Gulf, aye, and round the world, with its echoes ringing in the isles of the sea."

Coming down from this eloquence to the plain facts, we find that Columbus City is on the bank of the Tennessee River, about 100 miles by the river below Chattanooga. The nearest railroad point to the north is Scottsboro, on the Memphis & Charleston Railroad, and to the south Gunterville, on the Tennessee & Coosa branch of the Alabama Great Southern. It is stated, of course, that a railroad connecting these points is now "under construction." Coal and iron ore exist in proximity near the location, as they do in nearly the whole of northern Alabama and southeastern Tennessee. In this respect it presents no advantage over a hundred other points that might be selected on or near the Tennessee River, between Chattanooga and its junction with the Ohio. Apparently, Florence and Sheffield, Ala., on the same river, have a better location, and their past history as "boom iron towns" does not encourage the hope that any location on that river is likely soon to become the site of a great city. Neither the ore nor the coal seem to be as good as at many other points, several of which have proved dismal failures.

We are told in the prospectus by an "expert" that "the red hematite is in regular fissure veins," which will be news to those acquainted with the geology of Alabama. The brown ores, he says, "are very uncertain," which is beyond question, and he can make no approximation even of the output of ore from a given area. Of the manganese ores he saw the outcroppings show, at some points, some very pure ore and at others it is badly mixed with sand. The bog ores, he thinks, do not carry a high percentage of iron. The analyses given are still more discouraging than the surface indications. Certainly no one now engaged in the iron business would dream of locating there upon such a showing.

But if the report on the iron ores is not enough to throw a shadow on the whole enterprise, the statements made in the *World* article, concerning aluminum, water-gas, and electricity are enough to condemn the whole project in the mind of any one acquainted with these things. It is gravely proposed to carry crude oil to Alabama, a State that is full of coal which can be mined at from 60 cents to \$1 a ton, and to use it instead of coal as a fuel for steam boilers and for smelting. By the use of water-gas made from this oil it is also proposed to smelt aluminum out of clay, and the aluminum is to be alloyed with steel. The gas process is said to have been invented by W. W. WEAVER, of Chicago. "It is not desired," says the article, "to make any statement which shall be in the least sensational, yet it is a fact that by the use of this gas in smelting steel, at the first melting the phosphorus, sulphur and base metals are practically eliminated, thus giving without any intermediate process a pure steel." This wild statement is simple absurdity to any intelligent metallurgist, and it is followed by a description of a new electrical generator, "invented by S. J. M. BEAR," also of Chicago. "There is no wire on the armature,

therefore there is nothing in the armature to burn out. The dynamo is self regulating. It has no critical speed—that is to say turning either forward or backward with revolutions not to exceed two or three per minute, two lamps of 16 candle power are to be lighted. Power, light and heat are to be supplied in Columbus City by this system." When this is done, what will become of the water-gas? The Boynton Bicycle Railway system, operated by electricity, has been adopted for the street railways of Columbus City, with an extension to Scottboro, 20 miles, which will be completed by October 1st, 1892, etc., etc.

The object of all this advertisement in the *New York World* is, of course, to sell town lots. An excursion train will leave Boston on April 16th, and an auction sale of lots will take place at Columbus City, April 19th, *et seq.*

We would suggest to the excursionists that, instead of stopping at Chattanooga, as proposed, to visit Lookout Mountain, it would be better to proceed 50 miles beyond Chattanooga and visit Fort Payne, one of the "boom towns" described in the *ENGINEERING AND MINING JOURNAL*, March 19th and 26th. There they will find a beautiful town already built, a splendid hotel, a sanitarium (which it is now proposed to turn into a Keeley bichloride of gold cure establishment—as an alternative we would suggest its use as an insane asylum for the fools who invested in the "boom towns"), a blast furnace that ran 100 days and stopped, another furnace, two-thirds built, and stopped; a \$200,000 steel works, with two furnaces and a magnificent equipment, four-fifths built, and stopped; a hardware factory and numerous other factories, built but not started; fine streets, elegant stores, many of them vacant, hundreds of well built dwelling houses, most of them awaiting new tenants, a fine climate and good scenery. Several sheriff's sales are advertised in the local paper, and stock in industrial enterprises and town lots can be bought very much cheaper than it could only two years ago. The travelers to Columbus City would get a good object lesson at Fort Payne which might have the effect of tightening their hold upon their pocket books at the Columbus City auction sale. These "town lot booms" are simply swindles, for they are based upon misrepresentation, and the "fools" who invest in them are certainly "easily parted from their money."

PROPOSED MINING LEGISLATION IN NOVA SCOTIA, BAD POLITICAL ECONOMY.

It is reported that the Legislature of Nova Scotia has under consideration a measure increasing the rate of royalty to be paid by the lessees of coal lands, including the holders of existing leases, operating collieries. Without entering into details, it is sufficient to say here that the leases affected are not all alike. They have been granted, as I understand, by the Crown—that is, one would think, by an authority higher than the Provincial Legislature; and whether their conditions can lawfully be changed by that body would naturally depend upon their precise terms. In some cases these terms do not expressly permit (and it may be plausibly argued that they therefore forbid) such modifications. But in many cases it is admitted that the Province has the right to change the royalty "from time to time."

Now, it is a very easy matter—at least, within constitutional limits—to squeeze money out of invested capital and established industries; and the process is a highly popular one in these days. But nothing is more certain to react disastrously upon the prosperity of the community than this method of taxation. It may be lawful for the Province of Nova Scotia to change suddenly and arbitrarily the rate of royalty under a mining lease, and it may be that the lessee, if this power of change was reserved to the Province by the terms of his lease, would have no legal or equitable right to complain of its exercise, being presumed to have invested his money with full knowledge of this risk; but the important question still remains whether it would be wise to exercise that power in the manner proposed with regard to existing enterprises. On this point I wish to say:

1. It will be useless to expect further investments of capital from abroad for the development of Nova Scotian resources if investors are given to understand that the conditions of their tenancy are liable to sudden change. The mere reservation, in some leases, of the power of the Province to make such change has been, to my personal knowledge, a hindrance to investments hitherto. Cautious capitalists have declined to put money into plant and mining work, subject to the will of the Legislature as to their rights and obligations. Many have made investments, nevertheless, on the earnest assurance of promoters that, although the Legislature could alter the terms of leases, it would not do so, because it was heartily desirous to favor the development of the natural resources of the Province. If this confidence is now proved fallacious, there will be no basis on which investment can safely be made.

2. It is highly demoralizing for any government to make agreements with private citizens or corporations, in the terms of which an unlimited power of change is reserved to the legislature. In the United States, coal and other mineral lands are sold outright, and the owners are taxed like other property holders. This is one reason of the comparative ease with which capital can be secured here for such investments. It would

be, in my judgment, better for Nova Scotia to adopt a similar policy. But if the coal lands are to be leased, then the government should do as private owners do, namely, lease for a fixed period (25 or 30 years) at a specified royalty, and bind itself not to change that royalty until the end of that period. The effect of leaving the legislature free to change it "from time to time" is simply to make lessees dependent, not upon clearly defined rights of which they cannot be deprived, but upon the favorable or unfavorable action of a varying body of men, who have to be influenced, legitimately or illegitimately, to let the leases alone. This means, in the best case, constant expense to lessees for the proper representation of their case to successive legislatures. In the worst case, it means lobbying, bribery, and legislative blackmail. Canadian politics have furnished some recent instances, going to show that the worst may be apprehended in that latitude, as well as in this. I have no reason whatever to suspect the motives of the present legislature of Nova Scotia. If I believed that body to be actuated by unworthy motives, I would waste no words in argument. On the contrary, I would simply say to my friends engaged in coal mining in Nova Scotia, "These men want to be bribed to take their hands off your business. It is your duty to suffer the injury they threaten, rather than yield to their demands." Perhaps my advice would not be followed; perhaps the crisis would be averted by secret means—to the great injury of political morals, and the certain loss, besides, of the capitalists themselves; for nothing is more ruinous than to pay blackmail *once*, leaving to the next and the next and the next set of marauders not only the power to levy it again, but the encouragement of the established precedent.

But, as I have said, I do not take this view of the present situation in Nova Scotia. I assume (and, on present information, believe) that the Legislature means honestly; that the proposers of this scheme believe it to be within the clear right and the proper policy of the government; and it is to men thus disposed that I address my warning, urging them not to set for disinterested reasons an example which is certain some day to be followed with less worthy motives. If they really desire to promote the progress and prosperity of the Province, let them not only abstain from arbitrary action now, concerning vested interests in Nova Scotian collieries, but also offer fresh safeguards against arbitrary action hereafter. As to this point, I shall speak more definitely below.

I would add here, that not merely the corruption of individual legislators, but also the changes of party control, are to be feared in such matters. A party in power, for instance, enthusiastically favors "improvements" of all kinds; it offers bonuses, loans, cheap railroad rates, low taxes or no taxes, low royalties and large franchises, to attract capital and stimulate enterprise. It gets up a "boom," in short; and when the boom begins to decline the business reaction from over-speculation extends to politics also, and the other party comes into power. Perhaps this alternation is a public benefit on the whole. No doubt the new administration is bound to overhaul the work of its predecessor, to correct abuses, to undo the results of actual fraud and to adopt for the future whatever system it may deem better for the public welfare. But if it is to be understood that such "reforms" are to include the revision of the terms of *bona fide* leases of land (even when the right of such revision has been expressly reserved to the government), the result will be to force the representatives of the capital invested in such leases, and in extensive operations connected therewith, to act, in pure self-defense, with one political party, to supply money for its expenses and to influence employes in its favor. The corrupting influence of this situation cannot be overrated.

The net result of both the factors above described will certainly be, that the investment of capital for enterprises dependent for their profits upon the arbitrary action of the Legislature will be confined to parties who believe they have, and can keep, a "pull" on the Legislature, either through alliance with the party in power, or through control of individual legislators. But such a "pull" costs money—a great deal of money. Nobody who is willing to employ such means is fool enough to do so unless the profits of the business will be so large as to warrant this extra risk and expense. Such large profits cannot be made under free competition. Hence the industry itself is likely to be restricted, and the prices of the product are kept higher than they would be if capital were not thus handicapped. The total result, therefore, includes not only the demoralization of politics, but the retardation of industrial development.

3. I doubt whether an increase of royalty upon coal could be borne by the collieries of Nova Scotia generally. Certainly the weaker enterprises would be seriously injured by it, and thus the business would be delivered into fewer hands, which is just what the public interest does not require. All taxes on gross product, without regard to cost of production, have this bad tendency. It is only when they are very small indeed that it may be overlooked. But whether the collieries can stand it or not, its future effect upon the Province would be disastrous, by introducing into the problems of industrial enterprise an element of unnecessary insecurity. There is insecurity enough, Earth knows, in mining enterprise, without inventing new means of discouraging its promoters.

There has never been, probably, more unemployed capital in London,

Berlin, Paris and New York than there is to-day. Yet it has seldom been so difficult to enlist it in promising enterprises. One principal reason is declared to be (and I believe the statement), the hostility shown by legislatures to capitalists and corporations. Granger laws, special tax-laws, laws dictating prices of commodities, and a host of other fanciful experiments in "State Socialism," are driving capital away from the places that need it most. Would it be wise for Nova Scotia to join this procession of folly, and give notice that she also, "from time to time," intends to pluck and squeeze, and see how near she can come to killing, the goose that lays her golden eggs? If she does, even geese will shun her shores hereafter.

4. "But," it may be asked, "if it should be clear that the royalty now paid upon coal is smaller than, in fairness to the Province and without injustice to the industry, it ought to be, may not the Legislature, now or at any other time, at least wherever it has the expressly reserved right to change the royalty, exercise that right?"

My answer is that, as to future leases, there can be no question; and it would be a very good thing for the Legislature to try the experiment and see whether, under the higher royalty imposed, anybody would want to lease the lands. As to lands leased but not worked, there might be no special harm done by giving notice of a higher royalty to be exacted when work should be begun. But in both of these cases I think assurance should be given that this new royalty would not be raised again for a period of years, long enough to justify the investment of capital in extensive operations. Finally, as to enterprises now active upon leased lands, I think an immediate increase of royalty, whether lawful or not, would be in the highest degree unwise, and would inflict upon the Province an injury far greater than any benefit which could be expected from a temporary increase of revenue.

R. W. R.

CORRESPONDENCE.

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

Steel for Stamp Shoes and Dies.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: A friend of mine, a steel maker, wishes to ascertain experimentally the best composition of steel for stamp mill shoes and dies. To that end he has prepared several different sets of shoes and dies of various compositions, and now seeks some mill where the different kinds can be tested comparatively. Can you suggest any one who would be likely to enter into such a scheme; I mean any owner or manager of a stamp mill who would try these several sets and record the results?

Boston, March, 1892.

INVESTIGATOR.

[This is a very important subject, and there are doubtless many mill owners in the West who would be glad to make such a trial. If any will write to us about the matter we will put them into communication with the steel maker referred to, who will no doubt pay all the expenses of carrying out these tests.—ED. E. & M. J.]

Mining Notes from Alaska.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Winter has already broken, and there is considerable activity here, the rich strikes last season on Forty-mile Creek in the Yukon country having stimulated many old timers to take an early start for that country. Several parties have already left Juneau, and quite a number who came out last fall to buy supplies have started on their return journey, which even for the rugged and experienced miner is one of hardship. The Yukon miners, this season, are taking in much larger amounts of supplies than usual, so as to be able to spend next winter there and reap the harvest of golden nuggets while they can. Every steamer from the States brings new men who are going to face the difficulties and dangers of the long trip to these gold fields.

The winter has been unusually quiet. The influenza has lost its hold but not until it had secured a few victims, among whom was one of Alaska's pioneers and one of the first and most prominent of Juneau's mining men—Mr. Patrick J. McGlinchey, of Cambridge, Mass.

The entire Wheelock party has been given up as lost, as repeated efforts have been made by Juneau parties, who have gone to Lituya Bay to obtain information of them, and nothing can be learned. Their small schooner probably sunk at sea in a storm.* The parties on board were S. O. Wheelock, Morris Orton, John Ellis, Jeff. Talbot, W. Whittaker, Joseph Cummins, Harry Spence, A. R. McConnaha and Wm. Prior. There is but one chance in a thousand that they were saved by their boat being driven a thousand miles west on to some of the islands along the coast. If the Government had a seaworthy boat at Sitka instead of the old "Pinta," more might have been learned of the fate of these men.

The Treadwell mill has run pretty steadily all winter and the Nowell tunnel was extended about 200 ft. into the basin, until gravel was struck at the tunnel level. Work has been progressing at Schuck toward the re-opening of the tunnel. The Nowell combination has sent men to Berner Bay to start up the saw mill which was purchased last fall.

ALASKA, March, 1892.

W.

* [In our last issue we printed a dispatch received from Alaska by telegraph stating that the Wheelock party had arrived safely at Yakuta. There have been no further particulars since then.—ED. E. & M. J.]

The Free Coinage Discussion.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have read with much interest the views you express on the free coinage question and the views of your various correspondents. Even at the risk of being as mercilessly picked to pieces in an editorial note as my predecessors have been, I venture to submit my views on the subject.

Last year, with silver higher in price than for several years, it was frequently stated by the opponents of free coinage that the large gold exports were a direct result. One of their most emphatic statements is that with free coinage a silver dollar will not be worth a dollar, and that an employer paying his men's wages in silver dollars will virtually rob them of about 30 cents on every dollar; that practically the men's wages will be reduced 30%.

Referring to the first proposition, if gold were exported last year because silver was above its intrinsic value, why is gold being exported at the present time, when it is undoubtedly below its value? Its value must depend on the cost of production. At the present price there are many of our leading mines that cannot pay running expenses, even though they have very extensive bodies of ore developed preparatory to extraction. Is it not a fact that the high price of silver last year had nothing whatever to do with the large exports of gold? Personally, I think so. I believe the exportation of gold both last year and this year was, and is, due to the foreign investors in American securities having to realize on account of the monetary difficulties in their own countries. I have learnt from correspondents in different parts of the world that their "home" investments have depreciated in value, so that they could only realize by incurring a heavy loss. It is natural under these circumstances that investors residing in foreign countries whose own investments have depreciated should realize on investments that have best maintained their value. I believe the fact of the foreign investors selling their holdings in the United States, and receiving gold in exchange, is the true reason of the exports of gold. Although so large a quantity of gold has left the country it is not therefore poorer. The securities received in exchange are undoubtedly worth what was paid for them, and the interest or profit derived from them, instead of going into the pockets of foreign investors, is going into the pockets of home investors.

With regard to free coinage reducing the wages of the wage earners 30%, or any per cent., I must express much doubt. It is the Eastern capitalists that oppose free coinage. I have yet to learn that the large manufacturers and the capitalists who are interested in many extensive operations where very large numbers of men are employed are averse to reducing the wage earners' wages 30% whenever, or however, the opportunity occurs. If the statement is correct that free coinage means the cutting down of wages 30% the Eastern capitalists would most certainly want free coinage; their opposition to the measure is the best argument that that theory is incorrect.

With the price of silver at 90 cents per ounce troy the value of silver in a dollar is 70 cents. With free coinage a dollar would contain a dollar's worth of silver, if silver increased in value as the exponents of free coinage hope.

The mining industry in the Far West should be fostered and encouraged in every way possible. The Far West has no manufacturing industries to depend upon. If it were not for the numerous mining camps the wide expanse of agricultural lands would be very slowly settled, as there would be little market for the products of the country.

The United States can well afford to charge a small duty on imported metals if it has the effect of increasing the mining industries at home. If the price of copper, silver and lead were to go down to a figure where only the rich and extensive deposits would pay for working, but little interest would remain in searching for new deposits, and the opening up of this great Western country would be retarded for a generation or two to come.

BUTTE, Mont., March 1, 1892.

A. H. WETHEY.

[The large gold exports last year were because the balance of trade was against us, and in consequence of that the rate of exchange was such that it was profitable to ship gold hence. The balance of trade was against us largely because Europe was selling American securities, probably in part because of the fear that the adoption of free coinage here would greatly diminish their gold value. The reason that most of the gold so exported did not come back to us before the end of the year, as was expected, was, without doubt, the fear that free coinage legislation here would depreciate the values of our securities; so the foreigners continued unloading them. Gold was exported from this country in February and March of this year because certain bankers in Europe (said to represent the Austrian Government, which is endeavoring to establish its finances on a gold basis) wanted it badly enough to pay a premium for it. These shipments were made with sterling exchange at 4'87@4'88. The rate at which gold coin can be exported without loss is 4'88½ for bars and 4'89½ for coin.

The statements that silver is above or "below its intrinsic value," which our correspondent makes, are meaningless. Its value is the price it will bring in gold, and is at present about 87 cents per ounce. It is a fact that the high price of silver last year had nothing to do with the exports of gold, but had it not been for proposed free coinage legislation, involving the removal of the chief buyer of silver (the United States Government), and the consequent fall in value of the metal, more silver would have been exported instead of gold.

Mr. Wethey is right when he says that the value of silver must depend on the cost of production, and many mines cannot produce it at a profit at the present time. But there are many which can, and as in every other industry it is a case of the survival of the fittest. What the free coinage advocates desire is that the Government should support the weak mines and add to the profits of the rich ones at the expense of the taxpayers, who are chiefly the poor people of the country.

If all commercial nations would unite in adopting a standard ratio between gold and silver, at which they would accept either metal indifferently, it would be widening and strengthening the "corner" extend its duration, but so far from that being probable, every silver standard country is now endeavoring to get on the gold basis, and with India, the great purchaser of silver, this effort is rapidly becoming an element affecting the value of the white metal.—ED. E. & M. J.]

THE NEW SULLIVAN GADDING MACHINE FOR STONE QUARRIES.

A new type of the Sullivan gadding machine for stone quarries, which is used in connection with channeling machines, is shown in the accompanying illustration. The method of using the machine is well shown in the background, consisting of drilling rows of horizontal holes under a tier of stone having free ends, and with a channel cut a few feet back from its face. By driving wedges into the holes drilled by the gadder, the tier can be detached from the floor of the quarry, and can then be broken into smaller blocks by means of wedges in horizontal and vertical or inclined rows of holes.

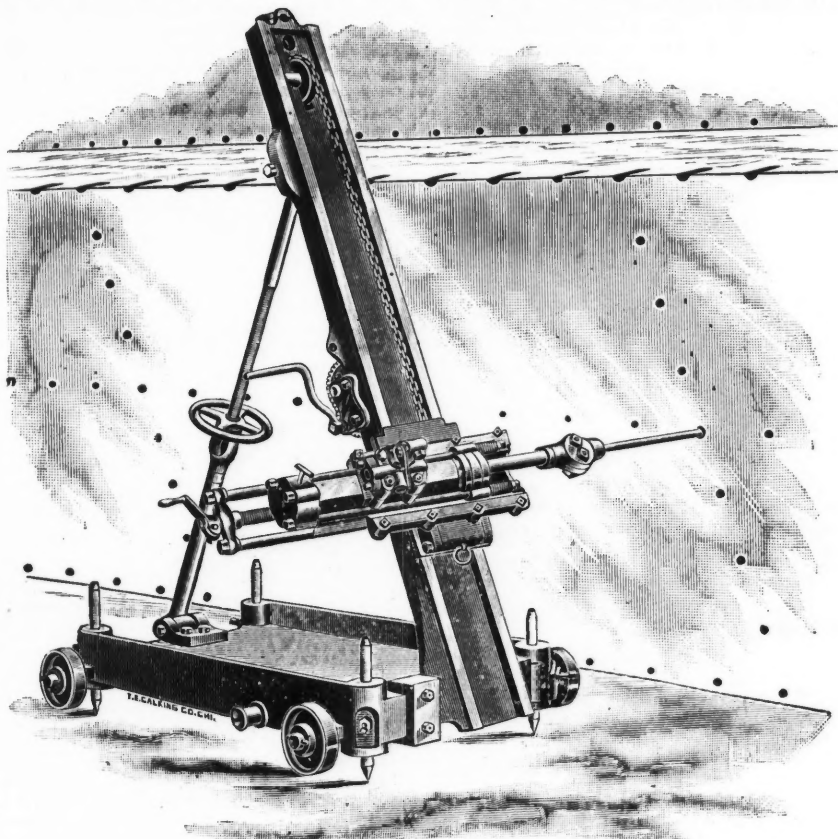
The new Sullivan gadder is, in some respects, similar in its principles of construction and operation to the Sullivan steel gang channeling machine. The gadder is mounted on the adjustable frame which has been used for many years on the Sullivan diamond pointed gadder in the Vermont marble quarries, and which permits horizontal holes to be drilled close to the floor of the quarry and in vertical rows at any angle.

Some of the improvements which have been made in the new Sullivan gadder are in its valve motion, which is simple, durable and economical of steam, and which permits the blows to be struck quick and fast; in its chuck for holding the drills, which can be replaced, when broken, without replacing the piston and rod; in its improved ratchet for rotating the drill while at work; and in other details which add to its durability, economy and convenience of operation, and rapid work. The machine is in use in the marble quarries of Vermont, New York, Tennessee and

of \$32 per ton, or \$800,000. In addition to this 2,741 tons of second class milling ore, estimated to be worth \$20,000 net, has been raised and stored in the yards. During the year the J. R. Keene claim, adjoining the company's property, has been purchased.

Captain Plummer says in his report to the directors that the lead product of the vein has come up to his highest expectations. The principal feature in the past year's operations has been the discovery of a remarkably rich ore body at the 1,250 ft. level south of the shaft. Especial importance is attached to this strike from the fact that the character of the ore differs from any other found in the mine. It contains chloride of silver, some native silver and hard and soft carbonates of lead. Alongside of these is found silicious ore of good grade, and the appearance of the whole strongly indicates that the apex of a very valuable ore body has been uncovered.

During the year the main shaft was sunk 214 ft., making its total depth on the incline 1,362 ft. and its vertical depth 818 ft.; 1,598 ft. of levels, drifts and cross-cuts were driven and 480 ft. of raises. There were hoisted 16,739 tons of ore, of which 9,809 tons were shipped to the mill and 3,234 tons to the smelters, the balance being carried to the stock piles. The mill crushed 10,791 tons of ore, 1,733 tons of salt and 103 tons of iron ore, making a total of 12,627 tons (wet). The pans worked 11,645 tons (dry), which averaged 40.408 ozs. silver per ton. The tailings averaged 3.488 ozs. per ton. The percentage saved, according to assay, was 93.58, and according to bullion produced, 93.78. The amount of silver produced from ore was 451,305 ozs.; from old amalgam, 7,600 ozs.; the



NEW SULLIVAN GADDING MACHINE.

Georgia, where its work has been very satisfactory in comparison with older styles of gadders. This gadder is sold by the Diamond Prospecting Company, of Chicago, Ill.

OFFICIAL REPORTS.

Elkhorn Mining Company, Limited, of Montana.

The directors' report shows a net profit for the year 1891, after payment of income tax, of £71,224 17s. 1d., which, together with the balance of £14,206 2s. 7d. brought forward from the previous year, makes a total balance on revenue account of £85,430 19s. 8d. Out of this sum four interim quarterly dividends have been paid, amounting in the aggregate to £65,627 12s. 6d., being a total distribution during the year of 37½% upon the paid up capital of the company, leaving a balance to be carried forward of £19,803 7s. 2d. In 1890 dividends at the rate of 30% per annum were paid, and £14,206 2s. 7d. carried forward. During the twelve months ending December 31st, 1891, 11,645 tons (dry) of ore were treated in the mill, producing, after payment of expenses of shipping, refining, and selling, a yield of \$441,452.76, equivalent to \$37.90 per ton; there were also raised from the mine and sold to smelters 3,234 tons of high grade ore, realizing \$207,756.70, equivalent to \$64.22 per ton, or a total produce of \$649,209.46, equivalent to a general average value of \$43.62 per ton. The average cost of mining and milling (including large sums spent in prospecting and development work, all of which are charged to revenue account) amounted to \$19.86 per ton, as compared with \$18.52 for the previous year. In the milling department an increase in the amount of salt used has resulted in a saving of 93.78% of the assay value of the ores, as against 86.83% during 1890.

Captain Plummer, the manager of the mine, estimates that the reserves of first class ore amount to 25,000 tons, which should produce a net profit

amount of gold produced was 530 ozs. The stamps were in service 334 days and 22 hours; the pans 349 days and 10 hours. The average amount crushed per stamp per day was 1.348 tons. Of the smelting ore sold 3,074 tons were lead ore, containing 262,706 ozs. silver and 463 ozs. gold, and 613,495 lbs. lead, and 161 tons of silicious ore, containing 9,209 ozs. silver and 11,744 ozs. gold. The cost of mining, including breaking ore, sinking main shaft, ore sorting and all other charges was \$10.64 per ton. The cost of milling was \$9.226 per ton, of which \$3.6212 was on labor account and \$5.6056 on supplies account.

Manufacture of Sodium Borates.—When borates containing boracic acid and lime are transformed into calcium tetraborate by addition of crystalline boracic acid, or when sulphuric acid or sodium bisulphate is added to the aforesaid borates in such a quantity that by the boracic acid set at liberty and the decomposed borate or lime calcium tetraborate is obtained, the latter may be transformed easily into sodium tetraborate and gypsum by heating it with sodium sulphate, according to the following formula:



This reaction may be used with advantage in the manufacture of sodium borates, according to C. Bigot and J. Schreiter, of Hamburg, Germany, who have patented a process for this purpose. The operation is effected as follows: 100 parts of borate of lime, containing 45% boracic acid and 31% calcium oxide, and 200 parts of water, either with 37 parts of sulphuric acid and about 140 parts of sodium sulphate, or with 91 parts of sodium bisulphate and about 85 parts of sodium sulphate, are boiled together in a digester under a pressure of 2½ atmospheres, or in an open pan provided with an agitator. The mixture is then forced through a filter press to separate the insoluble gypsum. The solution may be then neutralized by any base to separate the borax,

GOLD WASHING IN COLOMBIA.

Written for the Engineering and Mining Journal by Charles Bullman, M. E.

In Colombia there are four methods of washing gold, depending upon the different conditions under which the metal is found. These methods may be named as follows: 1, *Caliche* washing; 2, gravel bank washing; 3, river bank washing; 4, river bar washing.

1. *Caliche Washing*.—A *caliche* bank is a bank composed of clay, sand, pebbles and small boulders indiscriminately mixed. There is always a stratification, but it is not in any way dependent upon the weight or size of the materials. It is a stratification of the clay itself, depending upon successive times of deposition and different origin of the material. In general, there are four strata, the bottom one being blue, the second red, the third white or gray, and the fourth or top stratum yellow. It frequently happens that one or even two strata are missing, and when this is the case it is generally the white or yellow. Sometimes the red stratum is also absent, but with less frequency than those above it. The blue is always present. The blue color is due to iron in a ferrous, the red to iron in a ferric, condition.

The blue and white strata contain the largest amounts of black sand, while the yellow contains very little. The larger amount of the gold taken from any particular "face" is found in a layer or *cinta*, varying from four inches to two feet in thickness, but gold is always found disseminated throughout the entire mass. As the blue stratum is always present, the *cinta* is more generally found in it than in any other of the strata, but still it does occur in any of the others, and sometimes it happens that the richest part of a "face" is found within a few inches of the surface. The *caliche* gold is very fine and flaky, no rounded nuggets being found. A piece two grains in weight is unusually large.

A reservoir is made either by damming a convenient creek or by simply digging a pit near the mine; in the latter case the supply of water is very limited, as the miner depends entirely upon direct rainfall to fill his reservoir or *pila*. The average *pila*, so constructed, will contain 2,000 cu.

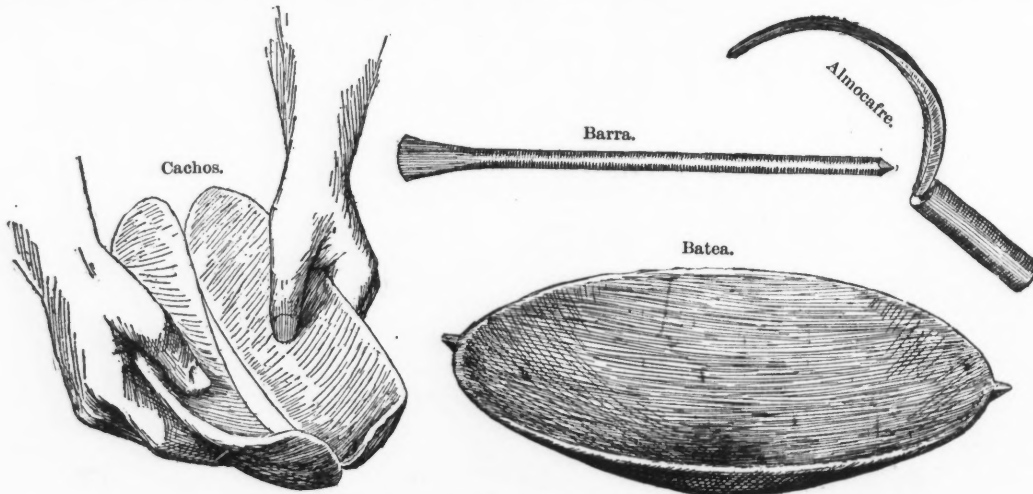
A reservoir is constructed the same as for a *caliche* mine, but the ditch is constructed at right angles to the line of the "face." Finally, a ditch is dug parallel to the "face," about 6 ft. from it. The sluice or *canalon* is also parallel to the "face" and very near it.

The barren clay is first worked off back to the parallel ditch. The gravel is then broken down in large masses until the sluice is full. It is so left until the heavy rains have thoroughly disintegrated and washed it; or, if the reservoir is a large one and water is plenty, it is turned on, and the women and children wash all the largest stones separately. The sluice is cleaned as in the case of *caliche* washing.

In general every family has its own mine or mines, and laborers in the ordinary sense are not to be had. But on certain occasions labor is borrowed. For instance, when a family is about to make a *pila* and ditches, they get Pedro and Juan and Francisco, with their wives, to do a day's work by promising to return the day's labor whenever it is needed. The tools used are simple, few in number, and cost but little. The *barra* costs \$5; *almocafre*, \$2.50; *batea*, 55 cents, and *cachos*, 12 cents.

3. *River Bank Washing*.—All of the rivers of the west coast of Colombia are, owing to the great rainfall, subject to sudden and great floods. In consequence of these floods old banks are frequently washed away, and new banks are as constantly formed. When the rivers run very low in the dry season some of these newly-formed banks are found to contain a thin stratum of black sand, which may or may not contain gold. If upon trying it (*cateandola*) it is found to contain gold, it is worked in either one of the following ways. If the amount of gravel and clay above the *cinta*, or pay streak is small, it is cut down with the bar and thrown into the river. Then the black sand is scraped up and washed in a *batea*. If the gravel over the pay streak is of considerable thickness, no attempt is made to remove it. The black sand is scraped out as far as possible without caving the bank. When the river rises the bank caves, and the debris is washed away. When the river again runs dry the miner returns, and the operation is repeated.

Certain of the river valleys are very broad, that of the Iro at Santa



IMPLEMENTS USED BY NATIVE GOLD WASHERS IN COLOMBIA.

ft. of water; the largest seen and measured contained 4,800 cu. ft. A small and generally poorly constructed ditch takes the water to the head of the bank.

The reservoir being filled, the miner with his wife and such of his children as are able to work goes to the mine at 9 o'clock in the morning. The reservoir is then opened and the miner cuts down the bank under the running water with the broad edge of the bar (*barra*), and as the pieces are washed down the women and children break them and at the same time throw out the large stones. The sluice is generally cut in the clay itself, a grade of 10 in. to the rod being given when possible, and falls or drops of from 1 to 3 ft. are also given when circumstances permit of it.

As a rule the sluices are too short; they generally tail into a neighboring creek. As the sluice has too much grade and as it is short, the clay is not always thoroughly disintegrated, consequently much metal is lost—as much as 40% in many cases. A proof of this is to be found in the fact that creeks long since worked out still yield a considerable quantity of metal every year, it being carried into the creek from the sluices of the mines above.

Unless the "face" is very rich the sluice or *canalon* is cleaned up but once a year. In cleaning up they begin at the end, the man loosening the tightly packed material with the sharp end of the bar, while the woman rakes it with the *almocafre*. The children wash and throw to one side or the other all stones over 2 in. in diameter. In working toward the head they manage to restore the grade, which is always lost by unequal filling. The smaller stones are removed by the woman with the *cachos*. This they do by pushing the material up and down the *canalon*, the attrition removing all clay from the stones. The gold sinks, the clay runs off and the woman scoops up the stones, souses them in the water a few times to remove any particles of gold, and finally throws them to one side. The *canalon* is generally gone over three times, the *cargo* being lowered 6 to 8 in. each time. Finally nothing but black sand and very fine pebbles are left, which are gathered and washed in the *batea*. No mercury is used.

2. *Gravel Bank Washing*.—This kind of washing is not liked by the natives, and it is only done when the gravel is very rich, or when no other kind can be obtained. No banks are washed where the gravel is over 8 ft. thick. This kind of deposit is a true stratified gravel, blue when first exposed, but changing to red with exposure. These deposits are always found near a river or large creek, and are always covered with *arren* clay and loam.

Rita being two and a half miles. The river formerly flowed on the north side, but gradually filling up with gravel and boulders, it has changed its bed to the extreme south, leaving a gravel flat only slightly elevated above its present normal level. This gravel is for the most part barren of gold, but rich pay streaks are found at the heads of the old river bars.

Mining in this deposit is difficult, and success largely a matter of luck. The deposit is from 10 to 15 ft. thick, and water is found in large quantities at a depth of 4 to 6 ft.

The thin stratum of top clay being removed, a hole is commenced about 12 ft. in diameter, the stones loosened by the bar being removed by hand. When water is reached, every stone is washed before removal. The fine stones are removed with *cachos*, as in cleaning up a sluice. The water is bailed out with *bateas*, pails being unknown. When the hole gets too deep to throw out stones or water, a step is made for a passer. If the gravel is so loose that the water enters too fast to be bailed out the hole is abandoned. The same happens when two or three boulders are encountered which are too heavy to be removed. When gravel has been taken out down to within six inches of bed rock, the remainder is taken out and carefully washed in *bateas*. The fine gold is all lost.

4. *River Bar Washing*.—This work is generally performed by women alone. February is the driest month of the year, and during it the rivers are very low, and beaches and bars are then exposed, which during the rest of the year are covered by 2 to 4 ft. of water, with a current of 5 ft. per second.

When a good paying bar is found the news travels quickly, and women come from miles around to work it. The only tools used are the *batea* for washing, *cachos* for gathering, and *almocafre* for loosening the gravel. The scene presented is oftentimes very animated. Babies are placed in baskets under the shade of some gigantic *picbindé*. The older children play about the beach, and even assist in the washing. The women too old to work tend the fire and roast plantains for the noonday meal. The dress of all is extremely simple, being nothing more than two yards of a coarse woolen cloth tied around the waist. It is a yard wide, and consequently while touching the ground when worn by a short woman, it comes but little below the knees when worn by a tall one. Some of the women tie a gaudy handkerchief about the neck, leaving it fall over the bosom; others are naked above the waist.

The work is begun by removing the large stones on top; or rather the women facing up-stream throw the stones in front and on each side, forming three sides of a rectangle (*burro*). Then the finer gravel and sand

is loosened with the *almocafre*, and dipping in their *bateas* they fill them from in front by the aid of the *cachos*. When full the *batea* is washed over the *burro*, the resulting metal being put in a gourd, kept for the purpose, called *mate*.

The women frequently work when the water is so deep that it is necessary to dive, and then a flat stone weighing from 4 to 8 lbs. is tied to the small of the back by creepers called *dejuco* or *guasca*. The work is carried on in a very desultory manner, the women frequently stopping to smoke and gossip or to nurse their babes they have brought with them, so that although the day is spent at the place it is seldom that more than three hours' work is done, during which time 35 to 45 *bateas* of gravel are washed.

CONCENTRATING SULPHURIC ACID IN GOLD-LINED PLATINUM STILL.

Written for the Engineering and Mining Journal by G. Lunge.

In my remarks on the progress in the manufacture of heavy chemicals in Europe during the year 1891 (ENGINEERING AND MINING JOURNAL, January 2d) I mentioned the success of a combination of gold and platinum for sulphuric acid stills. Authentic reports which I have since received have convinced me of the great utility of that process, and I think it may be interesting to American readers to learn something more about it.

The stills in question were brought out by Mr. W. C. Heraeus, of Hanau, in Germany, in January, 1891. Since that time fifteen of them have been supplied to various customers. It was found in all cases which have hitherto come under examination that gold is far less attacked by boiling strong sulphuric acid than platinum, the proportion being 1 to 7 or 10. But a mistake was committed at first in constructing the stills, which has now been detected. At first it was thought that it was suf-

ordinary platinum still. But two questions may be asked now. First, why must the Heraeus combination be employed instead of an ordinary gilding of the platinum? Secondly, if gold is the only metal in contact with platinum, why not employ a copper still lined with gold? The first question may be answered as follows: Any ordinary gilding, whether galvanic or igneous, does not at all effect the purpose of protecting the platinum, as the minute film of gold is always more or less porous; the base inequalities are speedily sought out by the boiling acid, and the gold film is soon detached from the underlying metal. But in the Heraeus system a sound and thick lining is produced by pouring melted gold on to the surface of a platinum ingot brought to a white heat, beyond the fusing point of gold. Thus an intimate junction is produced, and a substantial, solid coat of gold is left on the inside, which is never at any point detached from the platinum, and behaves toward sulphuric acid as if the metal consisted entirely of gold. Nor is it possible to employ a base metal in lieu of platinum, for the slightest accidental injury to the thin gold lining would allow the boiling acid access to the base metal which would be instantly dissolved and would cause the still to collapse.

It is true that a gold lined still costs a good deal more than an ordinary one. Taking a Delplace still weighing 37½ lbs., an inner gold lining of 0.1 mm. for the bottom and 0.025 mm. for the dome will weigh about 5½ lbs., and will raise the cost by about \$1,000, deduction being made for the value of an equal thickness of platinum. This means a small amount for additional interest on plant. But allowing for a yearly production of 2,000 tons of acid, the annual saving of platinum, otherwise dissolved and carried away by the acid, would be at least 2½ lbs., worth nearly \$300, and the saving would be in reality very much greater than that, seeing that the total renewal of a still, in which case only ¼ or ⅓ of the price of new platinum is realized, will occur at very much rarer intervals than at present. It may be assumed that the additional expense of a Heraeus still will be paid for in from one to two years.



RIVER BAR WASHING IN COLOMBIA.

ficient to apply the gold lining merely to the bottom of the stills, or, at most, as high up the sides as the liquid acid reaches. But a year's experience has proved that this is not sufficient; the gold, and therefore the bottom, is certainly perfectly unchanged, but the upper portion of the still, where the platinum is not protected by gold, is corroded as much as before, especially at the point of junction between the platinum and the gold. This has led to ordering new stills to be lined entirely with gold, but keeping the lining much thinner at the upper portion than at the bottom. I will now quote some details of the reports which I have seen.

At the Griesherm Chemical Works (one of the largest and best managed in the world) a still was set to work in April, 1891, composed of an old platinum dome joined to a platinum-gold bottom.

The still was run night and day, mostly for acid of the highest concentration (96%). In December, 1891, it was examined and the upper (platinum) portion was found to be corroded, but the gold lined bottom did not show a trace of either mechanical or chemical action. Therefore a new still, entirely lined with gold, was ordered forthwith.

At the Mansfield Copper Smelting Works a Faure & Kessler still was started in June, 1891, furnished with a platinum bottom of 0.4 mm. thickness, lined with 0.1 mm. gold. On January 15th the still was dismantled, having furnished 646 tons of strong vitriol, because the side portions, not lined with gold, were corroded. The bottom, however, plainly showed the hammer marks and exhibited no signs of corrosion whatever.

At the Corbetta Chemical Works a Prentice still was put up on March 9th, 1891, lined at the bottom and 3 in. up the sides with 0.05 mm. gold. In January, 1892, after having furnished 1,700 tons of strong vitriol, partly up to 96%, it was examined, and the loss in weight was found = 32 grammes, all of which was from the upper unprotected portion.

At the Dupry works a similar still was started in February, 1891, and stopped for examination in February, 1892, after having furnished 1,163 tons of strong vitriol, half of it at 96.7%. The loss of weight was 120 grammes, or a fifth of what would be expected from an ordinary still under favorable circumstances. Here also the loss manifestly extended only to the unprotected platinum portion.

There cannot be any reasonable doubt that the loss of a stock entirely protected by a gold lining would be less than one-tenth of that of an

The Course of Metal Prices in Germany.—The latest volume of the "Statistical Reports for the German Empire" contains the following statement, which shows the prices of coal, pig-iron, lead and copper in that country since 1882-83. The prices stated are those quoted at the close of the year:

ARTICLE.	1891.	1890.	1889.	1883.	1879.
Pig-iron.....1,000 kilogs.	Marks. 43.21	Marks. 65.60	Marks. 38.42	Marks. 57.79	Marks. 51.37
Lead.....100 "	26.23	25.10	27.25	26.88	30.67
Copper.....100 "	119.50	129.75	118.50	141.27	133.42
Coal.....100 "	44.98	45.11	38.25	28.60	

Glass Tubes of Large Size.—Glass tubes of large size are costly when produced by the ordinary method of blowing, owing to the fact that none but the very best workmen can produce them. The ordinary method of coating only admits of the production of short tubes of considerable thickness. In a memoir on the manufacture of glass pipes of large diameter, by L. Appert (*Bull. Soc. d'Encouragement l'Industrie Nationale*), improved machinery for casting and molding such tubes is figured and described. The molten glass in the required state of fluidity is run into a strong iron mold, which is then closed, and the workman regulates the rapidity of the passage of the spindle or core according to the dimensions of the tube. The mold is then opened and the tube taken out for annealing. With tubes of 100 mm. diameter, 15 can be made in an hour. Two metres is a usual length, which would give 30 metres an hour, but of that 20% must be deducted for failures, giving an effective output of 24 metres an hour, or about 500 metres per diem. Four men and a boy are employed in the work. The power—steam or compressed air—required for driving the cone or spindle is very slight. The facility of working is greater with the larger size of tubes. The *Journal of the Society of Chemical Industry* says the method of connecting the tubes depends on the use to which they are put, metallic joints being used for tubes designed for the passage of water at high pressure.

RECENT DECISIONS OF THE COURTS AFFECTING THE MINING INDUSTRY.

Supreme Court of the United States (October Term, 1891.)

LARKIN & M'NAMARA, PLAINTIFFS IN ERROR, v. UPTON, LARGEX & ZENOR.

1. It is unquestioned law that the top, or apex of a vein, must be within the boundaries of a claim, in order to enable the locator to perfect his location and obtain title.

2. The apex of a vein is not necessarily a point, but often a line of great length.

3. Any portion of the apex in the course found, or strike of the vein found within the limits of a claim, is sufficient discovery to entitle the locator to obtain title; for while the owner of a mineral vein may follow it in its descent into another's territory, beyond his own side-lines, he cannot follow it beyond his end-lines; and the vein beyond these end-lines is subject to further discovery and appropriation. Judgment of court below affirmed.—*Error to Supreme Court U. S. from Territory of Montana [Decision March 14th, 1892].*

United States Circuit Court of Appeals; Ninth Circuit.

NORTHERN PACIFIC RAILWAY GRANT—MINERAL LAND RESERVATION—DEFINITION OF CLAIM—SUBSEQUENT MINERAL DISCOVERY ON PATENTED LAND—SQUATTERS.

1. The Act of July 2nd, 1864, granting land to the Northern Pacific Railroad Company to aid the construction of its road, which creates a reservation of the odd numbered sections of land "not mineral," within the limits defined, "which are free from pre-emption or other claims or rights," from the time of filing a plat of the general route in the General Land Office does not prevent parties from taking up mining claims in the reserved lands after the filing of such map and before the definite location of road, and it does not avail the railroad company that lands so located with mineral claims are in fact non-mineral lands.

2. In the common parlance of the mining-districts the word "claim," used as a noun, has a definite and particular meaning, denoting when coupled with the name of miner, a particular piece of ground to which that miner had a recognized vested and exclusive right, or possession, for the purpose of extracting precious metals therefrom; and there is reason to suppose that in framing the reservation clause of grants that Congress selected the word "claim," for the express purpose of excluding from the grant lands held in possession of, and claimed by, miners according to local customs.

3. The Court does not understand that a patent issued to a settler under the homestead pre-emption laws would be void, or even voidable, by reason of the mere fact that the land conveyed contains valuable mines. The authorities cited certainly do not maintain that title resting upon patents from the Government can be vitiated by the discovery of minerals subsequent to the issuance thereof.

4. In all cases in which land patents have been canceled the courts have proceeded according to the familiar rules of equity, and the Government has been required to allege and prove, by clear evidence, fraud, or some other sufficient equitable ground for wresting the property involved from the parties sued.

5. The claim of a mere squatter, based upon nothing but an unlawful occupancy of lands, will not be taken notice of by Government for any purpose. Judgment of Court below affirmed.—*No. Pac. R. R. Co. v. Sanders, et al [Error to Circuit Court U. S. from Dist. of Montana.—Decision January 25th, 1891.]*

Department of the Interior.

SCHOOL LAND PATENTED IN LIEU OF MINERAL LAND INDEMNITY SELECTION.

A school indemnity selection, made by the territory (of Washington) in the place of land which has been patented as mineral, and of record at the date of the passage of the act of Congress of February 22d, 1889, authorizing such selections, operates to reserve the land as against a subsequent homestead application.—*McKenzie v. the State of Washington. [Rendered March 18, 1892.]*

ALABAMA IRON LANDS—ACT OF MARCH 3RD, 1883.

The act of March 3rd, 1883, does not require the public offering of land that has been returned as containing "iron," if such return does not show that the said land is "valuable," on account of the iron that it contains.

There are only two classes of lands reported as being mineral in Alabama which may be disposed of without first being offered, to wit: *First*—Such as were included in an entry on March 3rd, 1883, when the act was approved, or land at that date covered by actual legal settlement, and *Second*—Land not reported as "valuable" for coal or iron.

The mere report that the land contains "iron," without any statement that it is *valuable* by reason thereof, will not prevent the land from being subject to entry before it is offered.—*In Re James W. Burnum, Huntsville. [Rendered March 22, 1892.]*

THE DANGERS IN THE MANUFACTURE OF EXPLOSIVES.

On March 7, a paper was read before the London Section of the Society of Chemical Industry, by Mr. Oscar Guttman, on "The Dangers in the Manufacture of Explosives." After describing the plant used in a modern nitro-glycerine factory, the author drew attention to the importance of the purity of the materials to be employed. The glycerine should be free from fats and all foreign bodies, and should leave a smaller residue than .15% on ignition. The sulphuric acid used in the preparation of the nitric acid should be free from arsenic and chlorine, as the presence of either of these elements in the nitric acid manufactured therefrom might lead to subsequent decomposition of the nitro-glycerine. Pure lead, free from zinc and other foreign metals, should alone be used for the tanks employed, and the sheds should be well ventilated and ample provision made for cooling the mixture by compressed air and efficient stirrers. The absence of leaks in the pipes and containing vessels, and well-made joints were essentials for good results.

The glycerine can be added to the acid either by means of a screw agitator, a perforated pipe, or an injector below the liquid. In the latter case, however, the acid soon corrodes the pipe, which has then to be renewed from time to time. It is very essential that no local

heating shall take place in the mixture, and that provision be made for quickly emptying the tanks in case of need. A sudden explosion is not to be expected, as in most cases of spontaneous decomposition the evolution of red fumes for some minutes before any serious danger is to be apprehended warns the operator of a possible accident, so that a careful and cool-headed workman has ample time to cool and stir the mixture and thus avert any catastrophe.

The removal of the acid from the nitro-glycerine is without danger. The secondary separation, in which are removed the traces of nitro-glycerine left in contact with a large excess of spent acid, is, however, a more likely source of danger. Waste can be conveniently destroyed by burning with paraffin, an operation which Doctor Dupre has shown is unattended with any danger. As nitro-glycerine is volatile, the vapor may be a source of danger if efficient ventilation be not rigorously enforced. In the manufacture of cartridges and blasting gelatine explosions have occurred through carelessness, but with ordinary precautions this part of the manufacture is not attended with any special risks.

The author then drew attention to the dangers of frozen dynamite, which explodes with a blow, due probably to a molecular rearrangement of the solid. Direct action of the sun's rays through glass, which might act as a lens and thus cause a local heating, must be avoided in the factory by painting the roof and windows white. On the whole, the author contends that the manufacture is less dangerous than that of gunpowder.

FLUORINE.*

By Henri Moissan.

I was the first person to obtain the element, fluorine, in a state of purity, and this I did for the first time in the year 1887. Since then I have considerably enlarged and improved my apparatus, which is now capable of turning out 160 cu. ins. of the gas an hour. I obtained this result by passing a strong current of electricity from twenty-six or twenty-eight Bunsen batteries through hydrofluoric acid, in which was dissolved a metallic compound, to increase the conductivity. Every part of the apparatus is constructed of platinum with stoppers of fluor-spar, through which pass the wires conveying the current. The purifying vessels, tubes, and connections are also of the same metal, fastened together by nuts and flanges with lead-washers, which, when acted on by the escaping gas, expand and seal any leak.

The tube in which the generation takes place is kept at a temperature of -9° F. by the evaporation of a very volatile organic liquid contained in an outer vessel, and the first member of the purifying series at -58° F. by the same means; the greatest care having to be taken that even the vapor of the refrigerating liquid does not enter any part of the apparatus, or else violent explosions occur.

Fluorine gas is of a yellow color, with a smell resembling bleaching powder. Every precaution has to be used in studying its action on other bodies, both on account of its dangerously irritating action on the eyes and mucous membrane of the operator, and its marvelous energy, far exceeding that of anything hitherto discovered. There is hardly a gas, liquid, or solid that it does not attack, usually, with the greatest violence; in fact, its mere contact with any other substance is nearly always signalized by the sudden evolution of intense heat and light and loud detonations.

As a supporter of combustion, fluorine leaves oxygen far behind. Lamp-black bursts immediately into brilliant flame and gets red hot in a current of fluorine gas, and charcoal is made to give an interesting exhibition of its porosity, by first filling its interstices with the gas and then burning spontaneously with sparkling scintillations. The diamond, however, is able to withstand its action, even at high temperatures. Silicon, a crystalline substance closely resembling the diamond, gives a very beautiful reaction, showers of brilliant spangles being scattered in all directions from the white-hot crystals, which are finally melted. As they do not fuse under 2190° F., some idea can be formed of the immense energy set free during the combination.

All the metals, with the exception of gold and platinum, are rapidly attacked by fluorine, and even those in less degree. Iron combines in the cold with splendid energy, becoming white-hot; and rust, when heated, behaves in a similar manner. Zinc, if slightly warmed, bursts into gorgeous luminosity, accompanied by bright white flames so intense as to be almost blinding. Mercury is attacked violently in the cold. I once attempted to pass a quantity of the gas into a tube standing over mercury protected by an inert fluid; but when inclining the tube, the two elements came into contact, there was a violent detonation, and the containing vessels were broken to atoms; with silver very little action occurs until 212° F. is reached; at a red-heat, however, incandescence is observed, the product melts, and, on cooling, has a sheen like satin. Gold, on heating, forms a volatile fluoride which, when carried to a slightly higher temperature, splits up again into the metal and the gas.

The behavior of liquids with fluorine is usually very energetic, and experiments have to be conducted with much caution. If the gas be passed into the middle of alcohol, the result is very striking; the whole mass is violently agitated, and each bubble, as it appears, becomes incandescent in the middle of the liquid, finally vanishing in flame. If a few drops of chloroform are shaken up in a tube full of fluorine gas, a violent explosion takes place, and the tube is reduced to fragments.

Hydrogen combines fiercely with fluorine, even in the dark, and at -9° F., the issuing stream burning with a blue flame, bordered by red. In every other known case, heat or some form of extraneous energy is required to induce the combination of elementary gases. Oxygen is one of the few bodies that appear to have no affinity for fluorine. Even when they are heated together up to 932° F., nothing is observed to take place between them. If a few drops of water are placed on the floor of the experimenting tube and fluorine gas is passed in, a dark fog is seen surrounding each drop, which presently clears and resolves itself into a characteristic blue vapor, apparently more than an inch in thickness, and which is found to be that most interesting condensed form of oxygen—ozone—in a state of great density.

* From *Annales de Chimie et de Physique*, October, 1891, and January, 1892.

THE SHAW ELECTRIC TRAVELING CRANE.

Until within a few years nearly all the cranes in use in machine shops and foundries in this country were of the jib type, despite its serious limitations as to area of floor served and large portion of the floor occupied by the mast foundation and thus rendered useless. A few traveling cranes had been built, but they were generally so crude in design and workmanship, and, consequently, so slow and jerky in their movements, that they met with little favor, especially in foundries, where smoothness of action is very important.

The comparatively late development of the traveling crane was undoubtedly due, not only to the fact that a higher order of design and better workmanship was required to produce a traveling crane which would operate satisfactorily than to construct a jib crane which would work with equal steadiness, but also to the difficulties connected with the transmission of power from an external source to a moving machine. This necessitated either a square shaft, with its cumbersome and expensive tumbling bearings, or rope transmission. With the advent of electric transmissions of energy, the latter difficulty was at once done away with, and electric cranes have now come into quite general use.

Among the first to apply electricity in this manner was Mr. Alton J. Shaw, then of Milwaukee, Wis. The first triple motor electric traveling crane put in practical operation on the designs of Mr. Shaw was erected

than breakage of parts, but absolutely prevent any possibility of "racing" in lowering.

The brakes are automatic in their operation and do not depend for their action on the skill or vigilance of the operator. One of them, the mechanical brake, is applied continuously by the reaction of the load itself, the force with which it is applied being proportional to an increasing with the load, and released by the pull of the motor. The other is applied by a powerful spring, and is always "on," except when withdrawn by the action of a solenoid in series with the hoisting motor. Without the mechanical brake the crane would "race" in lowering, as the magnetic brake is then withdrawn by the current which actuates the motor, and both the motor and load act in the same direction. Without the magnetic brake the load could not be stopped promptly after either hoisting or lowering, on account of the momentum of the armature. Without the capability of instantly checking the movement of the load, accurate handling would be impossible, as, when the current is thrown off it would always go either a little too far or not far enough. The two brakes acting in combination give great accuracy of control, which, together with the extremely slow speed at which the crane may be run, enable the heaviest loads within the capacity of the crane to be set with absolute accuracy.

All the truck wheels are cast from charcoal iron and the treads are chilled deep and hard and ground true. These wheels are considered by



SHAW ELECTRIC TRAVELING CRANE IN THE WORKS OF THE E. P. ALLIS Co., MILWAUKEE, WIS.

in the foundry of the Edw. P. Allis Company, in Milwaukee, Wis. Although an experimental machine and naturally somewhat crude in many of its details, it was at once pronounced by all who saw it in operation to be a great improvement upon the cranes previously in use there.

There has since been installed in the works of the Edw. P. Allis Company two more electric traveling cranes built by the Shaw Electric Crane Company, one crane of 30 tons capacity operating on the same tracks with the first, and the other of 15 tons capacity in the Reliance Works, No. 2 erecting shop, an interior view of which, taken from a photograph, is shown in the accompanying illustration. This crane, while not as rapid in its movements as some which have since been constructed, was, when put in, much faster than the majority of cranes then in use. It has a maximum hoisting speed of 25 ft., a bridge or longitudinal traverse speed of 350 ft., and a trolley or transverse traverse speed of 125 ft. per minute. The speed of each of these movements may be raised from nearly zero to the maximum by simply moving the reversing lever a greater or less distance either side of its mid-position. As but one lever is required for each movement, the manipulation required is of the simplest possible character. The crane is fitted with incandescent lamps of an aggregate of 600 c. p., which brilliantly illuminate the floor below whenever the crane is used at night. This crane, as are all those built by this company, is fitted with duplex automatic brakes, to which, in large part, is due the accuracy with which the load can be handled in hoisting and lowering. These brakes not only insure against the accidental dropping of the load from any cause other

than the makers to be better than steel, as the hard surface insures great durability, while the accuracy attained by grinding causes the traverse movements to be extremely free from vibration. All the shafts are large and bearings are unusually long. Great attention is given to the matter of accessibility, the machinery being so arranged that all important details may be removed and replaced readily without disturbing other parts. Bearings are capped wherever possible. The riders are very rigid, laterally as well as vertically, and have a large margin of safety.

These cranes are built by the Shaw Electric Crane Company, Muskegon, Mich. In addition to a large number of cranes of the usual speeds, they are now building several electric cranes to hoist 100 ft. per minute.

New deposits of the very rare mineral bertrandite ($2\text{Be}_2\text{SiO}_4 + \text{H}_2\text{O}$) have been found at Verrière, in the Lower Loire.

Keys made of cast aluminum are being extensively manufactured by Herr Ernst Meck, of Nuremberg, Germany, says *Eisen Zeitung*, over 200,000 having already been sold.

The Decomposition of Sulphurous Acid by Carbon at Very High Temperatures.—M. Scheurer-Kestner (*Comptes Rendus*, cxiv., 6) states that sulphurous acid at very high temperatures is decomposed by carbon, forming free sulphur, carbon monoxide, and carbon dioxide. M. Berthelot has shown that at a lower temperature sulphurous acid is converted into carbon monoxide, oxysulphide, and sulphide. The two latter bodies are not permanent at very high temperatures.

THE STANLEY HANDY LEVEL AND BUTT AND RABBIT GAUGE.

The improvement, shown in the level illustrated by Fig. 1, is so simple as to escape notice if attention is not called to it. The novel feature is the hand groove on either side of the block, which allows a firm hold to be taken of it. The ordinary carpenter's level as used is a heavy affair, but by the firm grip which can be taken of this new tool it is much more easily handled than the common form.

The Stanley butt and rabbit gauge, Fig. 2, is particularly designed for use in door hanging and tenon cutting. It is peculiar in construction because of two bars being used, one inside the other, and also from the fact

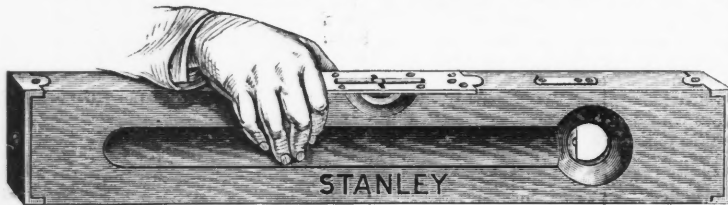


FIG. 1.

that the scribing point is on the inner bar and movable. The thumbscrew at the end of the bar adjusts the inner bar and scribing point.

Beside the rosewood head a metal head is constructed on the outer bar and thus the application for tenon cutting is arranged. For butt application the tool is used by bringing the markers or scribes on the end of the inner bar, back of and to any required distance from the outer surface of the steel plate. By placing this greater surface against the back of the rabbit in the door casing, the operator can then gauge correctly for the back leaf of the butt; and without changing any of the parts, the inner surface of the steel plate will act as a guide for the other marker in

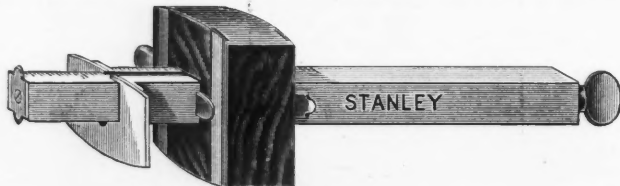


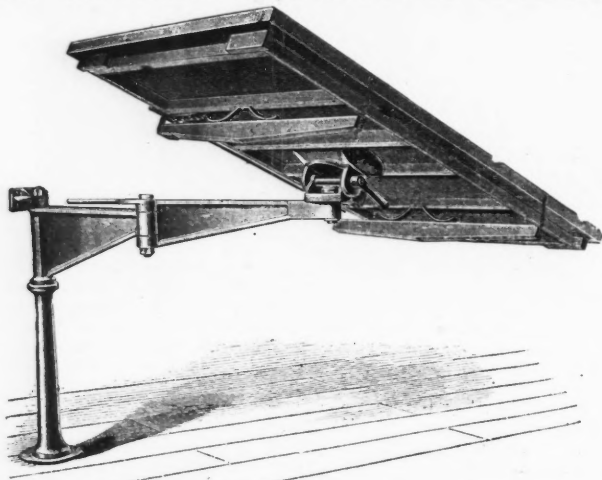
FIG. 2.

gauging on the edge of the door, for the front leaf of the butt. The thickness of the plate (1-16 in.) will set off the door sufficiently to clear the jamb, in opening and shutting. The rosewood head should be secured at the end of the bar nearest the thumb-screw, when the tool is being used as a butt gauge. By placing the edge of the butt between the surface of this head and the small blade which stands up back of it, the exact thickness of the butt is ascertained, and can be accurately gauged on both the door post and the door.

A NEW SOLAR PRINTING FRAME.

The accompanying illustration shows a solar printing frame made by the Philadelphia Engineering Works, Limited, of Philadelphia, Pa.

The articulated arms carrying the frames are so designed that they may be pushed out of a window, and made to assume any angle. The sash of the window may be lowered to the top of the main arm when the frame is outside and a lid hinged to the window sill thrown up to shut out cold. When the frame is within the room, the window may be



lowered entirely. The room is not obstructed with tracks and a large frame lying in a horizontal position, as this design, may be folded up and placed in a nearly vertical position against the wall.

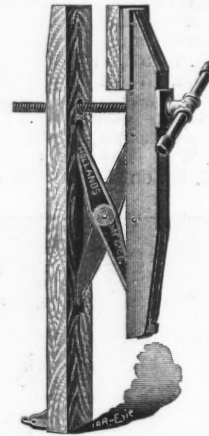
In order to secure a good blue or other print, it is important to have the frame as nearly at right angles to the sun's rays as is possible. Under these conditions a print can be made in considerably less time, and come out clearer and more distinct. The construction of this frame will permit it to be adjusted at right angles to the rays of the sun at any time of day.

The bed frame is made of white pine and covered with a layer of thick felting. The glass cover is hinged to the bed frame on the long edge, and secured by means of two oak bars, provided with elliptic springs. With this arrangement the glass may be brought to bear with a light or heavy pressure on the bed. When desired, the bed frame is provided with

a double thick plate glass and covered with thick felting. This gives an absolutely level surface, and prevents crimping of the paper. To the bottom of the bed frame is secured a universal bearing provided with a cramping lever. This bearing is mounted upon the end of a jointed lever or arm, which may be supported upon a pivotal column or a strong bracket firmly secured to the window casing.

THE HOLLANDS PATTERN MAKERS' VISE.

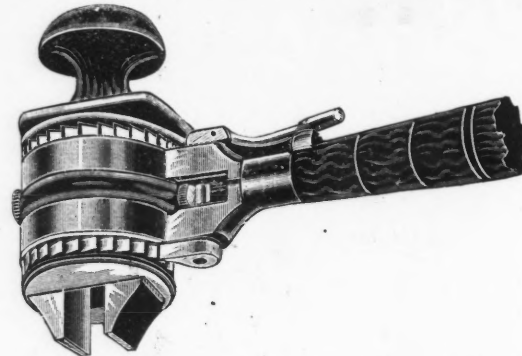
The construction of this vise is such that the jaws are at all times parallel. This is attained by the application of two cross guides instead of the customary foot guide. These guides are pivoted in the movable jaw, and are arranged to move upward and downward in the stationary jaw.



The jaws are leather covered, and may be made to assume an angle by adjusting a screw at the bottom of moving jaw. The vise is 42 in. high; the jaw is 6 in. wide, and it opens to 18 in. Its adaptability will be appreciated by wood-workers. The vise is listed at \$16.50, with discount to the trade. The device is being introduced by the Hollands Manufacturing Company, of Erie, Pa.

THE THORN ADJUSTABLE RATCHET WRENCH.

This is a new tool which is being introduced by The American Patent Agency, of Cincinnati, O. It is designed to be reversible, working in either direction, according to which of the two pawls is engaged. The outside encircling bands have their shanks introduced together within the ferrule of the handle. Within these bands, and adapted to rotate freely therein, there is a circular block, or rather two semi-circular parts, diametrically abutting these parts, having an annular flange, which is intro-



duced into the space between the bands and serves to retain the parts in rotative position. Each semi-circular part has a rectangular recess, which conjointly forms an oblong opening, into which are placed the jaws which are fitted to move along. The jaws are moved together or apart by means of a right and left-hand screw adapted to be turned by a milled head. The knob or head is used to press or hold the jaws to their work, or to steady the implement in its oscillatory movement. This wrench will, obviously, work in very circumscribed spaces, where the handle may not have room for much swing.

The Physical Constitution of some Sulphide Solutions.—H. Picton, in *Proc. Chem. Soc.* 1891-1892, 176-177, gives an account of a special examination of the solutions of mercuric, antimonious and arsenious sulphides. In each case the whole of the dissolved sulphide is found to be present in the form of very finely divided particles. Arsenious sulphide is found capable of existing in "solution" in three distinct types of subdivision. The following examples illustrate the main characteristics of sulphide "solutions": Mercuric sulphide.—Particles are visible under the microscope (1,000 diameters); not diffusible even in the absence of a membrane. Arsenious sulphide(α).—Particles are just visible. Antimonious sulphide.—Particles are not visible, and it is not diffusible, but particles are detected by their power of scattering light, the scattered light being polarized. Arsenious sulphide(β).—Not diffusible; the particles scatter and polarize light. Arsenious sulphide(γ).—Diffusible in the absence of a membrane; particles are shown to exist by optical behavior. The solutions examined exhibit a series passing from those in which the particles of the solid are visible to those in which the particles simulate the phenomena of liquid diffusion, and, although not visible to the eye, are detected by the power of scattering light.

THE NILES PLATE-BENDING ROLLS.

The Niles Tool Works, of Hamilton, O., the well-known manufacturers of heavy machine tools, has designed a new plate bending machine, which has a capacity of bending iron or steel plates up to $\frac{3}{4}$ -in. in thickness, and is usually built to take in such plates from 10 ft. to 12 ft. in width. The rolls are solid wrought iron forgings arranged in pyramid form, the lower rolls being geared together. The upper or bending roll is operated by friction of the plate in passing through. It is adjustable by power to suit the thickness of the plate and the radius to which the latter is to be bent. It has a movable bearing at one end, and projects beyond the housing at the other in the form of a taper arm. Provision is made for depressing the extreme end of this arm, by means of the screw shown in the accompanying illustration, thus raising the opposite end and permitting the removal of a ring or flue. This feature, it is thought, will be found of especial convenience and advantage in boilers and other shops where plates are to be bent to complete circles.

The lower rolls are given additional stiffness by a gang of supporting rollers placed on the sole-plate midway between the housings. A heavy cast iron sole-plate ties the machine firmly together. The machine is very powerfully geared and all parts are made exceptionally stiff and substantial.

Suitable levers and clutches are conveniently placed for the quick and easy control of all operations of the machine. The cut represents this machine as arranged for belt driving power, although the design comprehends the substitution of a pair of reversing engines to drive the machine, and it is so made when desired. When the engines are used the sole-plate is extended to form a base to receive them, and the whole then becomes one solid rigid tool.

A NEW COAL DISTRICT IN HOLLAND.*

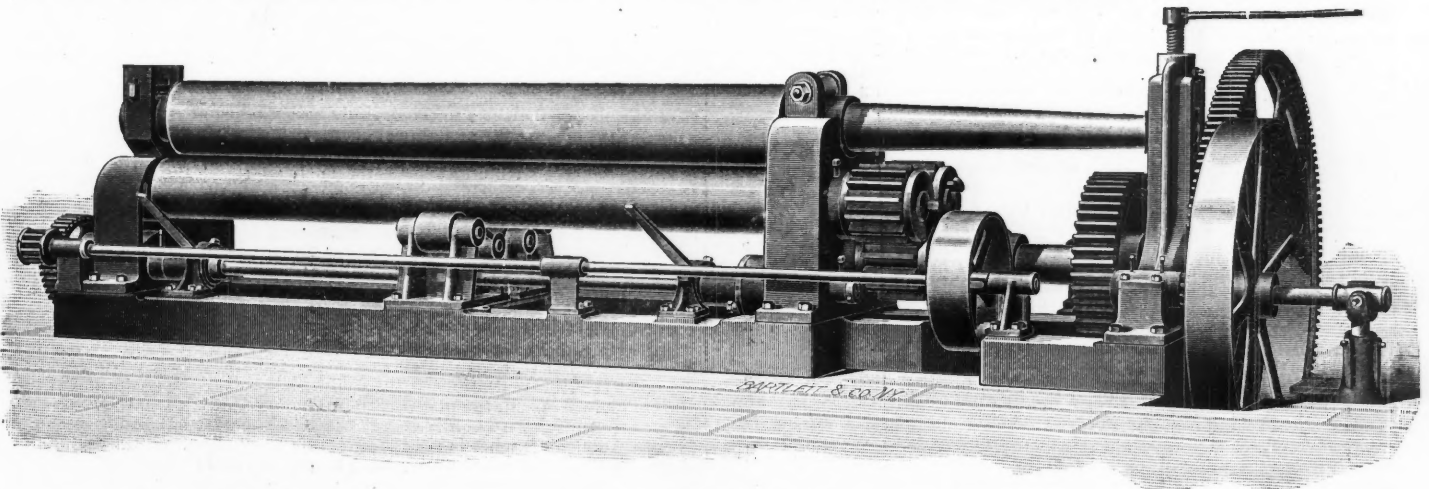
Translated for the Engineering and Mining Journal by Franz Büttgenbach, M. E.

The coal formation close to the western boundary of Prussia, which stretches northerly from the old imperial city of Aix-la-Chapelle along the Worm Valley for more than a German mile, has been worked pro-

siderable coal industry will soon be established here. This will put Holland in position to produce a large part of her consumption of coal (worth about 40,000,000 guildens annually) out of the lightly esteemed province of Limburg, wedged in between Prussia and Belgium.

An extension of the Herzogenrath-Sittard railway is projected to connect this new coal basin with main lines. The distance to the Maas and its navigable canals is not over 7 or 8 kilometres.

Mining in Newfoundland.—According to an official report from Newfoundland, says *Industries*, mining is still confined to within a mile or two of the sea coast, owing to the absence of roads through the interior. The mines being worked are for copper ores, antimony, iron pyrites and galena. This industry is yet in its infancy, but the country gives promises of great development in this direction. Ores of antimony, zinc, molybdenum, manganese, chromium, nickel, iron, gold, silver, etc., are all known to exist; while of the earthy minerals and non-metallic substances there is a great variety. Marbles, granites, slates, serpentines, ornamental stones, sandstones, limestones, soapstones and gypsum, abound, and asbestos, fluor-spar, graphite, mica, etc., are all found. Clays, suitable for the manufacture of brick and coarse pottery are abundant. During the past year valuable seams of coal have been discovered in the vicinity of St. George's Bay. Prior to this the St. George's Bay Carboniferous area was generally thought to be destitute of coal seams, and as being occupied almost entirely by the Carboniferous limestone and millstone grit series. Sir William Dawson, of Montreal, has, however, given it as his opinion that specimens which he has examined indicate a development of the coal measures not unlike that of Eastern Cape Breton, with which the beds may be connected under the Gulf, and he adds that the government of Newfoundland would do well "to inform the English government of the value of the coal deposits on the west coast and their prospective importance to Britain and Newfoundland as well as to the other colonies." Subsequent investigation has discovered 27 ft. of coal, the analysis of which gives a percentage of carbon not inferior to that of Cape Breton coal. This, together with the large deposits of magnetite existing in the same locality, cannot fail, when capital and skilled labor are employed in working them, to add greatly to the prosperity of Newfoundland.



NILES PLATE-BENDING ROLLS.

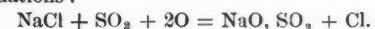
ductively for several centuries. The archives of the Kostrath-Rölduc monastery, founded in the 12th century, and lying close to the border, near Herzogenrath in Holland, show that the thrifty abbots of that institution mined coal on that property continuously from the 14th century up to the disturbances of 1794, when the monastery was closed. Under the French republic coal was still mined, and later by companies. At present within a square mile (German) the coal mining gives employment to about 8,000 miners and laborers. Two concessions only cross the Dutch border; one belongs to the neighboring Prussian *Vereinigungs-Gesellschaft*; the other belongs to the Dutch treasury, and is worked on rental by the Aix-la-Chapelle & Maestricht Railroad.

It was surmised more than twenty years ago that the coal formation must extend westward toward the Maas in the direction of Maestricht. This surmise was confirmed by the results obtained on French territory, in the Pas de Calais, and between Valenciennes and Mous; and the existence of the coal formation was definitely proved by a series of bore-holes in the neighborhood of the Dutch town of Heerlem, beneath 50 to 150 metres of Tertiary and Quaternary strata. The Dutch government then granted certain concessions, which have expired on account of non-fulfilment of conditions. In the meantime the extension of the workings on the northern part of the Aix-la-Chapelle district, and the deep borings in Prussian territory on the plains of the Netherlands, established the fact that the coal formation, with all its wealth of coal beds, must exist in the Dutch district mentioned. This result, and the favorable condition of the coal trade, caused several companies to renew deep borings in Dutch territory in order to get concessions.

The results are very favorable. Coal seams 0.80 to 1.50 metres thick have been bored through as expected in several places and it may be concluded that the coal basin reaching to that locality contains all the coal beds which are known in the Worm district, including the excellent anthracite mined at Kohlscheid and Bardenberg and the flaming and coking coals of the Alsdorf region, favorably situated for mining, and in much greater extent.

The Dutch government will grant concessions to these companies, but will prescribe a limit of time for beginning work. The companies control capital and are well equipped, and it seems to be certain that a con-

The Manufacture of Chlorine.—J. Kolb, of Lille, France, has patented an improvement on the Deacon process for the manufacture of chlorine. The manufacture of chlorine by the Deacon process has hitherto necessitated the employment of pure hydrochloric acid containing only traces of sulphurous and sulphuric acids, such as that which is produced by the decomposition of sea salt or rock salt by sulphuric acid in lead or cast iron pans, and it has not been possible to use the gases resulting from the second stage of the operation, which is conducted at a very high temperature in ovens heated to redness, as these gases, termed gases of calcination, being charged with sulphurous and sulphuric acids, soon render the decomposing material useless. Mr. Kolb's invention has for its object to purify these gases by passing them through externally heated iron cylinders or towers filled with fragments of porous brick impregnated with chloride of magnesium and chloride of copper, but as this process is inapplicable to the gases of calcination, as they are too highly charged with sulphurous and sulphuric acids, they are purified by means of chloride of sodium, which decomposes in the presence of sulphurous acid and oxygen, with or without water, according to one of the following equations:



In carrying out this purification, after having collected separately or together the gases produced in the pans and the calcination gases from the ovens, they are conducted into a series of iron towers externally heated by means of flues, and all, with the exception of one, filled with lumps of rock or agglomerated sea salt. The gases pass from one to the other of the cylinders, entering at the top of the first cylinder charged, and passing out at the bottom of the cylinder, which was most recently charged, whence the gases, which now only contain traces of sulphurous and sulphuric acids, mixed with hydrochloric acid and air, are conducted to the top of the last cylinder, filled with broken porous bricks impregnated with chloride of magnesium and chloride of copper, whereby their purification is completed at the same time that a portion of the hydrochloric acid is converted into chlorine.

* From *Berg & Huettenmaennische Zeitung*, Jan. 8, 1892

FLORIDA PHOSPHATES; THE ORIGIN OF THE BOULDER PHOSPHATES OF THE WITLACOOCHEE RIVER DISTRICT.*

Written for the Engineering and Mining Journal by Prof. N. A. Pratt.

I have studied with much care the geology of the phosphate region, extending along both sides of the Withlacoochee River, at intervals, for a distance of 60 miles north and south and 15 miles east and west, to ascertain, if possible, the conditions under which the deposits grew and accumulated, and the law of its relation to the rocks that underlie and surround it. The task is difficult and one that required close inspection of details, over a larger area than the time allowed and the limits of this property permitted. The material is new to the world, the detailed geology of the State practically unknown; its topography yet to be ascertained. No facts are available on which to base even a theory, except those discovered by my own limited observation. Still I believe I have ascertained and established the true origin of the material and as soon as the topography and levels are known I will be able, with some degree of assurance, to predicate the possibilities of finding, or not finding, the material in any given locality, with a reasonably close approximate estimate of the quantity, and thus lay the foundation for successful mining.

We have now to consider what is the original formation and origin of these deposits, and what its causes? The prevailing impression that the phosphate deposits are "pockety" and found only in limited and uncertain areas, and that they extend downward to unknown depths is not tenable, as will appear below. Several opinions and theories as to their origin have been expressed and published, among which I may refer to a few from memory:

(1) That of a pure bird deposit in localities favorable to the roosting of water fowl more nearly covers the condition of the problem as presented in one locality examined by me than any heretofore advanced, but the evidences are all opposed to that theory in case of the Withlacoochee River deposits and cannot be entertained here, for certainly this form of calcium phosphate has never existed in vertebral bone, which is the basis of all phosphatic bird deposits.

(2) That the underlying lime rock contains a certain percentage of lime phosphate (say, 5%) as an integral part of its composition, and that the lime carbonate being dissolved and carried off by carbonated soil or swamp waters percolating through large areas, there was left the 5% of the insoluble lime phosphate, and this was subsequently, by natural causes, consolidated into boulders, nodules, or plates; that is to say, that for every 5 ft. or inches of deposit, 100 ft. or inches of lime rock has been dissolved and carried away. This idea is plausible, but its importance is overestimated, for the underlying and even associated lime rock nowhere shows more than 1% of bone phosphate, and seldom so much.

(3) Directly opposed to this, it is held by some that the top surface of the lime rock, constantly bathed with phosphates in solution, has exchanged its carbonic acid for phosphoric acid, and thus metamorphosed its carbonate of lime into phosphate of lime, "just as shell or coral rock is silicified into buhrstone, an almost pure sand rock or flint," which is a very unfortunate illustration. This theory is more untenable than any advanced. The evidence of the material disproves it, for in every case in which shell impressions occur a cavity appears indicating the space formerly occupied by the calcareous shell, which has disappeared entirely, leaving only its impression or cast in the phosphatic material. In no case have I ever seen a calcareous shell transformed into a phosphatic shell. The phosphates in the Withlacoochee district have few or no shells or even impressions thereof.

My own impression, based on evidences collected there, is that the whole deposit, in all its varied form, had its immediate origin in animal life and agency, and that the phosphate boulder is a true fossil or fragments thereof. The animal, if such, extracting lime phosphate either directly from the mineral world (*viz.*, the waters of the sea, as plants do), or more likely by feeding on lower vegetable organisms that abound therein, and secreting the same phosphate of lime as its own solid skeleton to support its own gelatinous body, thus maintaining the accepted law of nature that no mineral matter can be assimilated and raised to the higher plane of animal life and structure, without having previously passed through the lower plane of vegetable life and structure. In this case, however, the animals (if such) were of the lowest type and so closely allied to the lowest types of plant growth that naturalists have scarcely yet agreed as to their affinities.

In this connection it is immaterial how their food was obtained as the result is the same. Some kinds of sponges infusoria, zoophytes and animals of the lowest type assimilate directly from the water, or from their food, and secrete silica (flint); some lime carbonate, and some, a horny substance, as their supporting skeleton, and this secretion and growth continues until the favorable environments change, the animal is exterminated, and a massive nodule of flint, a stratum of infusorial casts or tripoli (silica) a cliff of chalk or a coral reef remains as the result of their life work. Is it at all improbable that other species may have secreted a skeleton of lime phosphate?

Most shells either recent (living) or fossil consist mainly of the lime carbonate, secreted by the animal; some, however, are known to secrete and live in a shell of lime phosphate. To-day, on the coast of North Carolina, is a mollusk, the *lingula*, living and flourishing in a shell containing 50-34% of lime phosphate, and 43-33% organic matter, the same as fresh human bone, and when deprived of its organic matter the bone phosphate is 85.81%, the same as the fossil shell contains. This fact was discovered only a few years ago (1869), when attempting to trace and discover the origin of the phosphates of South Carolina, and wherever the fossil of *lingula* is found, even in oldest Silurian times, the shell is lime phosphate, 85%. Several other fossil shells, closely related to the *lingula* and of the same geological age, have approximately the same composition. If the lynx-eyed miner, manufacturer or merchant fails to recognize at sight a valuable commercial article, can the naturalist, who is seldom a chemist, be blamed for considering a phosphatic skeleton a calcareous one? It is no stretch of the imagination to assume that some of the lower types of animals, such as sponges, zoophytes (protozoa), rhizopods, foraminifera, etc., had the power and exercised it, in building up a skeleton of lime or bone phosphate for the support of their turgid and gelatinous bodies.

*The opinions embodied in this article were originally expressed in a professional report written in April, 1890.—N. A. P.

I have before me many samples of so-called phosphate boulders, from the size of a match box to five and eight feet in diameter. The most perfect shows a complete spiral or circular band or sheet around a central axis or stalk almost as symmetrical in arrangement of its loosely separated concentric laminations as the encircling leaves of a head of lettuce, which it closely resembles in appearance, except that the laminations are continuous in concentric or spiral bands. I am satisfied that the phosphate boulder of Florida is the fossil remains of a gigantic foraminifera; perhaps as considered by some naturalists a sponge-like coral, having in every part of its skeleton identical composition (but not structure) with bone deprived of its organic matter. I am constrained to believe that such a structure can only be attributed to life agency, and under no stretch of chemical or physical law can such be called a concretion or conglomerate or be formed and shaped by any other power than that of life agency and organized growth.

I am led to this lengthy explanation in order to say that the evidences compel me to believe that all of the phosphate boulders in the ledges or surfaces exposed, and classed as laminated and conchoidal types, grew as a zoophyte, possibly as sponge, more probably, gigantic foraminifera or rhizopod on the spot in which it is now found just as sponges now grow in favored localities and as oysters of gigantic size found in the Tertiary age, grew and flourished under favorable conditions, and left their shells even 16 in. to 20 in. long still attached to the bank on which they had thriven so well. I will not attempt in this article to reason out the origin of each of the other types of Florida phosphates further than to say that the types Wedgewood and Oreole (soft phosphate) show to the unassisted eye, no indication of organic or of organized structure. *Such I have no doubt the microscope will reveal.* It is certain, however, that they have a close relation to the boulders of "hard rock," described above, since the material is in, around and under the boulder masses, and is generally bedded in sand or clay.

Accepting as true that we are dealing with gigantic foraminifera or rhizopod (which propagate themselves by "division" or "budding"), it is not unreasonable to suggest that the soft white material may be made up of the remains of (for want of better name) the "germ spores" "buds" (spawn) of these prolific animals—possibly the comminuted debris of the gelatinous animals themselves, just as soft calcareous marl is the debris of the coral reefs, that grow and accumulate in practically the same manner. It is probable that the delicate gelatinous flesh (sarcode) of these lowest types of animals, provided abundant food for higher types, in which case the excrement of these marine animals (but not of birds) would consist largely of the comminuted debris of the phosphate skeleton of the food taken.

A remarkable fact, seen at many of the mines, adds evidence to the strength of my theory as to the organic origin of the material. It is well known that most rock formations, clays and sands are colored more or less reddish with ferric oxide, and that wherever these are brought into intimate contact with organic matter (such as the "flesh" (sarcode) of these gelatinous animals would afford) undergoing decomposition, the red ferric oxide is reduced to a soluble form and is readily leached out of the sands and clays, leaving them white and free from every tinge of color. No doubt this same reaction has bleached the phosphate beds and also the associated sands and clays to the almost dazzling whiteness that is so often seen at the mines, in strong contrast to the dirty reddish color of the overlying sands. But the most convincing argument lies in the absolute horizontality of the hard rock or boulder, phosphate zone or belt, when referred to tide-water level (being never lower than 25 ft., nor higher than 100 ft. above tide), indicating as it does that during one of the periods of the oscillations of the peninsula, probably near the end of the middle Eocene epoch, the phosphatic producing animals commenced their growth simultaneously all along the Gulf coast, extending at least 150 miles south of what is now the Georgia State line, within the limits of the depth of water and under other conditions best suited to their development, and continued to flourish and grow, so long as favorable environments, chiefly the proper depth of water, existed. The affinities of the fossil are with *Strematopora* and the growth probably was in deep water. On the elevation of the land and subsequent emergence of the peninsula, this bank or bed lifted out of the sea, remains as the life work of these animals and the depository of this accumulated wealth, and is confined apparently to a zone or belt from 60 ft. to 65 ft. in altitude or thickness. A practical inference from this is, that under most favorable conditions some of the ledges or banks of boulder phosphate, to wit, those found at highest elevation may extend to a depth of 60 ft. to 65 ft. before striking the lime rock, beyond which point it is needless to search. The underlying and associated lime rock is a true nummulitic and orbitoides-limestone generally considered the Vicksburg, conventionally referred to the Upper Eocene period, but to me the formation seems to belong to the Middle Eocene.

I have been in doubt until recently whether or not the phosphate deposit was of the same age as this lime rock and the accompanying sand rock and cherty flints. Of this I am now assured, having found identical fossils in both. It was my impression that the sand rock, generally a gray and porous mass at the surface, but flinty at the center (and which I have seen in long ledges standing 5 ft. to 10 ft. above the surface and evidently the product of sponge growth), is older than the phosphate growth, and underlies it; possibly they grew and flourished simultaneously, each in the locality and environment that best suited it. In any case the latter outlived the former, and perhaps, under the law of the "survival of the fittest," overpowered and exterminated it, and it follows that the phosphates may reasonably be looked for alongside of the flinty type of sand rock, but will not be found among the underlying lime rock except where it has subsided into a lime sink or like depression.

The latest scheme for the revival of hydraulic mining in California, formulated after the recent conventions in that State, seems to be meeting with general approval. It is proposed to erect impounding dams for the debris in the various rivers along which hydraulicking will be conducted, under the direction of a commission of Government engineers, and for the maintenance of these to tax the output of the mines. There has undoubtedly been a considerable change in sentiment among the farmers of California with respect to placer mining, and now some of the most earnest advocates of the new proposal are representatives of that industry.

FAILURES IN BOOMED TOWNS—CARDIFF, TENN.

Written for the Engineering and Mining Journal.

The town of Cardiff, Tenn., has gained such notoriety as a pre eminent failure in carrying out the promises of its promoters that it is hardly necessary to go fully into details; yet it would be rank ingratitude to omit it, in speaking of "boomed" towns in the South, and it really deserves notice on account of the peculiar legal aspect which presents itself at the present time.

Cardiff was brought before the public during the time when the boom at Fort Payne was at its height. Some of the persons interested in the organization of the latter place, with others who knew of the large sums of money which had been realized there from the sale of lots, etc., organized the "Cardiff Coal and Iron Company," with a capital stock of \$5,000,000, and leased or purchased large tracts of land on the Cincinnati Southern Railroad, 75 miles north of Chattanooga and one mile north of the old town of Rockwood, in Roane County, Tenn. Owing to the fact that Fort Payne had thus far been apparently successful, it was not found difficult to secure the names of some well known and responsible men to serve on the board of directors for Cardiff, and their reputation, combined with the knowledge that the enterprise was conducted by men who had been, and still were, prominent in the former town, made it a comparatively easy matter to place the stock of the company.

The usual rose-tinted circulars were issued, stating the resources of the place, intentions of the company and especially the date on which sales of town lots would be held. They proclaimed that as the general tendency of investment was southward along the iron and coal belt of the Alleghanies, this company had, for the benefit of such as wished to realize large profits, secured a body of land suitable for a town site and manufacturing purposes, near another town which had been in existence for many years, and was still in the same place; and in which pig iron had actually been made by one company, for a long time without its having to mortgage the plant in order to secure money for a dividend to the stockholders. They further announced that their town of Cardiff was eminently suited for the manufacture of pig iron, because they owned coal, some ore and enormous deposits of limestone, from all of which pig iron could be made for the small sum of \$7.95 per ton; and should they find it desirable to purchase other ore to mix with theirs, the cost of the iron would be but \$8.63½ per ton; and still further, that as the success in developing any place depends upon "the good judgment, the experience, the honesty, the industry, the tact and the financial and business resources of those undertaking the enterprise," this company possessing all of these qualifications has selected a location which had no superior, where success was certain and business life was pure pleasures. So they strongly urged their friends (and others) to come there with speed and attend the first sale of lots, as well as all subsequent sales, in order that they might share in this wonderful El Dorado of the South.

For some reason, which could best be explained by the directors of the company, after a few sales of lots which attracted many New England people, the excitement rapidly simmered down to a state of profound quietude, and it was not long before the only people who remained in the place were either those who could not leave for lack of free passage on the railroad or those who were waiting to be paid amounts due by the company. This latter class increased so rapidly that, in order to adjust affairs in an equitable manner, a receiver was appointed and instructed to wind up the enterprise. To do this he began suits against those who owed the company, and by far the larger number of those were people who had purchased lots on the usual terms, a small cash payment and the balance in notes, with time much at the purchaser's convenience, and which were yet unpaid.

In answer to the receiver's suit these people claimed that when they purchased it was with the distinct understanding that the company was to do certain things by which the value of the lots would be enhanced, and that as it had failed to do these, the original purchase money should be paid back; the company replied, however, that it made no definite promises of any kind, nor in any way guaranteed the investment, and further, that while the auctioneer in the excitement of selling may have made certain statements which would lead persons to believe that the company agreed to carry out all the golden hopes which he set forth, they were not in any way responsible for this; that every purchaser could see what their resources were and should have been guided by his own judgment as to the advisability of the investment rather than by what the auctioneer may have said. This is answered, on the part of the purchasers, by the statement that at each sale there were representatives of the company present and if the auctioneer, who was acting as their authorized agent, had made any statements which the company did not feel called upon to carry out they should have corrected him and so prevented misrepresentation on his part.

It is to be hoped that this case will be carried to a final decision, as the point in question is one which will apply to nearly every town which has been boomed in the South, and a decision in favor of the purchasers would act as a wholesome check to this too general method of bringing a place into prominence.

The statements of twelve of the principal railways of Great Britain for the past year show aggregate receipts of £33,028,558, and expenditure of £17,880,158, making a net revenue of £15,148,000.

The Mount Morgan Mine, Queensland.—During 1891 the yield of gold from the Mount Morgan mine has fallen off by 80,000 ozs., and the dividends now paid are only 6d. per share per month, equal to £25,000, says a correspondent of the London Mining Journal. There seems to be some reticence on the part of the management as to the cause of this, and the difficulty of treating the kaolin in quantity is generally accepted as the main reason for the decreased output, as well as the lower value of the ore; but the real reason is probably the last, namely, that the richest ore has been exhausted. Certainly the limonite ores have nearly disappeared from the hill top, and the kaolin now forms the largest part of the ore treated. This ore is very rich in places, but there is a difficulty in treating it rapidly in large quantities. No new developments have taken place during the past year, the lower tunnels having failed to cut anything payable. A deep shaft is now being sunk rapidly to further test of the ground, and should it fail to discover payable ore, it is to

be feared that Mount Morgan shares will never regain their lost value. Still there must be much gold yet to come out of the known deposits, and possible economies in working and cheaper methods may increase the dividends. It is known that the McArthur-Forrest process has been tried during the year, but was reported upon unfavorably by the general manager. Other schemes have been suggested, but the old practice still holds the field.

Aluminum Soldering.—The following methods of soldering aluminum are recommended by the Neuhausen Company, says the Electrician. For sheet aluminum an iron tin solder may be used with a flux composed of resin, neutral chloride of zinc, and grease. The metal should not be cleaned or scraped unless it is absolutely necessary to do so, in which case alcohol or essence of turpentine should be used for the purpose. For 5% aluminum-bronze tin solder may be employed, but this is not possible with the 10% alloy, in which case the company recommends a preliminary copper plating. If it is difficult to dip the ends to be plated directly into the solution, pieces of blotting paper soaked in a solution of CuSO₄ may be laid on them, and a current passed. The flux mentioned above may be used. Another solder which is recommended is one consisting of copper, 56 parts; zinc, 46 parts, and tin, 2 parts, applied with borax. Some tests made at Neuhausen showed that with these solders plates of aluminum soldered together edge to edge required a tractive effort of from 16½ to 18 tons per square inch to pull them asunder; if the edges overlapped, 22½ tons per square inch were required. Pieces of cast aluminum bronze, if placed in sand molds, can be joined together autogeneously by running in some of the molten metal. If this operation is properly carried out the joint is indistinguishable from the rest of the casting. Thin cylinders of the aluminum are made in this way by bending the sheets round end to end and soldering with molten aluminum.

Friction of Lubricated Bearings.—At the meeting of the Leeds Association of Engineers on February 25th, Mr. J. H. Wicksteed read a paper on the "Friction of Lubricated Bearings," founded on the researches of the Institute of Mechanical Engineers. After describing the apparatus used, the author began the discussion of the results arrived at, which he stated confirmed the deductions drawn from ordinary practice. With careful lubrication steel shafts running in gun-metal bearings at from 50 to 300 revolutions per minute would seize with the below mentioned loads: Collar bearings, 100 lbs. per sq. in.; footstep bearings, 200 lbs. per sq. in.; cylindrical bearings, at 600 lbs. per sq. in.; whilst a pin working intermittently will stand about 10 times the above pressure without seizing. In all the experiments the surface was taken as being the diameter by the length. The lecturer pointed out that in the friction of solids, the friction is directly proportionate to the load, while with liquid friction, i. e., with a perfect lubrication where a film of liquid intervenes between the metallic surfaces, the friction is independent of load. The experiments showed that in a bearing with the load applied above as in rolling stock, there was an upward pressure of more than 500 lbs., a hole being bored in the crown of the journal, and a pressure gauge inserted showing as much as 600 lbs. pressure per square inch in a bearing 4 in. in diameter by 6 in. long. Thus a total pressure of upwards of 6 tons was supported by fluid pressure of the lubricant, which pressure did not fall appreciably for half an hour after the experiments ceased; this film of oil would not exceed one ten-thousandth of an inch in thickness.

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

NAME OF COMPANY.	Paid in March.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in March.	Paid since Jan. 1st.
Adams, Colo.		\$7,500	Hecla Con., Mont.	\$15,000	\$45,000
Alaska, Treadwell,			Helena & Frisco, Mont.		20,000
Alaska		75,000	Homestake, S. Dak.	12,500	37,500
American Coal, Md.	\$45,000	45,000	Horn Silver, Utah	50,000	50,000
American-Nettie, Colo.	15,000	30,000	Idaho, Cal.	3,100	6,200
Argyle, Colo.	10,000	20,000	Iron Mountain, Mont.		15,000
Bald Butte, Mont.	7,500	20,000	Kennedy, Cal.		15,000
Bannister, Mont.		6,000	Lexington, Colo.	3,000	9,000
Best Friend, Colo.	10,000	30,000	Maryland Coal, Md.		42,000
Brotherton, Mich.		20,000	Maxfield, Utah		9,000
Bull Domingo, Colo.		4,000	Minnesota Iron, Minn.		210,000
Buxton, S. Dak.		50,000	Mollie Gibson, Colo.	150,000	350,000
Calumet & Hecla, Mich.	500,000	500,000	Morning Star D., Cal.	7,200	18,000
Centennial - Eureka,			Napa, Cal.		10,000
Utah	15,000	45,000	Ontario, Utah	75,000	225,000
Champion, Cal.	10,200	20,400	Omaha, Cal.		3,600
Colorado Central, Colo.		13,750	Pacific Coast Borax	15,000	45,000
Consolidation Coal, Md.		205,000	Pandora, Mont.		3,000
Colorado Fuel		67,120	Parrott, Mont.	18,000	54,000
Cortez, Nev.	95,000	95,000	Quincy, Mich.		200,000
Daly, Utah	37,500	112,500	Rescue, S. N., Mex.		12,000
Deadwood Terra, S. Dak.	10,000	30,000	Rialto, Colo.	4,500	13,500
De Lamar, Idaho		72,000	R'ky Fork Coal, Mont.		100,000
Diamond, Kyune & Castle, Utah		7,500	Running Lode, Colo.		5,000
Elkhorn, Mont.	87,500	87,500	Standard, Cal.		10,000
Eureka Con., Nev.		12,500	Tamarack, Mich.	200,000	200,000
Franklin, Mich.		80,000	United Verde, Ariz.		30,000
Golden Reward, S. Dak.	5,000	15,000	W. Y. O. D., Cal.	3,000	9,000
Granite Mountain, Mont.	80,000	280,000	Yosemite No. 2, Utah		5,000
Great Western Quick-silver, Cal.	12,500	25,000	Total	1,496,500	3,697,570

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, MARCH 29TH, 1892.

- 471,616, 471,617. Process of Treating Refractory Ores. Julius Leede, Minneapolis, Minn.
- 471,618. Apparatus for Desulphurizing Ores. Julius Leede, Minneapolis, Minn.
- 471,677. Brick Machine. Henry W. Mead, Quincy, Ill.
- 471,692. Coking Oven. Herman Ekelund, Jönköping, Sweden.
- 471,731. Machine for Separating Gold, Silver, etc. James B. Freeman, Los Angeles, Cal.
- 471,769. Brick Kiln. John C. Kinzel, Knoxville, Tenn.
- 471,720. Method of Making White Lead. Elwyn Waller and Charles A. Sniffen, New York, N. Y.
- 471,809. Determining the Temper of Iron and Steel. Carl A. Caspersson, Forsbacka, Sweden.

PERSONALS.

Mr. Leo von Rosenberg, of New York, left on Thursday last for Colorado on mining business.

Mr. Henry Alexander, the treasurer of Alexander, Barney & Chapin has resigned his position and closed his connection with the company on the 1st inst.

Mr. F. Augustus Heinze, manager of the Ramsdell-Parrot mine, of Butte, who has been in this city for the past fortnight, has returned to Montana.

Mr. C. H. Morgan, mining engineer, of Kettle Falls, Stevens County, Washington, informs us that he proposes to spend the coming summer in the various mining camps of British Columbia.

Mr. C. Wade Stickney, M. E., lately with the Parrot Silver and Copper Company, of Butte, Mont., has been appointed superintendent of the Riverside Mining and Milling Company, whose property is located near Red Bluff, Mont.

There will shortly be a vacancy on the editorial staff of the ENGINEERING AND MINING JOURNAL. Applicants should have editorial and mining or metallurgical experience, literary ability and familiarity with the chief modern languages. Address communications to Managing Editor, ENGINEERING AND MINING JOURNAL.

Mr. E. Engelhardt, who has been chemist of the East Helena smelting works for several years past, has removed to Deadwood, South Dakota, having been engaged as manager and chemist of the Bald Mountain Consolidated Mining Company, of the latter place. Mr. Engelhardt is well known in lead smelting circles in both Montana and Colorado.

The American Chemical Journal for February contains a valuable monograph of 102 pages by Dr. Ira Remsen, Professor of Chemistry in the Johns Hopkins University, of Baltimore, and editor of the Journal, George M. Richardson, Charles H. Herty, Charles E. Saunders, C. Pliny Brigham and J. E. Gilpin on "Researches on the Double Halides," in which are discussed the double halides of tin, lead, manganese, antimony and bismuth.

Dr. William Hallock, of the Smithsonian Institution, has accepted the Adjunct Professorship of Physics at Columbia College. Dr. Hallock was born at Milton-on-the-Hudson in 1857, and graduated from Columbia in 1879. He held the three-year fellowship in science, and on it went to Wurzburg, Germany, for a course of post-graduate study. Before returning to this country in 1882 he received an appointment as physicist on the Geological Survey, which he retained until last November, resigning it to enter the Smithsonian Institution as assistant in charge of the Astral Physical Observatory. While connected with the Geological Survey he conducted the investigation of subterranean temperatures in the famous dry well at Wheeling, W. Va. He was also for three years at work in the Yellowstone cañon, investigating the phenomena of the hot springs and geysers there. In collaboration with Prof. Carl Barnes, of the Geological Survey, he worked for some time at New Haven, studying methods of measurement of high temperatures. Among the other topics to which he has given his attention are the effects of pressure on powdered materials and the thermal expansion of rocks. Dr. Hallock acted at Wurzburg as laboratory assistant, and afterwards as private assistant to Professor Kohlrausch. His degree, *summa cum laude*, was taken in December, 1881. He will begin work in New York with the fall term.

Sir William Thomson, now Baron Kelvin, president of the Royal Society, on February 19th presented to the Council of King's College, on behalf of Lady Siemens, the laboratory of electrical engineering given by her in memory of her husband, Sir William Siemens, and as a record of his many and valuable discoveries in electrical science. The gift includes a bust of Sir William Siemens, beneath which is the inscription, "Sir William Siemens' Laboratory. This laboratory was established by Lady Siemens for the study of electrical engineering, and presented to King's College, London, in memory of her husband, Sir William Siemens, D.C.L., F.R.S., and as a memorial of his valuable labors for the advancement of that branch of engineering science, 1891." Sir William Thomson said that Lady Siemens earnestly hoped that the desire which prompted her to take that form of memorial to her husband would prove of help in carrying out the advancement of that science. He felt that there was some appropriateness in his being asked to speak on that occasion, as he was probably the oldest friend of Lady Siemens among those present, and could bear testimony to the splendid manner in which her husband always devoted himself to scientific labors. His great work in connection with Lewis Gordon and his brother Werner Siemens in electrical submarine telegraphy was known to all.

At the anniversary meeting of the Geological Society, held at Burlington House, London, on February 19th, the following officers were elected: President, Mr. W. H. Hudleston, M.A., F.R.S.; vice-presidents, Prof. T. G. Bonney, D.Sc., LL.D., F.R.S.; Mr. L. Fletcher, M.A., F.R.S.; Mr. G. J. Hinde, Ph.D., and Prof. J. W. Judd, F.R.S.; secretaries, Dr. H. Hicks, F.R.S., and Mr. J. E. Marr, M.A., F.R.S.; foreign secretary, Mr. J. W. Hulke

F.R.S.; treasurer, Prof. T. Wiltshire, M.A., F.L.S. It was decided that the council should consist of Prof. J. F. Blake, M.A.; Prof. T. G. Bonney, D.Sc., LL.D., F.R.S.; Mr. James W. Davies, F.L.S., F.S.A.; Mr. R. Etheridge, F.R.S.; Mr. L. Fletcher, M.A., F.R.S.; Prof. C. Le Neve Foster, D.Sc., B.A.; Sir A. Geikie, D.Sc., LL.D., F.R.S.; Mr. A. Harker, M.A.; Dr. H. Hicks, F.R.S.; Mr. G. J. Hinde, Ph.D.; Mr. W. H. Hudleston, M.A., F.R.S.; Prof. T. McKenney Hughes, M.A., F.R.S.; Mr. J. W. Hulke, F.R.S.; Prof. J. W. Judd, F.R.S.; Mr. J. E. Marr, M.A., F.R.S.; Mr. H. W. Monckton, Mr. Clement Reid, Mr. J. J. H. Teall, M.A., F.R.S.; Mr. W. Topley, F.R.S.; Prof. T. Wiltshire, M.A., F.L.S.; the Rev. H. H. Winwood, M.A.; Dr. H. Woodward, F.R.S., and Mr. H. B. Woodward. The address, delivered by the retiring president, Sir Archibald Geikie, dealt with the history of volcanic action in England from the close of the Silurian up to the older Tertiary period. The remarkable volcanic outbursts that took place in the great lakes of the lower old red sandstone were first described. From different vents over central Scotland, piles of lava and tufa much thicker than the height of Vesuvius, were accumulated, and their remains now form the most conspicuous hill ranges of that district. It was shown how the subterranean activity gradually lessened and died out, with only a slight revival in the far north during the time of the upper old red sandstone, and how it broke out again with great vigor at the beginning of the Carboniferous period. After another long quiescence volcanic action once more reappeared in the Permian period, and numerous small vents were opened in Fife and Ayrshire, and far to the south in Devonshire. With these eruptions the long record of palaeozoic volcanic activity closed. The address concluded with a summary of the more important facts in British volcanic history bearing on the investigation of the nature of volcanic action.

OBITUARY.

Dr. D. M. Bond, of Iron River, Mich., president of the Caledonia Mining Company, died at his home on the 19th ult.

William B. Lorton, a well-known California pioneer, died suddenly on the 24th ult. in this city, aged 64 years. Mr. Lorton was born in this city and went to California overland in 1849, returning in 1854. At the time of his death Mr. Lorton was engaged in writing a book on the experiences of the forty-niners.

Ario Pardee, of Hazleton, Pa., banker, coal operator and manufacturer, died suddenly at Rock Ledge, Fla., on the 26th ult., aged 81 years. He was the pioneer and foremost anthracite coal operator in the Upper Lehigh and Lower Luzerne region. He was born in 1810 at Nassau, N. Y., and began his career with the late Asa Packer, with him engaging in that series of developments that have brought the Lehigh Valley into the industrial prominence it occupies to-day. Taking up the study of civil engineering, Mr. Pardee ran lines up the Hazel Creek section of Carbon County, from the present Penn Haven Junction through Weatherly to Beaver Meadow, acting as chief engineer of the Beaver Meadow Railroad, one of the first railroads built in the State. The late Judge Brodhead, of Mauch Chunk, Pa., and others had determined upon the Beaver Meadow as the site for a large town and planned accordingly; but young Pardee decided, in 1836, that three miles further up the Buck Mountain was a better point, and there he founded Hazleton, now a city of 15,000 population. Hazleton in 1836 was a mere crossroads staging point, on the State road from Wilkesbarre to Easton, and there Mr. Pardee took charge of the mines he leased in 1839, working them with Gillingham Fell. The mine properties to-day comprise six collieries in and around Hazleton. They make up in part, also, the Fell estate. In addition Mr. Pardee owned outright the mines at Lattimer, Hollywood and Mount Pleasant, and leased from the Roberts estate the mines at Cranberry and Crystal Ridge. The combined output is put at 1,250,000 tons of coal a year, and 3,500 miners and laborers are on the pay rolls of Pardee & Co. and Pardee Brothers & Co., who operate them. Mr. Pardee's coal enterprises at Hazleton, great as they are, represent only a part of his holdings and investments. He owned the car shops and planing mill at Watsonstown. About 7,000 acres of soft coal territory and small tracts situated in Clearfield and Jefferson counties make up a very valuable realty just coming into the market. He owned about 500 shares of Huntingdon & Broad Top stock, and his Lehigh Valley Railroad stock is estimated at \$1,000,000 in value. He owned the Stanhope (N. J.) furnaces, and the town of Hazleton, O., was a late venture in the canal coal fields of that State. No man of wealth was ever more unpretentious. Mr. Pardee presented Lafayette College, at Easton, Pa., with the hall bearing his name, a building first erected at a cost of \$350,000, and when destroyed by fire rebuilt by him.

SOCIETIES.

The New York Mineralogical Club will hold its annual meeting for the election of officers at the residence of Prof. D. S. Martin, No. 236 West Fourth street, on the 26th inst.

EXPORT NOTES.

The *Journal des Mines* says that it is proposed to establish a new steamship line between San Francisco, Sydney, New Caledonia, Tahiti and the Marquesas Islands.

The Chief of the Bureau of Statistics reports that the total values of the exports of merchandise from the United States during the two, eight and twelve months ended February, 1892, as compared with similar exports during the corresponding periods of the preceding year, were as follows: Two months ended with February, 1892, \$186,776,433; 1891, \$157,506,308. Eight months ended with February, 1892, \$747,901,628; 1891, \$622,002,067. Twelve months ended with February, 1892, \$999,779,771; 1891, \$839,319,882. The values of the imports were as follows: Two months ended with February, 1892, \$128,101,523; 1891, \$128,280,232. Eight months ended with February, 1892, \$527,776,444; 1891, \$540,550,406. Twelve months ended with February, 1892, \$828,142,234; 1891, \$825,196,035.

A well informed American hardwareman writes to the *Ironmonger* in regard to the condition of hardware in Mexico as follows: In this section of the country American hardware is used almost to the exclusion of European goods, and it is only certain articles which are brought from Europe—England and Germany—on account of more favorable prices. When prices are the same the American article is given the preference. Among the articles which are exclusively European are enamelled iron ware (cooking utensils), cutlery, corrugated roofing, wire netting of all kinds and certain kinds of cheap locks. Bar iron and sheet iron are also generally imported from abroad, as well as different kinds of steel, although of these articles large quantities are also brought from the United States, as a great saving in time is thereby effected. Tools and huilders' hardware are exclusively American, since the American article at a given price is always greatly superior in finish to like European goods. It is only in case of some articles in this line which are in the United States not made at a sufficiently low price (or, rather, in a sufficiently low grade) that English and German goods are handled. As to finish, an average German doorlock looks at the side of an American one like an old-time "snake fence with stakes and rider" in comparison with a good barb-wire fence. Speaking of barb-wire, I must say that this article enjoys a very large demand here, especially so during the last few years. Of farm implements the only articles used to a great extent are pony-plows, these being used in very large quantities. Mowers, threshing-machines and like machinery are few and far between. A great many peculiarities are to be noted here; for instance, narrow wrought fast pin huts are used to the almost complete exclusion of all other kinds; all windows and doors are hung on these. The most common fastening for a door is a hasp and padlock, rim or mortise locks being used only on the better class of residences. Doors are also generally provided with a lifting handle, in lieu of a knob or pull. All windows are protected by upright bars of round iron fastened in cross-bars of flat iron, giving a house the appearance of a prison until one is accustomed to the sight.

An American resident in Mexico writes to the *Evening Post* that a strong element that has largely contributed to increase the animosity of the Mexican people toward Americans is the European traders. As a rule they come from the Continent, and represent a type of so-called merchants who are no less noted for their shrewdness than their lack of morals in commercial transactions. This class was strongly rooted not only in Sonora but all parts of Mexico before the advent of railroads. When the railroads brought in the representatives of American factories and jobbing houses, the European traders at once saw that their great distance from their sources of supply, coupled with other adverse features, rendered honorable competition with the representatives of American establishments impossible. Knowing their case was desperate, they sought to poison the minds of the people by reminding them of the war with the United States and the large area of rich territory we acquired by the treaty of peace. An American who has for years been interested in mining in Sonora said to me: "The intelligent element here is friendly to our people, but European traders are constantly at work to prejudice the ignorant and vicious against everything American. If they think a representative from the United States is likely to outstrip them in trade, they will not stop at hiring desperadoes to rob, and if necessary murder him. I could cite a number of such outrages that have been committed since this country became accessible by railroads." Others confirmed this statement. But despite this opposition, American mining machinery and agricultural implements have more friends than European because they are cheaper and better. The flouring mills are also being supplied with the most improved plants made in the North. The majority of carriages and wagons seen here are of the same manufacture. One of the most encouraging signs of progress among the agricultural classes is the readiness with which they abandon their wooden plows and supply themselves with improved patterns. It is safe to say that had the Washington government been more friendly

toward this country in a commercial sense, our trade with Mexico would be triple what it now is, as we could offer it the best market for what it had to sell, and are in a position to supply it with nearly everything it buys, and to do this cheaper and more expeditiously than any other country.

WORLD'S FAIR NOTES.

Saginaw, Mich., the center of the salt producing district of that State, is constructing a complete salt plant in miniature for exhibition at the World's Fair.

A California "big tree" has been selected in Tulare County, to be shown at the Exposition. A committee of the Board of Trade, after an extended tour of inspection, picked out a tree measuring 87 ft. 9 in. in circumference at the base, 85 ft. five feet above the ground and 65 ft. at a height of 16 ft.

The mineral resources of San Miguel County, Colo., will be well represented at the Exposition, Mr. Kayser, mineral collector for San Juan County, is now in Telluride, gathering specimens for this purpose. The Sheridan-Mendota Mining and Milling Company, which owns the Sheridan and Mendota mines in Marshall Basin, has promised him several valuable specimens, one of which will weigh 2,000 lbs.

A very complete diamond exhibit will be made by Cape Colony, South Africa. The exhibit will include 10,000 carats of uncut stones, a large quantity of very fine cut and polished ones, together with all that is necessary to show the process of mining and washing. For this it will be necessary to transport to Chicago 100 tons of pulverized blue earth, 50 tons of unpulverized earth and a complete washing machine, which will be operated by natives. The exhibit will also include a unique collection of crocidolite, special diamondiferous products, etc.

Consul Partelle, at Dusseldorf, Germany, has informed Chief Skiff that the iron industry will be well represented at the Exposition, and that the owners of iron mines and metallurgical establishments throughout the empire are displaying great activity in that direction. From another German source it is learned that Mr. Massenez, the inventor of a process for the desulfurization of pig iron by treatment with manganese, will make a full exhibit of the process and the products. This will be an important feature of the division of metallurgy.

INDUSTRIAL NOTES.

Butz Bros. & Lichtenwalner, iron ore miners of Allentown, Pa., failed on the 30th ult. in consequence of the embarrassment of the Lehigh Iron Company.

The Montour Iron and Steel Company, of Danville, Pa., resumed operations on March 21st, giving employment to 400 men. The works have been idle for eight months owing to a strike of the puddlers.

The Abercarnie tin plate works, in Monmouth, Wales, have been closed. At the Arbertillery works the operatives have received a month's notice of the close of contracts. Three thousand hands will thus be thrown out of employment.

The new machine shop for the Henry R. Worthington Hydraulic Works at South Brooklyn, N. Y., will be built of iron by the Berlin Iron Bridge Company, of East Berlin, Conn. The building is to be 200 ft. long by 51 ft. wide with a 20-ton Sellers' traveling crane.

The Illinois Steel Company has broken ground at its South Chicago works for the plate mill it is about to erect. This addition will comprise five buildings, the largest of which will contain 80,000 sq. ft. of space and will be one of the most important additions that have ever been made to this company's plant. When completed and in operation it will afford employment to between 700 and 800 additional men.

The Lehigh Iron Company stockholders met on the 28th ult., at Allentown, Pa., and appointed a committee to confer with the creditors of the company to devise a plan of relief. Efforts are being made to create a funded debt of \$200,000. The Second National Bank has entered another judgment for \$65,000 against the company, thereby increasing the judgments against it to \$200,000, and Witherbee, Sherman & Co. have brought suit for \$8,000.

Through the falling of a number of arch centers in the York road "shield-shaft" tunnel on section 2 of the Belt Line Railroad, in Baltimore, Md., on the 25th ult., four men were seriously and two fatally injured, while a dozen or more were scratched and bruised. The accident was caused, it is said, by carelessness upon the part of the night gang in taking down a number of centers. None of the brick work or any part of the arch fell with the centers. This is the first accident of this kind that has occurred since the Belt Line Railroad work was begun two years ago.

Carl Bolckow, chairman of Bolckow, Vaughan & Co., Limited, large iron masters and colliery owners near Middlesbrough, England, failed on the 26th ult. He was also chairman of other com-

panies. The failure caused a great sensation in the Middlesbrough district. The nominal capital of Bolckow, Vaughan & Co., Limited, is £4,000,000; capital subscribed, £3,962,740; capital paid up, £3,218,300; debentures, £388,200; reserve, £50,250. The last dividend was 3% per annum for 1888 and an interim dividend of 2½% has been paid on account of 1889. No report later than this is given in the ratings available here. The directors of the company are Carl F. H. Bolckow, chairman; H. D. Pochin, vice-chairman; Benj. Whitmore, Joseph Laing, Henry Lee, and W. S. B. McLaren.

Messrs. Manning, Maxwell & Moore report that among the firms which have recently adopted the Shaw electric traveling cranes for which they are sole agents, have been S. L. Moore & Sons Company, Elizabethport, N. J.; the Ball & Wood Engine Company, Elizabethport, N. J.; the Pond Machine Tool Company, Plainfield, N. J.; Whitehill Engine Works, Newburg, N. Y.; Cottrell & Sons, Wesley, R. I.; Whittier Machine Company, Cambridge, Mass.; New York Navy Yard (2), Brooklyn, N. Y.; Ames Iron Works, Oswego, N. Y.; McIntosh, Seymour & Co., Auburn, N. Y.; Pratt & Letchworth, Buffalo, N. Y.; Erie City Iron Works, Erie, Pa.; Standard Elevator Company, Chicago, Ill.; E. P. Allis & Co. (3, each 35 tons), Milwaukee, Wis.; Russell & Co., Massillon, O.; Dry Dock Engine Works (2), Detroit Mich.; Williams Engine Company, Beloit, Wis.; A. K. Arig & Co. (2), Buena Vista, Va.; Union Pacific Railroad Company (50 ton), Cheyenne, Wyo.; Maryland Steel Company, Sparrows Point, Md.; Taylor Iron & Steel Company, High Bridge, N. J. They also report that they are now building crane No. 54 and have received an order for a 80-ton crane and a 20-ton crane from the Midvale Steel Company, Nicetown, Pa.

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.

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

No charge will be made for these services.

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

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

GOODS WANTED AT HOME.

- 2,624. Second-hand locomotive about 12 x 18 in. cylinder, weighing in working order about 40,000 lbs., saddle tank preferred, and to burn wood. North Carolina.
- 2,625. Edger and exhaust fan. West Virginia.
- 2,626. A semi-portable engine and boiler about 30 H. P.; also mills for reducing 10 to 15 tons bituminous coal slack daily, to No. 40 powder. Virginia.
- 2,627. A full line of clay-working machinery for washing, drying and preparing for the market kaolin or china clay; also engine, boilers, etc. Florida.
- 2,629. A complete outfit for foundry and machine shops. Virginia.
- 2,630. A passenger elevator for a three-story and basement building. Georgia.
- 2,631. Overhead wire tramways. Florida.
- 2,632. A second-hand 16 in. x 12 ft. engine lathe. Alabama.
- 2,633. Catalogues, price lists, etc., of brick and tile machinery. New York.
- 2,634. A shingle machine. Virginia.
- 2,635. A brick machine, 10,000 capacity, that can be run by a 10 H. P. engine. Louisiana.
- 2,636. A dynamo, constant current, 400 revolutions, 365 amperes, 570 volts; a 325 H. P. (400 revolutions) triple expansion surface condensing engine; a 400 H. P. hoiler (150 lbs. pressure)—all necessary attachments; mechanical stroke, injectors, pumps, gauges, cars for carrying material, reverberatory and smelting furnaces, crucibles and building materials. West Virginia.
- 2,637. Roofing and an elevator for a house 50 x 100 ft. North Carolina.
- 2,638. Two 200-light dynamos, three 50 H. P. water tube boilers, and laundry outfit for a hotel of 100 rooms; also hardware, steam pipe and fittings, helting, steam pump for boiler feed and fire pump, lines of underwriter's hose and fixtures, gas and electric chandeliers and brackets, iron grills and railings, tile and mosaic floors, plumbings, etc. West Virginia.
- 2,639. Broom machinery. Georgia.

AMERICAN GOODS WANTED ABROAD.

- 2,628. Machinery to grind and finish fibrous talc or asbestine. Canada.

GENERAL MINING NEWS.

ARIZONA.

GILA COUNTY.

More work is being done in the mines of Globe district this season than for many years, despite the low price of silver and copper, says the *Globe Silver Belt*. The increased output of silver is especially gratifying, and a number of properties are being developed which promise to become steady producers.

CALIFORNIA.

(From our Special Correspondent.)

In addition to the Miners' Association of San Francisco, similar organizations have been formed in Nevada, Placer, El Dorado, Yuba, Butte, Shasta, Sierra, Plumas, Mono and Alameda counties, while others are in process of formation in Amador and Calaveras counties. The fact that the Hydraulic Miners' Relief bill had been reported upon by a unanimous vote of the Committee on Mines and Mining and is now ready to be presented to the House, has caused great satisfaction here as it was thought that the greatest difficulties would be encountered in committee.

BUTTE COUNTY.

(From our Special Correspondent.)

BUTTE QUEEN MINING COMPANY.—The stockholders of this corporation are again before the Supreme Court in the endeavor to settle the fight which still agitates the company. On one side 61,524 shares of stock are represented, while three opposing stockholders represent 40,939 shares. Since November, 1891, both sides have been fighting to get control of the mine. Conspiracy and fraud are being charged and counter-charged. In the complaint just filed it is alleged that in November, 1891, the plaintiffs held 46,261 shares of stock and the defendants 40,939 shares. It was understood that the old board of directors should be re-elected, but instead the defendants "secretly and by previous understanding cumulated their votes in favor of H. B. Blagrove, V. I. Gadsden and S. D. Mayer," with the result that three out of the five places on the board were captured. After the election, say the plaintiffs, "they conspired to defraud us out of our stock and rights by levying assessments and cumbering the property with charges. The property had not been worked and all the officers and superintendent served without pay. When the new directors met they elected president, vice-president, secretary and treasurer, and proceeded to vote themselves salaries and to levy assessments." An appeal was made to the Superior Court to oust them from office, when the disputed offices were declared vacant and G. H. Powers, H. Francisco and E. Mayo were elected to fill them. The defendants refused to recognize the new officers, and advertised the stock of their opponents for sale because the assessment was not paid. Plaintiffs sued out a writ of injunction and stopped the sale, and for the present the matter stands.

LAKE COUNTY.

GREAT WESTERN QUICKSILVER MANUFACTURING COMPANY.—A dividend of 25c. per share, aggregating \$12,500, has been declared. This is the twenty-first dividend paid by the company, a total amount of \$275,000 having been disbursed.

NEVADA COUNTY.

IDAHO MINING COMPANY.—In March this company declared its regular monthly dividend of \$1 per share on the capital stock, making 261 dividends declared by the company. The mine is looking well throughout, and is said to be destined for a long life yet. Two hundred men are employed. The company is composed of Edward Coleman and John C. Coleman, of Grass Valley, Judge Miles O'Conner, of San Jose, and Geo. D. McLaine, of San Francisco. It has produced, says a correspondent of the *Sacramento Record Union*, over \$13,000,000 in bullion, more than two-thirds of which has been profit. Edward Coleman is superintendent of the mine. The Idaho is situated on the south side of Wolf Creek, one mile south of Grass Valley, at an altitude of 2,450 ft. The course of the vein is east and west, with a dip to the south, varying from 55 to 73°. During the years of 1889 and 1890, 39,225 tons of ore, valued at \$20 per ton, were extracted.

The Idaho mine is located just across the creek from the famous Eureka. The latter mine was first opened in 1851 and worked by various parties with indifferent success, the ore near the surface being of low grade. In 1865 the mine was sold for \$400,000 to the Eureka Mining Company, which sank a deep shaft, and during the next two years took out \$1,200,000. The company paid \$2,134,000 in dividends all told. The Idaho is on the same vein and the rich chute of ore worked in the Eureka passed into its lines.

PLACER COUNTY.

MORNING STAR DRIFT GRAVEL MINING COMPANY.—This company declared a dividend on the 17th inst. of \$3 per share, aggregating \$7,200.

SHASTA COUNTY.

(From our Special Correspondent.)

CROSSBOW.—Arrangements have been made to erect a mill and it is expected the stamps will be dropping by May 1st.

COLORADO.

A mining exchange was organized at Pueblo on the 22d ult. It already has a membership of over 100, among which are some of the most prominent mining men of that city.

A dispatch from Denver, yesterday, says that owing to the present low price of silver the Aspen mines, at Aspen, Colo., have been closed down and 900 men are thrown out of employment. The Sheridan-Mendota mines, in Marshall Basin, managed by J. H. E. Waters, also shut down on the 30th inst., throwing out over 700 men. Two mines at Leadville closed on the same day.

State Engineer James P. Maxwell, George D. Nickel, deputy surveyor of Rio Grande County, W. McCree, county surveyor of Saguache, and J. J. Abbott, county surveyor from Hinsdale, held a meeting at Creede recently to determine the county lines at that place. The lines decide upon place Jimtown and the school land in Hinsdale, and leaves only a small portion of Upper Creede, together with the Holy Moses mine and its immediate vicinity, in Rio Grande County. The decision was satisfactory, save to the representatives of Saguache County. Proofs of title to the land in Jimtown were made in Saguache, and nearly all the recording has been done in the wrong county.

The Board of World's Fair Managers for Colorado has organized a special department of mines and mining, and intrusted it with the work of collecting and preparing a mining exhibit, which shall be as complete as possible and commensurate with the greatest and most prominent industry of the State. The headquarters of this department have been established at room 33 Barclay Block, Denver, and the active work of collecting and planning the said mining exhibit has now been commenced.

It is intended that the exhibit shall be both technical and economic in its character, showing at once a scientific classification of the mineralogy and lithology of the State, and a correct presentation of its geology, and at the same time a popular and massive display of its resources in ores, building stone, coal, iron, commercial clays, oils and all other mineral products of whatever character.

In industrial mining, models, maps and diagrams will be employed to illustrate the progress made in mining and in modern methods of developing, breaking and surfacing ores. A complete exhibit will also be made of mining engineering and metallurgy, and the dressing and milling of ores. Full statistical and historic data will be collected, and reliable information compiled regarding the product, character and formation of our veins and mining districts.

The construction of a large map or model, showing the geology and topography of the mining area of Colorado on a large scale, is now commenced. This economic map or model will be compiled from data and information gathered from all available sources, such as the maps of Hayden, King and Wheeler, and all others of the United States Geological Survey, the records of the State Engineer's office, Surveyor General's office, and the valuable topographical data now held by the numerous railroad surveys throughout the State. It will be designed to point out the location of every mining district from which mineralogical exhibits are made, and whence our vast annual output has been derived; showing also the formation, transportation facilities, water and timber supply, proximity of coal fields, and all other economic features. This exhibit, in addition to being one of great engineering interest, will prove a permanent map of reliable information, demonstrating forcibly the inexhaustible and undeveloped mineral resources of Colorado.

In all of the work of the Mining Department for the World's Fair exhibit, it will be its purpose, in addition to that of making a grand display of the mineral wealth and resources of the State, to gather material from which to form for the future a permanent museum in the State of Colorado, and at the same time lay the foundation for a bureau of systematic research and investigation of its mining industry and mineral resources similar to that of the State of California.

COLORADO COAL AND IRON COMPANY.—This company reports earnings for the year 1891, compared with the preceding year as follows:

Gross	\$1,923,691	Dec. \$845,799
Net	162,867	Dec. 269,032
Other income	81,008	Inc. 15,281
Total	\$246,875	Dec. \$253,751
Charges	214,685	Dec. 54,954
Surplus	\$32,190	Dec. \$198,797

CLEAR CREEK COUNTY.

PAY ROCK SILVER MINES, LIMITED.—The mines of this company are said to be looking better.

DOLORES COUNTY.

BLACKHAWK.—A strike is reported at this property. Alongside of the carbonates and copper sulphides a streak of ore has been opened up which is said to assay as high as \$600 per ton.

EL PASO COUNTY.

JEFFERSON MINING COMPANY.—It is reported that this company has bought the Game Cock claim at Fremont for \$57,000. The claim has a shaft 47 ft. deep, and has ore which is reported to have assayed \$200 to the ton. It is located on Gold Hill immediately north of Great View.

LAKE COUNTY.

Seeley W. Mudd, manager of the Small Hopes Consolidated Mining Company, Leadville, has obtained a lease of the Jamie Lee mining lode in the California mining district. By the terms of the contract, Mr. Mudd agrees to put a powerful pumping and hoisting plant in the El Paso shaft of the property and to thoroughly drain, repair and develop the same. The royalties to be paid by the lessee to the owners run from 12½% on \$20 ore to 40% on ore assaying \$500 or more per ton.

(From our Special Correspondent.)

ARKANSAS VALLEY SMELTING COMPANY.—This company has introduced five large Brückner cyclinders, for the purpose of desulphurizing the sulphide ore shipped to it, preparatory to treatment in the blast furnaces. Each of these roasters has a capacity of at least 15 tons a day, and will be in operation by April 1st. The blast furnaces have all been pulled down and rebuilt, so that now they have an aggregate capacity of about 350 tons a day.

PAWNLAS.—This mine, on the north side of Big Evans gulch, has got its machinery in position, the water out of the shaft, and has sunk about 18 ft. The last 15 ft. has been in a contact that assays low in silver, and as the shaft is being sunk directly in the trend of a well known ore chute, without doubt a strike will be chronicled from here ere long.

STAR OF HOPE MINING COMPANY.—Since my last letter this company has been drowned out. Without doubt this will lead to the consolidation of the Penrose and Sixth street shafts with the Star of Hope, for the purpose of pumping. It is conceded that individual effort cannot empty the basin in which these shafts are going down, and the drowning out of the Star of Hope is bound to result in united effort. There is no doubt in the minds of the mining men of this district that once the basin is emptied not more than 300 gallons a minute will be met with, and a meeting will be held at which it is more than probable that Major Bohn will be chosen as the general manager of the three shafts until the water is out.

The water stands at present 100 ft. above the bottom of the Bohn shaft, but is easily kept at that point by the excellent pumping plant now in that shaft. But there is no reason why any one of these shafts should burn coal, and work to keep the water down, when it is known that an underground connection exists somewhere between all three, and that the same water is being handled, so that, while at first glance it appears a serious thing that the Bohn shaft should be drowned out, as a matter of fact, it is probably the best thing that could have occurred, as it has demonstrated the fact that only by united effort and consolidated action could this basin ever have been emptied. Now they will all be at work within 30 days, and within 30 days after the water is out, all of them will be in pay ore.

OURAY COUNTY.

AMERICAN-NETTIE MINING COMPANY.—The superintendent reports the discovery of a large body of sulphide ore, assaying from \$80 to \$100 per ton.

CALLIOPE MINING COMPANY.—A good strike of high grade ore in the Calliope mine is announced.

DUNBAR.—New machinery for this property has been ordered.

MINERAL FARM.—This mine, which closed down two weeks ago, will be opened again this month.

POTOSI AND HIGHLAND LASSIE.—These mines have consolidated, and are now being operated by a new company just formed in Chicago. Both properties are working in good mineral. About 40 miners are now employed.

PITKIN COUNTY.

The long pending agreement between the Cowenhoven tunnel company and the owners of the Park-Regent and Pontiac mining companies has been reached and work commenced on the extension of the tunnel on the 23d ult. The contracts call for an extension of 1,400 ft., divided as follows: Bushwhacker, 200 ft.; through Park-Regent properties, 900 ft., and to the center of the Pontiac ground, 300 ft. A full force of men will be kept employed, and Manager Brunton calculates that it will take about four months to complete the work. The tunnel will cut the vein about 500 ft. deeper on the dip than the present workings of the Pontiac.

SAGUACHE COUNTY.

LAST CHANCE.—This mine, which is the largest producer at Creede, is to be incorporated and shares placed upon the market. The capital stock will be \$5,000,000.

CONNECTICUT.

MIDDLESEX COUNTY.

Eight hundred quarrymen quit work in the three large brown stone quarries at Portland on the 23th ult. They ask 25 cents an hour for nine hours' work instead of ten hours. A letter from the agents was read at a meeting of the men, asking them to wait for terms until April 1st, the regular hiring day for the year. The proposition was not considered. A committee was sent to New York to consult with the Stonecutters' Union.

IDAHO.

LEMHU COUNTY.

Gibbonsville is reached from Salmon City, 35 miles distant, by wagon road and trail, or from

the Utah Northern Railroad at Divide Va poor wagon road 85 miles in length. The ores of Gibbonsville are iron pyrites carrying gold. Those on the surface are free milling, but as soon as depth is attained they become hase again. On these ores the chlorination process after roasting has worked successfully. Pan amalgamation after an oxidizing roast gives some 70%.

ESMERALDA.—This mine is cross-cut by a tunnel 650 ft. in length at the depth of 450 ft. A new tunnel is being driven to cut the vein 180 ft. deeper. The ore averages about \$30 a ton, hattery assay, but can be concentrated to \$100.

IRONSTONE.—This mine is situated four miles west of Gibbonsville. There is an open cut for 100 ft. along the vein from which samples taken 6 ft. across run from \$15 to \$25; 75 ft. lower there is a cross-cut tunnel in which 6 ft. of ore runs from \$8 to \$10; 35 ft. of lower grade ore without a wall is also exposed; 100 ft. lower down a cut shows 10 ft. to 12 ft. of good ore and 200 ft. further down a 20-ft. cut is all in fair ore. From the cut a tunnel is run 64 ft. For 40 ft. from the mouth the ore in this tunnel averaged \$32.60; then came a horse of 15 ft. and ore again going from \$6 to \$8.70 without the wall being reached.

ILLINOIS.

Prof. Joshua Lindahl, of Springfield, State Geologist, is sending out to the owners of coal mines and quarries a circular asking their co-operation in making a geological exhibit at the World's Fair. Some time ago Professor Lindahl issued a circular to coal operators. About 130 responses have been received. Of this number only seven coal miners express a willingness to co-operate in the manner suggested. The plan Professor Lindahl now proposes is to place on exhibition a miniature section of each vein of coal worked in this State. There are 16 veins of coal in Illinois, but only eight of them are worked. The circular now being sent out has reference to the stone and clay, as well as the coal exhibits. All the exhibits after the close of the exhibition are to be preserved in the Museum of Natural History at Springfield.

FULTON COUNTY.

The old mine troubles have again broken out in the sub-district embraced in Fulton County. The men at the Nickel Plate, Maplewood and Sunday Creek mines have been idle for over a week. The differences between the miners and the operators are of long standing, covering a period of many months. The mines affected are among the largest producers in Illinois. The main complaint of the laborers is not so much the question of wages as it is the "truck store" system in vogue in this sub-district. The law of the State provides for the weekly payment of miners. Now, these operators claim that the law is unconstitutional and propose to defy it. In consequence of this move on the part of the mine operators the Nickel Plate, Maplewood, and Sunday Creek mines have been closed and the fires hanked. The excuse is made by the operators that the compelling of weekly payments is discrimination against the smaller operators in favor of the big ones.

KANSAS.

CHEROKEE COUNTY.

During the week ending March 26th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,780,680; rough ore, pounds sold, 1,311,900; zinc ore, pounds sold, 1,125,000; lead ore, pounds sold, 398,280. Sales aggregated a total value of \$20,500.

MICHIGAN.

COPPER.

ALLOUEZ MINING COMPANY.—The mine has been closed down and will remain idle until there is a further rise in the price of copper.

ATLANTIC MINING COMPANY.—There has been a notable improvement in the yield of the stamp rock during the past month; it is expected that the figures will be better than 13 lbs. per ton. In January and March the yield per ton of rock fell off considerably.

FRANKLIN MINING COMPANY.—The annual report of this company for 1891 shows that 175,978 tons of rock were hoisted from the mine, of which 135,753 tons were stamped, yielding 1,922% of mineral, or 38,45 lbs. of mineral per ton stamped, the total mineral product being 5,213,642 lbs., yielding 82.085%, or 4,319,840 lbs. of refined copper. This summary of the year's business is given:

RECEIPTS.

4,319,840 lbs. of copper sold and on hand (at 10½ cents)	\$458,076.44
Interest	902.31
Silver	2,371.34
	\$461,350.09

EXPENDITURES.

Running expenses at mine (including construction account) ..	\$311,623.85
All other expenses, including smelting, freight, insurance, etc.	62,196.32
	373,825.17

Showing the income of the year to be

\$87,524.

The cash account is as follows:

Cash on hand January 1, 1891.....	\$62,816.28
Received from sales of copper, 1,862,081 lbs., at 12.612 cents.....	234,850.49
Received from sales of silver.....	2,371.34
Received from interest.....	902.31
Balance loan account.....	266,463.25
	\$567,403.67
Contra—	
Dividend July 11, 1891.....	\$80,000.00
Mine agents' drafts.....	322,084.69
Smelting.....	44,258.73
Freight, insurance and storage.....	12,818.40
Brokerage, expense, interest and taxes.....	29,143.29
	488,305.11
Cash on hand Dec. 31, 1891.....	\$79,098.56
ASSETS.	
Cash and accounts receivable.....	\$79,098.56
Copper account (amount unsold estimated 10 1/4 cents).....	694,231.02
Supplies at mine.....	64,836.11
Bills receivable.....	41,435.82
	\$881,601.51
LIABILITIES.	
Drafts outstanding.....	\$3,300.32
Liabilities at mine.....	29,509.23
Accounts and bills payable (smelting and freight bills, etc.).....	17,191.60
Loan accounts.....	311,463.25
	361,464.45
Surplus Dec. 31, 1891.....	\$52,137.06

KEARSARGE COPPER MINING COMPANY.—This mine is being opened on the plan of the Osceola. The removal of surface obstructions at No. 1 shaft goes on slowly, but in a short time the company will have two shafts with doubled hoisting capacity.

ST. MARY'S COPPER MINING COMPANY.—At the annual meeting of this company in Boston, on the 28th ult., the following board of directors was elected: John C. Watson, Francis Hunnewell, Charles E. Adams, Frederick Beck, of Boston, and R. R. Goodell, of Michigan, the new members being Mr. Watson and Mr. Adams. Fourteen thousand of the total 20,000 shares were voted. On the question of the renewal of the charter, which will expire in 1893, it was moved and carried that the directors be authorized to dispose of the property as best they can. The meeting adjourned 60 days, until May 21.

IRON—GOGEBIC RANGE.

PENOKE AND GOGEBIC DEVELOPMENT COMPANY.—It is reported that this company has closed contracts for the delivery of 600,000 tons of ore this season.

IRON—MENOMINEE RANGE.

MONITOR.—This mine was sold at auction on the 25th ult., under foreclosure of chattel mortgage held by Messrs. Forsyth, Hyde & Co., of Chicago. Mr. Edwin C. Veasey, vice-president of the Chemical National Bank, of Chicago, was the purchaser, the amount being \$42,542.

MINNESOTA.

IRON—MESABA RANGE.

The modus operandi of the big operators here, according to a Western paper, is to secure forty or two forties of lands, several forties of State leases if possible, other private leases, and then stock a company at from \$1,000,000 to \$3,000,000, reserving from \$400,000 to \$500,000 par value of the stock for the treasury. They then put the rest on the market, after showing up iron. The private leases are generally secured by paying a bonus of from \$5,000 to \$20,000 to the lessor, according to the amount of the value of his property, for from 15 to 40 years. The owners get a royalty of from 25 to 35 cents per ton, ore to be taken out each year. A proviso is included making the payment to the fee owner of a certain sum annually if the property is not worked. State leases are more liberal. The lease usually runs 40 years, with a royalty of 25 cents per ton. The plan usually pursued in getting stock on the market is to put on say \$200,000 par value at 10, 15, or 20 cents on the dollar as a beginning. No more is then sold until the price goes up several points, when another lot is sold. All these stocks are non-assessable and fully paid. The treasury stock is sold in quantities from time to time to defray the expenses of developing the mine.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, March 28.

The stormy weather which prevailed for almost two weeks was finally abated and the past week opened under favorable conditions. Some time was spent in draining the water from the mines, but a fair average production was made throughout the entire lead and zinc belt.

There was a slight decline in the price of zinc ore during the week, which would make an average of \$20.50 per ton throughout the district. There was a large output of lead ore and the sales amounted to over 500 tons. The market was strong at \$23 per thousand. Following are the sales from the different camps:

Joplin mines, 1,132,580 lbs. zinc ore and 402,280 lbs. lead ore; value, \$20,857.65.
Webb City mines, 966,990 lbs. zinc ore and 47,050 lbs. lead; value, \$10,933.70.

Carterville mines, 1,939,150 lbs. zinc ore and 186,650 lbs. lead; value, \$24,169.55.

Zincite mines, 103,420 lbs. zinc ore and 15,030 lbs. lead; value, \$1,542.55.

Oronogo mines, 43,190 lbs. zinc ore and 68,230 lbs. lead; value, \$1,991.30.

Carthage mines, 250,505 lbs. zinc ore and 7,150 lbs. lead; value, \$2,830.70.

Galena Kans mines, 1,135,000 lbs. zinc ore and 331,280 lbs. lead; value, \$20,050.

Districts, value, \$82,485.45.

Aurora, Lawrence County, mines, 336,000 lbs. zinc ore, 420,000 lbs. silicate and 320,000 lbs. lead; value, \$12,694.

Lead and zinc belts, total value, \$95,179.45.

Col. H. H. Gregg's Scotia mining camp, located about one mile southwest of Joplin, is coming to the front as a steady producer. Last week the Scotia mine produced and sold 65,240 lbs. of clean zinc ore, besides accumulating a large amount of rough ore. This new camp is attracting the attention of a large number of prospectors on account of the large deposits of ore at comparatively shallow depth. So far the ore bodies have been found at a depth of but 30 ft. to 50 ft.

STANDARD LEAD AND ZINC COMPANY.—Your correspondent visited the mines of this company and Zincite last week, and by the courtesy of the superintendent, Mr. J. H. Dangerfield, was shown through the entire workings. The mine has been operated by the present company for almost four years, during which time the development has been almost entirely confined to exploration work, of driving large drifts in the ore body. At the present time no less than 1,800 ft. of drifting has been done. These drifts have been cut around a number of large blocks or pillars of ore that have been left standing. At one point a body of ore 30 ft. to 40 ft. in height is shown; the ore body was followed down by underhand stoping for a distance of 110 ft., and ore is still showing in the bottom.

The pump shaft has recently been sunk to a depth of 165 ft., or 25 ft. below the present working levels, and still proves the continuance of the ore body downward. I am informed that this exploration work has produced not less than \$200,000 worth of zinc ore, and that there is ore enough in sight to keep up a steady production of not less than 30 tons of clean zinc ore per week for a period of three years. The mine is noted for producing an extra high grade of zinc ore, and I was shown a sample that gave returns of 69% metallic zinc. Most of the ore is purchased by the Illinois Zinc Company, and at the present time commands a price of \$23 per ton.

MONTANA.

DEER LODGE COUNTY.

BI-METALLIC EXTENSION MINING COMPANY.—A very rich strike is reported to have been made in this company's mine in the north cross-cut. The diamond drill core showed 3 ft. of very rich ore in 7 ft. of vein matter.

LEWIS AND CLARKE COUNTY.

SAPPHIRE AND RUBY COMPANY OF MONTANA, LIMITED.—The first ordinary statutory meeting of this company was held in London on February 22d Lord Chelmsford, chairman of the company, presided. In addressing the meeting he referred to the satisfactory reports received from two directors of the company, Mr. Edwin W. Streeter, and Mr. H. Malleby-Deeley, who went out to Montana to verify the statement made in the prospectus of the company to the effect that the contract with the vendors was not to be considered valid until the absolute accuracy of their statements regarding the property had been verified by personal inspection of the company.

Mr. Streeter says in his report: "We found the property in every respect to be better than represented. The total area of the sapphire bearing ground probably covers 10 square miles, or about 6,400 acres, all of which property will be owned by the company. The company has secured a practical monopoly of the gem production and also of the water rights of the region. At least 25% of the yield of gems will be cuttable for jewelry after throwing aside the imperfectly crystallized corundums. The ground is gold bearing as well as gem bearing."

Mr. H. Malleby-Deeley, who also inspected the mines, states that he "fully concurs with Mr. Streeter as to the abundance of the gems and the water supply. Three important water courses, viz., Beaver Creek, Soup Creek and Trout Creek will be brought to the mine. The last named will furnish at least 1,400 miner's inches of water."

It was also stated at the meeting that the property had been examined by Mr. J. D. Yerrington, of New York, who corroborates the reports of the two visiting directors. He says there exists an immense quantity of sapphire crystals which run from 25% to 30% of satisfactory gems cuttable for jewelry. He goes on to say that the mines are peculiarly adapted to rapid and economical working. The sapphire bearing gravels proved on sampling to be rich in gold. He was confident that a large market for these Montana gems can be established in New York and the United States.

In a discussion which followed these statements one shareholder asked if it were true that a number of shareholders had applied for a return of their money and were taking active steps for its recovery on the ground of misrepresentations in

the prospectus. The chairman replied that only one person, a Mr. Weil, who was an underwriter for a small amount, had taken action, but that the money had not been returned because it had never been paid. The purchase of the property has not yet been completed, the titles being in the hands of the lawyers. The property will be taken over within the next week or ten days.

Specimens of the gems from the property, collected by Mr. Streeter and Mr. H. Malleby-Deeley were exhibited at the meeting. The London *Mining World* says that the gems were of excellent appearance, being of all colors and of great brilliancy, and that it was computed that not less than 10,000 carats were exhibited.

CUMBERLAND MINING COMPANY.—The following is an abstract of a recent report of A. J. Huneke, manager of this company: "Castle Mountain mining district is located in the Castle Mountains, which form a detached and isolated range, lying midway between the Big Belt and Little Belt ranges to the west and east respectively, in the south central portion of Meagher County, Montana. These mountains have a plateau summit measuring about nine miles in length by six miles in breadth, having an elevation of 1,000 to 2,500 ft. above the surrounding valleys, and a maximum height of 8,000 ft. above sea level. The structure reveals a core of porphyritic granite, which is flanked on its easterly slope, and lying conformably to it, by the stratified formations, limestone, clay, slate, quartzite and sandstone, in the order named. The limestone stratas vary in width from half a mile to two miles, and in these occur the mineral veins and deposits of carbonate ores which have made the district famous. This limestone belt is intersected by numerous porphyry dikes, which, as in Leadville and Aspen, have been the cause of its mineralization.

"The mineralized belt of Castle is shown by developments to be actually five miles in length by from a half to two miles in breadth.

"The following applies more particularly to the Cumberland proper, though much of it, as far as the vein characteristics are concerned, have a general application to the other veins of the district. The veins vary in width from 150 to 200 ft., and can be traced for a great distance beyond the limits of the property. The ore occurs in chutes or lenticular bodies at irregular intervals along their strike.

"The general strike of the veins is north and south and their dip conformable to that of the limestone. In these veins, as in similar ones in other districts in lime formations, the origin or source of the ore bodies is attributable to the irruption of porphyry dikes from the inclosing limestone strata on the commonly accepted theory that the fractures in the latter caused by this irruption opened the way for the subsequent passage and flow of the mineral solutions, which in their contact with the limestone strata dissolved the latter, forming diverse cavities, and by simultaneous process deposited their mineral contents in the cavities so formed.

"The ores are carbonates and sulphides of lead with oxide of iron and pyrites, and all carrying silver to a greater or lesser extent. Of the baser metals, zinc, antimony and arsenic are present in small proportions. The carbonates preponderate on the hanging wall side of the vein, in which the ore was subject to a more rapid and thorough oxidization, whereas the sulphides are confined to the foot wall region."

SILVER BOW COUNTY.

ANACONDA MINING COMPANY.—We hear that the product of this company in February was equivalent to about 5,000,000 lbs. of fine copper; in the first two weeks of March it was about 4,500,000 lbs. of matte, which at 55% would mean 2,475,000 lbs. of fine copper, or about the rate of 5,000,000 lbs. for the month.

NEVADA.

ELKO COUNTY.

DEL MONTE MINING COMPANY.—There were shipped last week to the sampling works 24 tons of ore, the average assay value being \$275 per ton.

NORTH BELLE ISLE MINING COMPANY.—During the past week there were hoisted 27 tons of second class ore, the estimated assay being \$20 per ton.

NORTH COMMONWEALTH MINING COMPANY.—The stopes produced last week 28 cars of ore, the assay value being \$30 per ton; and two tons, assay value \$300 per ton.

MARTIN WHITE MINING COMPANY.—The Martin White is shut down, pending an investigation of the property by an agent of the Eastern stockholders.

ESMERALDA COUNTY.

MOUNTAIN QUEEN MINING COMPANY.—All the property of this company of Candelaria, including the mill at Columbus, has been attached by the sheriff of Esmeralda County to secure an indebtedness of \$1,600 to Edward S. Spring, who has brought suit against the company to recover that amount. The company claims to own the ground formerly owned and worked by the old Columbus Consolidated Mining Company.

EUREKA COUNTY.

(From our Special Correspondent.)

During the month of February 1,300 tons of ore were received by the Eureka & Palisade Railroad

Company for shipment to Salt Lake City, Utah, as follows: From the Diamond mine, 650 tons; Eureka Consolidated Mining Company, 350 tons; Jackson mine, 150 tons, and the Bullwhacker mine, 150 tons.

DIAMOND MINING COMPANY.—During the first two weeks of this month (March) 435 tons of ore were shipped from the Diamond mine to Salt Lake, and the teams were then laid off to wait the return of ore sacks. The debris having been removed from the caved portion of the mine, large quantities of ore are being extracted from there. It is reported that the company will shortly commence shipping ore at the rate of 90 tons per day.

EUREKA CONSOLIDATED MINING COMPANY.—Ore shipments are retarded for lack of a sufficient number of ore sacks. About 300 tons were shipped during the first two weeks of this month (March).

RICHMOND CONSOLIDATED MINING COMPANY, LIMITED.—The Cornell mines in White Pine District, White Pine County, have been examined in the interest of the Richmond Company, and if it concludes to purchase them, it is probable that arrangements will be made to haul the ore to Eureka for reduction, and the company would resume operation at their reduction works.

RUBY MINING COMPANY, LIMITED.—It is estimated that the production of the Dunderberg mine for the winter will amount to about 150 tons, which will probably be hauled to the railroad for shipment to Salt Lake during the month of April. The road from the mine to the railroad depot is already in good condition for the teams. The lessees of the Bullwhacker mine have increased their working force and are rushing to get out all the ore they can before the last of April. * †

HUMBOLDT COUNTY.

According to the *Silver State*, the mining outlook in the Lovelock district has never appeared better, and more prospects will be worked and more mines opened than ever before. The Arabia has been working steadily all winter and the body of ore has been steadily getting larger and richer, until now it can safely be placed among the dividend paying mines of the State. Mr. Stone, the gentleman who is at the head of the company owning the mine, arrived from the East recently to supervise operations. He expects to open the mine this spring to sufficient extent to work 75 men, and will put in electric lights and drills. The White Cloud, a mine recently bonded by Mr. Lovelock to L. V. Hltchcock, of Erie, Pa., for \$75,000, will be opened early in the spring. A large new boiler has just arrived from the East for the hoisting works. Dr. Hutchins has a large force of men at work at his antimony mine, and the Bell nickel mine is still taking out large quantities of rich ore and must now have 1,000 tons or more on the dump. At least 500 men will be employed in the mines tributary to Lovelock this season.

LINCOLN COUNTY.

PIOCHE MINING AND REDUCTION COMPANY.—George H. Nickerson has returned from Pioche, where he has been in the employ of this company, says the *Salt Lake Tribune*. He left there because of the general shut-down of all operations by the company except dead work in the mines, much of which is being continued. Mr. Nickerson attributes the shut-down to the scarcity of lead ores, the high cost and poor quality of fuel, and the expensive transportation. Cedar wood of poor quality costs \$5 per cord at Pioche, while charcoal is proportionally high and of inferior quality. A short time since the company had in its employ about 400 men, and the force has been cut down to 80. All the outside men engaged in operating the railroad, running the smelters, etc., were laid off.

In the Mendha mine, belonging to the company, there are pockets of lead ores, and these are now being developed, so that in four or five months the company ought to have enough lead ores to run its furnaces for quite a while. The Day mine is one of its big ones, and it has enough good fluxing ore, carrying iron and lime in such good proportions as to be worth a premium of over \$1 per ton assay value, because of its iron and lime. It carries some 25 to 30 ozs. silver, and there is enough so that they could, with a railroad, ship from 100 to 150 tons of ore per day. It has pockets where the ore runs up to 150 ozs. silver. The company has on hand from \$30,000 to \$40,000 worth of smelting supplies, so it is probable it will make a smelter run soon to work this up. One of the improvements being made is to drive a tunnel in the Onandaga mine to tap the Day mine at a depth of 600 ft. This will furnish an easy mode of operating the Day mine, and dispense with the use of hoisting plant and 4,000 ft. of tramway, making a great saving in cost of operating.

The great question which interests Pioche now is that of a railway. If the Union Pacific should extend its line, by laying the track over the grade already completed, Pioche would become a great producer, and until that time it must languish to some extent. Mr. Godbe, general manager, is now East trying to secure a railroad to the property.

STOREY COUNTY—COMSTOCK LODE.

Following is the official report of the pumping operations in the Crown Point incline for the week ending March 19, 1892: The 1,700 station pumps have been working continuously during the week. The flow of water is somewhat reduced, but keeps both station pumps running steadily. The 1,700

south drift is now out 910 ft. from the station. The face of the drift is in very hard ground, and we are now putting in pipe for compressed air to run machine drills, which will expedite the work of making connection with the air-shaft incline.

(From our Special Correspondent.)

SAN FRANCISCO, Mar. 25.

The following is the weekly statement of ore extracted from Comstock mines and milled, with the average battery assays:

Mine.	Tons extracted.	Tons milled.	Assay Values.	Mar. 19.	Mar 12.
Con. Cal. & Va.	1,020	980	\$20.75	\$19.43	
Overman.....	270	270	.....	20.19	
Ophir.....	200	53	18.08	.....
Savage.....	1705	660	17.85	18.50	
Yellow Jacket.....	1350	.....	.....	.....

*Car sample assay \$20.17. †Cars. ‡Being shipped to the Vivian mill, six ore chutes and bins full.

ALTA SILVER MINING COMPANY.—The drifts, 450 level, have been repaired and work will be resumed in the ore body known to exist on this level.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—The latest report from the mine is to the effect that the top of the seventh set in the raise, 1,500 level, is 8 ft. wide, and the ore now being stopped from this level averages \$40 per ton. The winze being sunk below the 1,800 level, has reached a depth of 7 ft. and is in ore averaging \$15 per ton, an increase of \$5 per ton since the winze was started. The average of the ore being taken from the stopes on this level is \$25 per ton.

HALE & NORCROSS SILVER MINING COMPANY.—The new management has abolished the position of an instant superintendent of the mine, making a saving of \$250 per month, as well as several other ornamental but useless positions. The management is also displaying zeal in making better arrangements for milling ore. About 100 tons of ore is being shipped to the Occidental mill for the purpose of testing the amount of bullion per ton that can be returned as compared with the assay value of the ore. Should the test be considered satisfactory, the mill will be leased by the company, and in the contract it will be specially specified that all slimes or tailings shall belong to the mining company. The Occidental mill has 20 stamps, with a crushing capacity of 70 tons each per 24 hours. As it is claimed by the new management that the ore resources of the mine are sufficient to run a 20-stamp mill for a year, there is every reason to hope that with economic methods, dividends to stockholders may again be paid in the near future. The bullion return for February amounted to \$24,083.03, the average assay being \$21.82.

WHITE PINE COUNTY.

NEW EBERHARDT COMPANY, LIMITED.—An extraordinary general meeting of this company was held in London on February 24th. The chairman said it was 12 months since he had called the shareholders together, and reported the results of his visit to the mine, and upon his report they determined to open up the works at Eberhardt, and to provide funds for the purpose. However, they only paid up 6d., which gave £6,200. This money the directors remitted to the mines. It was now for the shareholders to decide whether they would continue operations. After reading the manager's report the board were of opinion that it would be advisable to go on and spend more money.

The following is an abstract of Capt. Read's report:

Pursuant to your cabled instructions of February 12th, 1891, I proceeded to Eberhardt as soon as it was possible for me to do so, and proceeded to the reopening of the various levels of the mine; and as portions of our work of repairing were completed men were put at work in the mine. Our prospecting work has been confined principally to the north and south drifts from the No. 2 raise. Drifts north and east from No. 3 uprise, cross cut No. 2 west, and cross cut No. 3 west; likewise some work has been shown on John Wild north. Altogether I consider your Eberhardt property as being favorable, and such as would warrant continued and persistent work being prosecuted, considering the enormous outlay the company has been to in driving the Eberhardt and Aurora tunnel to tap the mines at this depth. Having discovered the large fissure or footwall upon which large bodies of ore were expected to exist, as they did above, I, unfortunately, upon first finding the seam, found but little ore upon it; but after driving upon the seam a distance of 610 ft. more ore was met with, and as per Mr. Hooper's estimate, I call it 60 tons. It is at this point we are now directing our attention, and, as before stated, our prospects are good, and work should be continued vigorously.

In view of the fact that you have spent a large amount of money to arrive at the point where we are now working, I think that prospecting work should be continued in this section of ground, both above and below our tunnel level, with the prospect of yet finding a continuation of these large and extensive ore bodies that were extracted from the upper workings of these mines, and from which so many millions have been taken. At the Monitor and Gore Hill mines no dead work has been done, and we have simply confined our efforts to what might be discovered by following the small streaks of ore, and at times I thought we were surely going to find the so much desired

deposit of ore, but disappointment comes again and our weekly extractions were reduced to a few tons, and this of a very low grade. At the time our chairman was with us one year ago our output was from five to seven tons per week with an average value of \$26 per ton. The seam of ore I was following at that time was not more than 3 in. in thickness nor more than 4 ft. in length, but by continually following this seam it opened out, so that from it was extracted 1,296 tons of ore, with an average assay value of \$38.50 per ton. Our mine at this writing is looking well, and from present prospects I have no doubt ere spring opens there will be in our mill and mine dumps not less than 500 tons of ore. I estimate the amount now in our mine dump at 200 tons, of an average value of \$40 per ton. We have one small seam of ore which is very rich; the value of same per ton is \$5,386.57. This rich ore is only about one inch in thickness.

Capt. Read strongly recommends the prosecution of further prospecting work in the Monitor mine. The total weight of ore extracted during the year was 1,296 tons; total weight of dry ore worked, 1,277 tons. Assay value of same, \$49,167.44, or per ton, \$38.50. Bullion product of same standard value, \$40,423.51, or per ton, \$31.65. Number of men at work in the Monitor mine, 9, and a watchman at the mill. The shareholders voted to authorize the directors to make a call of 6d. per share, payable in three installments, the first falling due on March 1st.

NEW MEXICO.

GRANT COUNTY.

Thirty-one iron mines in the Hanover district have been sold to a syndicate of Pennsylvania capitalists for the sum of \$110,000. Of the mines sold nine belonged to W. H. Newcomb and nine to John Brockman, of Silver City. The deal was closed by Lewin W. Barringer, of Philadelphia, Pa., for the purchasers, and the mines were transferred to John W. Brock, as trustee for the company. The mines purchased comprise most of the valuable iron mines in the Hanover district. The ore is said to run about 60% iron, and has been used extensively by the Socorro and El Paso smelters for fluxing purposes. Just what the purchasers of these mines propose to do with the ore is not known, but for the present at least they will continue to fill the contracts for ore which were made by Mr. Newcomb and which have been turned over to the company in the deal. These contracts amount to about 30,000 tons per annum. The company will purchase the Silver City & Northern Railroad if possible, but, failing in that, will build a new line from Hanover, over which to ship its ores.

NORTH DAKOTA.

Some months ago a company was organized to develop coal mines on the Missouri River about 75 miles above Bismarck. The company last fall had lumber placed upon the ground with which to construct not less than 18 barges, and it is presumed that the work of construction has been going on all winter. Each barge is designed to have a capacity of 300 tons and a steamer will be engaged to tow them the coming season. On each trip the steamer will tow three of the barges, while the others will be loading. Warehouses will be erected in each of the river towns from Bismarck to Sioux City, and from these towns the coal can be distributed to points inland. It is stated that the company has plenty of capital behind it and will make a success of the venture. The coal is reported by Missouri River steamboat men to be of good quality and far superior in every way to the soft coal shipped from Illinois or Iowa.

OHIO.

COAL.

The machine coal miners in the Hocking Valley have decided to accept the prices which ruled last year for the coming summer. Some time ago they demanded three-fifths of the price for pick mining for all coal loaded after machines. This would have made the price 42 cents per ton, an advance of eight cents. The operators refused to consider the proposition, and the miners concluded to settle on last year's basis.

OIL.

The Paragon Oil Refining Company, of Toledo, has completed a 4-in. pipe line from Gibsonburg, Sandusky County, to the refinery at Ironville, a distance of over 25 miles. The project has been pushed to a finish quietly, but with dispatch, and the first run of oil will soon be made. This step was made necessary on account of the immense output of the plant exhausting the supply of crude oil when transported by rail. The capacity of the line is about 2,500 barrels per day. A pump has been located at Gibsonburg, which will afford the pressure to transport the oil. Another line is being constructed from Bradner, Wood County, to Gibsonburg, a distance of 10 miles. This will consist of 3-in. pipe, and will serve as a feeder to the main line, with a pump station at Bradner. The oil will be pumped into storage tanks at the works in Toledo.

PENNSYLVANIA.

COAL.

Mr. J. M. Lewis, mine inspector for the fourth anthracite district, has just made public his report for the year ending December 31st. It is: Total production of coal, 5,804,964 tons; total shipment

of coal, 5,270,767 tons; number of days worked, 237; number of persons employed, 14,903; number of fatal accidents, 53; number non-fatal accidents, 116; number of kegs of powder used, 110,768; number steam boilers, 1,383; number horses and mules, 1,794; number mine locomotives, 70.

The annual report of Mine Inspector Hewitt, of the first anthracite district, shows 98 collieries in operation, employing inside and outside a total of 24,600 persons, and mining last year nearly 11,000,000 tons, an increase over the previous year of about 2,000,000 tons of coal, and requiring in the mining 300,000 kegs of powder. Sixty-six fatal accidents were reported in 1891, and 24 wives were made widows. This is an increase of two fatal accidents over the preceding year. One hundred and twenty children were left orphans as the result of those accidents. The number of non-fatal accidents was 250. The report shows that the mines are in a good, safe and healthy condition, the ventilation being good except in a few of the smaller ones.

NEW EAGLE.—Thomas F. Cain has leased this mine, near Monongahela City, and will begin work at once.

PHILADELPHIA & READING COAL AND IRON COMPANY.—The statement of this company for February shows gross receipts, \$1,778,029.91; gross expenses (including operating expenses), \$1,813,380.07; colliery improvements, \$70,224.64; loss from mining, \$35,361.16; one-twelfth of the current year's fixed charges, \$65,500; leaving a deficit of \$100,861.16, showing a decrease of \$74,148.20 as compared with February, 1891. The deficit for three months of the current year is \$150,276.15, against \$290,323.92 during the same period last year.

OIL.

ENGLISH PIPE LINE COMPANY.—It is reported that another pipe line from the Western Pennsylvania oil fields to the seaboard is contemplated. The new line, according to the *Pittsburg Post*, is to be built with English capital. It is said that the capital stock of the company will be £2,000,000. A charter is said to have been taken out in New Jersey. The agents of the contemplated pipe line company, it is reported, are now out along the route endeavoring to secure the right of way. The proposed line parallels the new Crescent Line throughout from Western Pennsylvania to its terminus near Philadelphia. As soon as the trunk line is completed, it is the intention to extend branch lines into West Virginia and Eastern Ohio. The line is to be ready to pipe oil within 13 months.

SOUTH DAKOTA.

LAWRENCE COUNTY.

The last mid-monthly shipment of bullion from Deadwood amounted in round numbers to \$240,000, being the largest 15 days' output ever made by the district. Of this amount the Homestake mine contributed \$175,000, the Golden Reward \$15,000, Consolidated Milling and Mining Company, \$15,000, the Welcome \$15,000, and the Deadwood Smelting Company \$20,000. The above output does not include that of the small stamp mills scattered about this section, which ship their metal in small lots, nor of the immense amount of ores that are shipped to Eastern smelters for reduction.

ANNIE AND JOSIE.—A rich strike is reported in these claims on Bald Mountain.

HESTER A.—The ore bodies now being worked in this property consist of iron pyrites carrying both gold and silver. For this class of ore it is said that the mine is receiving 95% of the assay value without treatment charge. The vein is flat and on the contact between quartzite and shale. It is from 2½ ft. to 4 ft. in thickness.

RICHMOND.—It is rumored that this property is about to be transferred to the Homestake Mining Company, which will work it. It has been idle for a year.

UTAH.

JUAB COUNTY.

RICHMOND & ANACONDA MINING COMPANY.—This company was recently formed to develop and operate two groups in Tintic, one being located near the Union Pacific depot at Eureka, and covering a space 1,200 by 3,800 ft., in which there are six mining claims. One vein here has been developed by a shaft 25 ft. down and a tunnel now in 60 ft. This vein is said to be 7 ft. wide near the surface. The other group is 800 by 3,000 ft. in extent between the Mammoth and the Godiva. Good assays are reported to have been made from the surface. The capital of the company is placed at 500,000 shares, of which one-fourth goes into the treasury for developing the two groups.

SUMMIT COUNTY.

DOLBERG GROUP.—Work will soon be resumed on this group of claims between the West Ontario and Meears. The shaft had to be abandoned some time ago on account of water, but is now drained by the Anchor tunnel.

McHENRY.—Work has been resumed at this, the oldest mine in the vicinity of the Ontario. A small vein of high grade ore has been found, and is being followed. The ore is averaging \$120 a ton.

ONTARIO SILVER MINING COMPANY.—It is proposed to introduce the Taylor gas producer at the Ontario mill to generate fuel gas for the rotary dryers and Stetefeldt furnaces. The system has

been in successful operation at the Marsac mill for some time. The installation will be in the hands of Mr. C. A. Stetefeldt.

VIRGINIA.

ROANOKE COUNTY.

PENNSYLVANIA ZINC AND IRON COMPANY.—This company has been incorporated at Roanoke, Va., to manufacture iron and zinc, erect furnaces, mills, etc. Henry C. Musser is president; J. H. Bartlett, vice-president and general manager, and Edmund Schaefer, secretary. The capital stock is to be \$300,000, with power to increase to \$500,000.

WASHINGTON.

GREEN PINE COAL COMPANY.—A mortgage of \$500,000 between this company and the Manhattan Trust Company, of New York, was filed recently. The Green River Coal Company has a seam of coal eight feet thick, and the money thus secured is for the purpose of putting in a permanent plant, including coke ovens, and for driving the main shaft and opening up the mine generally.

DOUGLASS COUNTY.

In this county, 65 miles east of Ellensburg, is located an extensive bed of borax, which is described by the discoverer in the *Ellensburg Capital* as having the appearance of a lake from a distance; on a near approach, however, no water is found, but in its stead a deposit of borax 8½ ft. thick. The "lake" is about 1½ miles in length by ½ mile in width. The deposit is underlain with clay, beneath which there is a slate bedrock. Experts who have examined the borax say that no process is necessary to put it into marketable shape. The deposit was discovered in 1875, but no attention was given it until last summer, when the discoverer and his friends filed mineral claims and have since done some development work. It is 21 miles from the nearest railroad point.

OKANOGAN COUNTY.

(From our Special Correspondent.)

About three miles from Wenatchee on the bluffs of the Columbia, coal was found a short time ago, and was supposed to be a continuation of the Roslyn coal measures. A shaft has been sunk to a depth of 30 ft., and three distinct veins of coal, averaging 2 ft. each in thickness, have been uncovered. A tunnel was then run lower down the bluff, when a solid 8-ft. seam was opened. The coal is a lignite of high grade. It is on the direct line of the Great Northern Railway.

GOLD FINCH.—The shaft on this mine at a depth of some 40 ft. shows the ledge to be improving, the pay streak being some 16 in. wide.

WASHINGTON MILLING COMPANY.—This company has arranged for a custom mill to be erected at Ruby. Machinery has been purchased, and construction work will commence about April 1. The capacity of the mill will be about 40 tons. It will be built under the supervision of Luther Wagoner, of San Francisco, who will also act as superintendent. Salmon Creek will supply the power for the mill, and a large ore house will be built at the mouth of number three tunnel on the First Thought mine. The bin will be used for accumulation of ore from all the mines until the mill is in operation, when a tramway will be constructed to the mill. The First Thought and Arlington mines are turning out about 30 tons of ore daily, and it is proposed to increase the output to 40 tons.

WEST VIRGINIA.

M'DOWELL COUNTY.

EUREKA COAL AND COKE COMPANY.—This company has been incorporated to develop coal mines and manufacture coke at Davis Branch.

WAYNE COUNTY.

COALDALE MINING AND MANUFACTURING COMPANY.—This company has about completed and already commenced shipments from a 1,000-ton tippie. It is proposed to prepare a splint coal of superior quality, to be shipped over the Kenova division of the Norfolk and Western R. R.

WYOMING.

ALBANY COUNTY.

(From our Special Correspondent.)

A diamond drill company has been organized in Laramie for the purpose of exploiting adjacent mineral districts by means of diamond drills. It will prospect any claim for an interest in the same or a cash payment.

The largest of the soda lakes, which is 60 acres in extent, located 14 miles from Laramie on the branch of the Union Pacific Railway is now drained by a ditch 3,000 feet long and 200 tons of soda per day are being extracted. It is expected that the product will soon amount to 1,000 tons per day. The sulphate of soda is calcined at Laramie and shipped from that point. It is estimated that there are 100,000 tons of soda in sight in the lake. Measurements over all parts show a thickness of the material of 8 to 13 inches. Messrs. Padden & DeSteigers are the lessees of the property and are making great success of their undertaking. The crude soda loaded on the cars at the lakes contains about 52% water, while the water drawn off from the lake contained 12% of soda.

LARAMIE COUNTY.

The Cheyenne Board of Trade has offered a bonus of \$200,000 for the establishment of a smelting plant in that city similar to the Omaha & Grant, of Denver, Colo.

FOREIGN MINING NEWS.

AUSTRALIA.

NEW SOUTH WALES.

BROKEN HILL PROPRIETARY COMPANY (LIMITED).—The weekly output for the first two months of 1892 has been as follows:

1892.	Week ended	Jan	Treated, Tons.	Yield, silver lead.	Silver ozs.	Ozs. per ton.
"	"	14	5,453	818	179,919	33
"	"	21	5,586	894	178,752	32
"	"	28	5,456	978	180,048	33
"	Feb.	4	6,094	914	195,068	32
"	"	11	6,213	995	198,976	37
"	"	18	5,570	913	198,690	37
"	March	3	5,349	994	198,866	34
"	"	10	6,122	1,102	202,026	33
"	"	17	5,980	957	203,320	34

The usual monthly dividend of 2s. per share has been declared for March, making 6s. per share paid, etc., for this year.

It will be seen from the preceding table that the output of the company shows a considerable increase week by week since the beginning of the year, but the steady fall in the value of the shares would seem to show that investors have not much confidence in the maintenance of this enormous output. The new method of mining by the open cut system or quarrying, which was undertaken after great deliberation on the part of the directors, is said by its success to have justified the policy that led to its adoption. The company has now come to an understanding with the other principal mining companies on the Broken Hill lode, and has applied to the Parliament of New South Wales for an act to enable it to bring in water from the Darling River.

CANADA.

PROVINCE OF NOVA SCOTIA.

The iron mine at Torbrook, Annapolis County, is yielding a good furnace ore, running about 60% iron, and the discovery of several new beds is reported in that neighborhood.

PROVINCE OF ONTARIO.

(From an Occasional Correspondent.)

A large deposit of "asbestine" or fibrous talc in Addington is attracting considerable attention from paper manufacturers and others. The mineral is similar to that of Gouverneur, N. Y., but the deposit is much larger and will be very easily worked.

An American firm is negotiating for the Effingham mica mine. If it obtains the property, it will equip it with steam plant, etc., and work it energetically. It consists of two large feldspathic dykes, carrying a fine quality of tough white mineral. The feldspar is suitable for pottery purposes. On the same property is a large quartz vein, carrying free gold, which they also intend to prove, and if ore exists in paying quantities, erect a mill. A 45-ton shipment of amber mica went from here last week.

The different municipalities in the Kingston district are petitioning the Ontario government for a grant for exploratory purposes by means of diamond drilling, which, if obtained, may bring some iron and lead properties into prominence.

Very little work is being done on phosphate or mica, nearly all the mines being shut down until spring.

MEXICO.

CHIHUAHUA.

The suit between Senator Tabor and the Sequeros family over the San Edivigas mine at Jesus Maria has been compromised and work will commence at once.

BATOPILAS SILVER MINING COMPANY.—In six weeks lately these mines yielded \$120,000 and for three weeks the product averaged between \$25,000 and \$30,000 per week. While this is not expected to continue yet good results are presaged by Gov. Shepard. The rainy season will prevent the aqueduct being finished.

SANTA JULIANA MINING COMPANY.—Mr. Walter S. Logan, president of this company, has received the following telegram from the superintendent: "We are extracting rich metal everywhere and expect to double the production during April. Prospects are very encouraging."

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, April 1.

Heavy Chemicals.—Not much change is to be noted in the market for heavy chemicals. Practically they all are in the position reported in our issue of last week. There has not been any noteworthy activity and no special feature of interest has been noticeable. Caustic soda for immediate delivery is firm and slightly higher priced owing to the exceedingly light supply on the spot. Only a hand-to-mouth business has been done by the consumers. Carbonate soda ash has been in some demand, especially for future delivery. Alkali on the spot is quiet. Bleaching powder continues dull, with an abundance of supplies here. Sal soda, both foreign and American, is featureless. Quotations are as follows: Caustic soda, 70%, 2-90@3c.; 74-76%, 2-92½@3-02½c.; 77%, 3-06½c. Carbonated soda ash, 48%, 1-62½c.; 58% (basis 48%), 1-50c. Alkali, 48%, 1-60@1-65c.; 58%, 1-45@1-47½c. Bleaching powder, 2-15@2-20c.; sal soda, English, 1-02½@1-05c.; domestic, 90@1c.

Acids.—This market continues in the condition reported for some weeks past; there is a steady demand and all manufacturers report a good business. Sulphuric acid is in very good request.

We quote this week for 100 lbs. of acid in New York, in lots of 50 carboys or more: Acetic, \$1.60 @ \$2, according to quality; alum, lump or ground, \$1.55 @ \$1.80; muriatic, 18°, \$1; 20°, \$1.12 @ \$1.25; 22°, \$1.25; nitric, 40°, \$4; 42°, \$4.50 @ \$4.75; sulphuric, 90c. @ \$1.10; mixed acids, according to mixture; oxalic, \$7.25 @ \$7.75. Blue vitriol is quoted all the way from \$3.25 @ \$3.50. Glycerine for dynamite 11½ @ 12½c. according to quality and quantity.

Brimstone.—The market for Sicilian brimstone continues very quiet, although prices show a slight improvement. We quote: For shipment, best unmixed seconds, \$22.50; thirds, \$21.75; on the spot, best unmixed seconds, \$24; best unmixed thirds, \$23.

Fertilizers.—A fair business has been done during the week, although the market is devoid of any interesting features. Several sales are reported at prices a shade higher than those given in our last issue. Quotations are as follows: Sulphate of ammonia, 29½ @ 3c. for spot. Dried blood, \$1.95 per unit for high grade and \$1.85 for low grade. Acidulated fish scrap, \$13.50 f. o. h. factory. Dried scrap, \$23.50 @ \$24. Azotine, \$1.80. Tankage, \$16.50 @ \$20, according to grade. Bone meal, \$22 @ \$23.

Double Manure Salts.—Quotations are about as follows for winter shipments, ex-vessel New York, in lots of 10 to 50 tons; 48½-53%, 118½ @ 128½c.; 90-95%, 218 @ 223½c.; 96-99%, 221 @ 223½c.

Kainit.—This chemical is very quiet, although there have been some inquiries for future business. Sales during the past month aggregate about 3,000 tons. New York prices remain \$8.75 for invoice weight and \$9 for actual weight.

Muriate of Potash.—This article continues quiet, with the usual number of arrivals. Syndicate prices are unchanged.

Phosphates.—Nothing of importance has been done in this market. Prices are as follows: F. o. h. Charleston, \$5.50 @ \$6 for dried. Freighters are: \$1.50 @ \$1.75.

Nitrate of Soda.—This market is very quiet. Quotations are: \$1.85 @ \$1.87½ ex-ship in port.

Liverpool. March 23.

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

The coal crisis is over except in the Durham district, where the strike still continues, and seems likely to do so for some little time to come. This Durham strike effects the Tyne chemical manufacturers and reacts on this market to some extent.

The Union is almost daily imposing fresh shipping restrictions, so that merchants here are gradually being shut out from most of the markets.

Soda ash is inquired for, but there is not much actual business to report. The spot quotations for the commoner qualities remain unchanged as follows: Caustic ash, 48%, £5 6s. 3d. per ton; 57-58%, £6 7s. 6d. per ton; carb ash, 48%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d. per ton, all net cash. For prime brands a considerable premium on above figures has to be paid.

Soda crystals are rather easier, and although £3 10s. per ton less 5% is the nominal value; some business has been done at 2s. 6d. per ton under this figure.

Caustic soda is very flat, but at the same time the late advance still remains in force. Buyers appear to be indifferent and hold aloof in anticipation of prices being reduced. Nearest spot values are as follows: 60%, £9 7s. 6d. per ton; 70%, £10 10s. per ton; 74%, £11 10s. per ton; 76%, £12 7s. 6d. @ £12 15s. per ton, all net cash. For parcels under 10 tons 5s. per ton extra is charged. The Union will not sell on this market for export to the United States.

Bleaching powder is firm at £7 15s. to £8 per ton net cash for hardwood packages, for all quarters except United States or Canada.

Chlorate of potash is still very firm and practically nothing offering for prompt delivery, while for April, June, 7d. per lb. is asked, and for July-December, 6½d.; possibly a few resale parcels could be picked up at a shade under these figures. At the advanced prices, however, buyers are not anxious to do anything.

Bicarb soda is steady at £6 15s. to £7 per ton, less 2½% for one cwt. kegs, according to brand and quality with usual allowances for larger packages.

Sulphate of ammonia shows little change, and nearest spot values are £10 7s. 6d. to £10 10s. for good grey 24% to £10 13s. 9d. to £10 17s. 6d. for 25% both in double hags less 2½% f. o. h. here.

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Deadwood, Dak., Pittsburg, St. Louis, London and Paris, see pages 392 and 394.

NEW YORK, Friday Evening, April 1.

The mining market continues to suffer from a complication of troubles. The same lack of interest is displayed by the public, and the same apathy by the mining brokers.

The feature of the week has been the trading in Brunswick, the price of which advanced to 18 @ 19c. Of the 35,000 shares sold during the week Mr. H. R. Lounsbury is reported to have bought the greater portion.

The following letter from the superintendent has been received: "The improvement at the mine continues. The ledge is about 18 ins. wide, and is of the same grade as reported by the assays; it shows free gold plainly and is of the best quality for milling. The ledge is across the shaft from east to west and is on the foot wall. It looks as if we were on top of a fine chute of good ore. The shaft is now down 569 ft." The certificates of the two assays referred to in the above letter have been received. They show \$569.12 gold and 7.57 oz. silver, and \$543.57 gold and 7.1 oz. silver per ton, respectively.

Of other California gold stocks Belmont shows sales of 300 shares at 60 @ 70c. and Plymouth 200 shares at \$1.75. There was a sale of 70 shares of Bodie Consolidated at 70c.

The Comstocks were very quiet and in some instances lower than last week. Consolidated California & Virginia was dealt in to the extent of 300 shares at \$5 @ \$5.25; Comstock Tunnel bonds had a sale at 26. Gould & Curry shows a solitary sale of 100 shares at \$1.60. Of Hale & Norcross 225 shares were sold at \$1.60 @ \$1.75. Ophir was quiet at \$3 @ \$3.15, as was also Savage at \$1.60 @ \$1.75. Only 150 shares of Sierra Nevada were sold at \$1.35. Yellow Jacket was quiet at \$1.30. Best & Belcher was in little demand at \$2.50. Comstock Tunnel shows transactions aggregating 4,900 shares at 16 @ 17c. Of Mexican 375 shares were sold at \$2 @ \$2.05. Potosi was neglected at \$1.35. There were sales of 100 shares of Union Consolidated at \$1.65, and 400 shares of Utah at 25 @ 35c.

Of the Tuscaroras only Navajo was dealt in, 300 shares being sold at 18c. to 19c. This is higher than for some time past.

The Colorado stocks were exceedingly quiet this week. Of Leadville Consolidated only 100 shares at 17c. were sold. There have been sundry rumors of manipulations of this stock, and we will publish next week the results of our investigations in regard to the matter. American Flag shows reported sales of 300 shares at 2c. Ward Consolidated, which had not been traded in for a long time, this week shows sales of 500 shares at 30c.

Of the black hills stocks Deadwood Terra shows sales of 300 shares at \$2.05.

Alice appeared in some demand, although the price declined from 80 to 65c.; 1,400 shares were sold.

Mutual Smelting and Mining Company, of which a sale has not been reported for some time, was dealt in to the extent of 500 shares at 41 @ 42c. Phoenix of Arizona shows sales of 200 shares at 45 @ 47c. El Cristo was very quiet; 900 shares were sold at 75c.

Boston. March 31.

(From our Special Correspondent.)

The reaction in copper stocks prevailing at the close of last week continued, with a decline in the whole list, and a subsequent rally in a few of the dividend paying stocks yesterday, which was nearly all lost to-day. There is very little disposition manifested to speculate in copper stocks by the outside public, and nearly all the trading is done by manipulators in the exchange. It is the opinion of many that the improvement in ingot copper will be permanent and that the copper stocks will show much higher prices during the next few months. During the past week Calumet & Hecla declined from \$275 to \$267, with later sales at \$268. Rather more stock than usual was offered, and in the absence of investment orders the decline was inevitable. Tamarack advanced from \$170 to \$175, but lost the advance, selling again at \$170 to-day.

Boston & Montana sold at the opening of the week at \$43, declined to \$41, rallied again to \$43½ and closed at \$42½, with sales of about 5,000 shares. Butte & Boston was fairly steady throughout the week, with sales at \$14½ @ \$15½, the latter for a small lot yesterday.

Centennial dropped from \$11 to \$9½, but quickly rallied and sold up to \$11 again, closing at \$10½. Kearsarge sold at \$13 and advanced to \$14½, closing about that figure.

Franklin has been quite strong all through the week with very little stock offering. It sold at \$14½ and advanced to \$15½ on the rally of yesterday.

Osecola was the weakest stock on the list, selling down from \$33 to \$30, with a subsequent rally to \$32½, closing to-day at \$31½.

Atlantic declined to \$11½, improving later to \$12 on small sales.

Alouez sold up to \$1½, but later declined to \$1. Arnold sold at \$1; later \$1½ was bid for it, with assessment of 25c. per share paid.

Santa Fe has been fairly active on the reports from the mine selling at 42½ @ 47½c. and later at 40c. Bonanza sold at 52½c. and 50c. Wolverine declined from \$3½ to \$2½ on a sale of 100 shares.

In the silver stocks Catalpa sold at 27½c. and 25c.; Breece at 42½c.; Dunkin at 40c., and Napa Quicksilver at 55½c.

3 P. M.—The market closed dull without any special change in prices.

San Francisco. March 25.

(From our Special Correspondent.)

The mining stock market has been dull and uninteresting throughout the week, but to-day a firm undertone gave indications of better prices. Without any determined effort to enhance values, prices were steady, notwithstanding the efforts of the

bearish element to depress them. The news from the Consolidated California & Virginia mine of an improvement in the winze on the 1,800 ft. level, and from the Hale & Norcross that the crushing of ore had commenced, no doubt helped greatly to steady the market, and make trading more active.

Consolidated California & Virginia sold to-day for \$5.12½, and from that figure there was little variation. Mexican sold for \$1.95; Ophir for \$2.95; Sierra Nevada, \$1.75, and Union Consolidated, \$1.50, all these prices being a trifle in advance of ruling rates one week ago.

In the middle group Hale & Norcross is at present the favorite. Over 2,100 shares sold to-day in regular session at prices varying from \$1.50 @ \$1.60, an advance of 15 cents on the week's trading. Best & Belcher sold fairly at an advance to \$2.40, and Chollar at \$1.15; Gould & Curry at \$1.50; Potosi at \$1.20, and Savage at \$1.50. All were from 5 to 10 cents stronger.

Of the Gold Hill and South End Comstocks, Belcher at \$1.05, Caledonia at 30 cents, Crown Point at 80 cents, Seg. Belcher at 45 cents, Overman at \$1.05 and Yellow Jacket at \$1.15, showed an advance on prices ruling last week, while Alta at 95 cents, Bullion at 75 cents, Caledonia at 30 cents, Occidental at 30 cents and Exchequer at 40 cents, remained much the same.

The activity prevailing in the Bodie camp is influencing the stocks very slowly, albeit there has been more strength in them. Bodie Con. is quoted at 55 cents, Bulwer Con. at 50 cents, and Mono at 85 cents.

The Tuscaroras remain steady, there being to-day no variation from ruling rates a week ago. Commonwealth is selling for 15 cents, Nevada Queen for 65 cents, North Belle Isle for 10 cents, North Commonwealth for 30 cents. The sales have, however, this week been larger than for some time past.

In the Quijotoa and other outside stocks only nominal sales have been made.

SAN FRANCISCO, April 1. (By telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$2.25; Bodie, 50c.; Belle Isle, 20c.; Bulwer, 50c.; Chollar, \$1.15; Consolidated California & Virginia, \$5; Gould & Curry, \$1.30; Hale & Norcross, \$1.55; Mexican, \$1.95; Mono, 80c.; Navajo, 20c.; Ophir, \$2.90; Savage, \$1.50; Sierra Nevada, \$1.60; Union Consolidated, \$1.50; Yellow Jacket, \$1.10.

St. Louis. March 30.

(From our Special Correspondent.)

St. Louis mining stocks were much more active this week, though the greater part of the trading was confined to one or two, noticeably Central Silver. Prices were rather lower than last week. The Bi-Metallic passed its monthly dividend, but this had little effect on the market, which was strong, it being generally understood that no dividend would be declared until the treasury again held a good surplus. The news from the mine is encouraging, and from an opening of \$22.75, the stock sold and is now bid at \$23. At one time it was bid at \$22.50, but sold later at \$23, 40 shares changing hands.

Central Silver shows a decline for the week and from an opening of 5½c. is now quoted at 3c. On the opening 23,800 shares sold down to 2½c. On the following day 25,000 shares brought 5 @ 3½c. On Friday 500 shares brought 3½ @ 4c., and on the next day 2,700 shares brought 4 @ 3½c., followed later by a sale of 4,500 shares at the same figures; then 15,000 shares sold at 3½ @ 2½c., and the market closes at 3c.

Elizabeth declined this week, and from an opening of 56½c. is now bid at 46½c. Sales were 100 at 56½c., 4,000 at 55 @ 52½c., 1,000 at 53½ @ 50c., 300 at 50 @ 48½c. and 300 at 47½c. The stock appears rather weak.

Granite Mountain was dealt in to greater extent than for several months past. Like the majority of stocks, it showed weakness throughout the week, and from an opening of \$16.50 is now quoted at \$14.50. On Thursday 10 shares sold at \$16.50, the following day saw 100 more go at \$16.25, and 25 shares followed on Saturday at \$16. On Monday the stock's best bid was \$15, and on Tuesday the market broke to \$14.75 and \$14.50, on a sale of 320 shares. The fall was attributed to the decline in silver, as the mine news was encouraging, and it has been given out that the regular dividend will be paid this week.

Adams was erratic in its quotations, and from opening at 95c. of 50 shares, sold on Monday at 92½c., and closed the day at 90c. On Tuesday, however, 300 shares brought \$1, and that was the closing bid.

No other stocks were traded in this week. Fluctuations in prices were: American & Nettie, 80 @ 75c.; Montrose, 9 @ 11c.; Leo, 7 @ 8c.

MEETINGS.

Centennial Mining Company, at the office of the company, No. 19 Congress street, Boston, Mass., April 13th, at 11 A.M.

Lady Richer Mining Company, at the office of the company, No. 216 Power Block, Helena, Mont., April 29th, at 2 P.M.

DIVIDENDS.

Mollie Gibson Consolidated Mining and Milling Company, dividend No 21 of fifteen cents per share, \$150,000, payable April 15th, at the office of the company in Colorado, Springs, Colo. Transfer books close April 8th, and reopen April 16th.

ASSESSMENTS.

COMPANY.	No.	When levied.	Delinqu't in office.	Day of file.	Amt. per share.
Andes, Nev.....	38	Mar. 8	Apr. 11	Apr. 29	.25
Belcher, Nev.....	43	Mar. 8	Apr. 12	May 3	.50
Best & Belcher, Nev.....	51	Mar. 3	Apr. 7	Apr. 29	.25
Consolidated, N. Y., Cal. River Cons.	7	Mar. 10	Apr. 12	May 5	.10
Guasacaran & California, B. C.....	6	Feb. 9	Mar. 15	Apr. 5	3.00
Lew Wallace, S. Dak.....	3	Feb. 16	Apr. 18	May 7	.001½
Little Pittsburg, Utah.....	1	Feb. 23	Mar. 28	Apr. 13	.01
Modoc Chief, Idaho	1	Jan. 28	Mar. 21	Apr. 11	.00½
Montreal, Utah.....	1	Feb. 17	Mar. 26	Apr. 13	.10½
Norway, Utah.....	1	Dec. 24	Feb. 1	July 21	.02
Original Keystone, Cal.....	9	Mar. 4	Apr. 14	May 7	.10
Overman, Nev.....	63	Feb. 10	Mar. 16	Apr. 6	.50
Peer, Ariz.....	12	Feb. 24	Apr. 6	Apr. 28	.10
Pennsylvania Con., Cal.....	1	Feb. 23	Mar. 24	Apr. 9	.05
Pine Hill.....	1	Feb. 11	Mar. 24	Apr. 15	.04
Teresa, Mex.....	7	Feb. 19	Mar. 21	Apr. 6	.10
Telegraph, Cal.....	3	Mar. 8	Apr. 16	May 2	.01½
Utah, Nev.....	14	Mar. 8	Apr. 12	Apr. 29	.25
Weldon Ariz.....	5	Feb. 2	Mar. 15	Apr. 14	.05

PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.					
	Opening.	Highest.	Lowest.	Closing.	Sales.
Mar. 26.....	55½	56	55½	55½	5,000
28.....	55	55½	54½	54½	32,000
29.....	55	55½	55	55	15,000
30.....	55½	56	54½	55	75,000
31.....	55	56½	55	56½	285,000
Apr. 1.....	55	56½	55	56½	12,000
Total sales in barrels.....					424,000
NEW YORK STOCK EXCHANGE.					
	Opening.	Highest.	Lowest.	Closing.	Sales.
Mar. 26.....	55	55½	55	55½	12,000
28.....	55½	55½	55½	55½	2,000
29.....	55½	55½	55½	55½	.....
30.....	55½	55½	55½	55½	.....
31.....	55½	55½	55½	55½	.....
Apr. 1.....	55½	55½	55½	55½	.....
Total sales in barrels.....					14,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 1st. Statement of shipments of anthracite coal (approximated), for week ending March 26th, 1892, compared with the corresponding period last year:

Regions.	March 26, 1892.	March 28, 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region..	361,462	283,084	Inc. 78,378
Lehigh Region....	80,042	60,156	Inc. 19,886
Schuykill Region..	194,079	169,067	Inc. 24,412
Total.....	635,583	512,907	Inc. 122,676
Total for year to date.....	8,571,393	7,875,704	Inc. 695,689

PRODUCTION OF BITUMINOUS COAL for week ending March 26th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.			
	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.....	1,765	23,192	35,721
Cumberland, Md.....	71,883	743,808	957,342
Barclay, Pa.....	3,171	49,161	40,264
Broad Top, Pa.....	9,897	134,956	154,106
Clearfield, Pa.....	67,268	847,805	1,075,751
Allegheny, Pa.....	22,674	268,185	339,651
Beach Creek, Pa.....	11,074	535,933	572,427
Pocahontas Flat Top.....	42,013	575,110	555,075
Kanawha, W. Va.....	*47,744	568,796	521,120
Total.....	307,489	3,746,916	4,251,458

*Estimated.
*Week ending March 21st.

WESTERN SHIPMENTS.			
	1892.		1891.
	Week.	Year.	Year.
Pittsburg, Pa.....	22,915	304,540	258,630
Westmoreland, Pa.....	33,186	429,919	493,839
Monongahela, Pa.....	9,615	105,866	136,910
Total.....	65,716	840,325	889,579
Grand total.....	373,205	4,587,241	5,140,837

PRODUCTION OF COKE on line of Pennsylvania R. R. for the year ending March 26th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 108,639 tons; year, 1,396,859 tons; to corresponding date in 1891, 773,772 tons.

Anthracite.

The market is dull. The demand is slight, though probably a little heavier than this season of 1891. The sales agents, at their meeting yesterday, decided that the allotment for April should not be increased, but should remain at 2,500,000 tons as in March. As the allotment has been closely adhered to, stocks are decreasing. Many of the collieries are shut down, and the frequent temporary suspension of others indicates that all are in harmony. There is a decidedly hopeful and healthy feeling for the future, although prices have not been raised, save

in Chicago, nor are they likely to be, it is said, for some time.

The Reading deal remains in *statu quo* in Pennsylvania and New Jersey, although a new move has been made by the opposition in the resolution introduced by Representative Stone, requesting the House Committee, on Interstate and Foreign Commerce to make an investigation of the deal. The committee authorized inquiry to be made of the Interstate Commerce Commission asking whether it has instituted any investigation of the matter. It is not believed despite the persistent attacks of its enemies that the deal will be hlocked by any legislative action. If Governor Abbott, of New Jersey, does not sign the bill now before him, the deal will go on in spite of him. The report of the Reading Coal & Iron Company for 1891 has been issued and is printed in another column.

Bituminous.

The market is somewhat firmer. The demand is fairly strong and several large contracts have been made during the past week, notably that of the Berwind-White Coal Mining Company with the White Star steamship line for nearly 100,000 tons of its Eureka coal.

During the week the Seahoard Association held a meeting and an agreement similar to that of last year was signed pending the drawing up of a stronger one, which, it is declared, will be a success, as the members of the association have all promised to enter. The Baltimore & Ohio has made its freight tolls for the ensuing year at the same rate as in 1891, but the Pennsylvania system has not made a move, although the custom was formerly to make the rates by March 1st. As a reason for this it is stated that since the Baltimore & Ohio has issued a schedule with competing rates the Pennsylvania intends to enter the list with a cut rate schedule.

The Baltimore & Ohio, through President Meyer, has addressed Mayor Latrobe, of Baltimore, in refutation of the statements frequently made that the railroad was incapable of handling the soft coal production and that, therefore, another railroad was necessary to handle this output, amounting in 1891 to 7,192,308 tons for the coastwise traffic alone. It had been said also that the Baltimore & Ohio had placed difficulties in the way of the large producers on its line, refusing them even 1,000 tons carrying capacity, until their contract with the water traffic had been signed. This was done it was said on account of its insufficient rolling stock, and its desire to keep its terminals clear. There was no question, however, that it worked serious inconvenience upon the operators. President Meyer, in his communication, said that the rolling stock was soon to be increased 30%, and that the re-opening of the Chesapeake & Ohio Canal would allow the equipment used on that division of the railroad to be returned to the coastwise traffic.

Among coal operators here it is not generally believed that the canal will be a success in comparison with railroad traffic, and that the Baltimore & Ohio should increase its small rolling stock by more than 30%.

There has been a hlockade on the Pennsylvania during the week and business at Philadelphia has been pretty well tied up. Vessels at the Southern ports, Baltimore and Newport News, are scarce. Indeed, it is said that there is not a vessel at Baltimore, although a fleet has been secured and is now on its way. Prices and freights at the various ports remain the same, save at South Amboy, where a reduction has been made to \$3.15 f.o.b. Both Cumberland and Pocahontas coals remain strong; in fact, they are extremely firm.

Buffalo.

March 31.

(From our Special Correspondent.)

In anthracite coal there is but little doing except for the demands of retailers for home trade. Prices are without change. Stocks very large and increasing daily.

Bituminous coal shows signs of weakness, but quotations are unchanged. The demand for manufacturing purposes is fair. It will be a month before any is wanted for propellers, tugs, etc.

There is no stir in lake freights; shippers generally are in no hurry to make or accept rates, and will await developments relative to the opening of navigation apparently before doing so. As all coal on the docks at Chicago and Milwaukee on May 1st pays some kind of tax, consignors do not call for any reaching those places by water until after that day. A few loads have been put on board vessels, but freight rates thereon have yet to be made.

The Lackawanna Company will not start its trestles here until May 1st. The Reading combination's coal will all go to Lake Superior ports, it is said, by the Northern Line boats.

The Board of Public Works of this city have decided upon a five-year contract for lighting by gas and electricity at the following rates: Gas, \$1 per 1,000 cu. ft.; electric light, 35c. per light per night. By this arrangement private consumers will, after July 1st, pay \$1.20 for gas per 1,000 cu. ft. The total reduction to consumers and city will amount to \$100,000 per annum.

Mr. W. K. Niver, for several years general Western coal sales agent of the Reading Railroad, has been made general agent of the Philadelphia & Reading Coal and Iron Company. This makes Mr. Niver head of all the Reading

coal and railroad interests in this city. He has appointed Col. J. H. Horton sales agent of the Reading for New York, Northern Pennsylvania and Canada, and Mr. A. R. Atkins the Western sales agent—both with headquarters at Buffalo.

Mr. T. Guilford Smith, the Buffalo agent of Messrs. Carnegie & Co., of Pittsburg, denies that the latter intends locating an iron plant at Tonawanda, four miles from our city line. Rumors, however, are in circulation that new iron works are to be built there and as large sales of land have been made at the locality named lately to parties who will not say what will be done with the property, some credit may be given to the report.

A large party of prominent members of the Merchants' Exchange are in Philadelphia, the guests of President McLeod and the citizens of Philadelphia. The object is to enlarge the business relations of the merchants and shippers of the two cities.

Boston.

March 31.

The coal combination is commencing to make its influence felt on this market by the manner in which it is strengthening prices and assuming an independent attitude in regard to business. Dealers feel much more inclined to buy than they did, yet they purchase only in a limited manner.

We quote net prices at New York: Stove, \$3.75 @ \$4; egg, \$3.60 @ \$3.75; broken, \$3.60; chestnut, \$3.50. Lykens Valley: broken, \$4.90; egg, \$5; stove, \$5.40; chestnut, \$4.50.

The recent action of the coal companies in putting up rates on their vessels from 50c. to 60c. is the most important event to note in the market. There is so little doing, however, that rates are easy. We quote: From New York to Boston, 60c.; from Philadelphia to Boston, 75c. @ 80c.; from Philadelphia to Boston, 75c.; to Portland, 80c.; to Bath, 95c.; to Providence, 70c.; from Baltimore to Boston, 90c.; Newport News to Boston, 70c.; Sound points, 60c.

Soft coal contractors are on the *qui vive* these days. The Pocahontas and New River people have closed most of their contracts in this district. Among the most important since my last were: Fitchburg Railroad Company, 100,000; Boston & Albany Railroad Company, 50,000 to 60,000 tons; Pacific Mills, Lowell, Mass., 30,000 tons George's Creek. The Amoskeag Mills which we noted last week as closed have placed with the Cumberland people; Merrimac Mills, 22,000 tons, Clearfield; Washington Mills, 20,000, Clearfield; Boston Electric Company 25,000 tons; Edison Illuminating Company, 25,000 tons; Booth Cotton Mills, Lowell, 8,000, and the Lowell Bleachery, 4,000 tons. It is understood that the West End Street Railroad Company, which has the largest street railway plant in the country, has also closed. A great many one and two thousand ton contracts have been closed in addition to the above, but some very large contracts still remain open. Bituminous coal on cars here is worth \$3.75, although as low as \$3.65 has been mentioned.

The retail dealers are not doing much at present. They keep their prices very firm, however.

We quote: Stove, \$5.50; nut, \$5.50; egg, \$5.25; furnace, \$5.25; Franklin, \$6.75 @ \$7; Lehigh egg, \$5.50; furnace, \$5.50; wharf prices 50 cents less than the foregoing.

The receipts of coal at this port for the week ending March 26 were 42,305 tons of anthracite and 12,180 tons bituminous, against 23,627 tons of anthracite and 5,261 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 301,286 tons of anthracite and 133,859 tons of bituminous, against 278,588 tons of anthracite and 281,523 tons of bituminous for the same time last year.

Chicago.

March 31.

(From our Special Correspondent.)

All new business is now firmly quoted at \$5.25 for anthracite, whether it is from dock, yard or all rail. The advance was entirely unlooked for by dealers, as not the slightest intimation or hint of it had been given out. To many of them it will result in a positive loss, as any number of sales had been made on the \$5 basis. A meeting of the members of the Coal Exchange will be held this afternoon, the call saying: "As owing to the recent arbitrary advance in the price of anthracite coal to dealers' wagons on dock, it is important that a meeting of shippers and larger retailers be held at once, to learn what the dock men are going to do regarding delivered price of hard coal to domestic consumers. Please be present." The foregoing circular will give a fair idea of how the trade feels about the matter.

It is rumored that some of the dock dealers are still taking retail orders at \$5.75 per ton delivered. This is unjust to the middlemen, who are compelled to pay \$5.25 in yard, and have but their cartage for profit. There is a fair amount of country business, and the same may be said of local retail trade, the season being considered, and dealers can about keep even with their orders.

Bituminous coal was fairly active during the first half of March, but has steadily decreased during the past two weeks. Some railroad contracts expire between now and May 1, and will, of course, be in the market. A rather lively competition is expected, and some low prices may be looked for.

There is a marked decrease in the heavy accumulations of soft coal, and, though there is still some surplus, it is less pronounced. The market

is steadily recovering its tone, and indications are that the late experience will teach operators the wisdom of ascertaining the requirements of the market before shipments are ordered.

The coal trade is much annoyed over the fuel oil contract, which is about to be placed with the Standard Oil Company for use at the Columbian Exposition, and the matter will not be dropped until a unanimous and vigorous protest has been presented to the Committee on Buildings and Grounds.

Furnace coke is in less demand as another stack in this vicinity has gone out of blast. Foundry coke is in fair demand, and a steady expansion is noted. Standard or "Connellsville" is steady at \$5.05, while other grades are shaded according to circumstances.

Quotations are \$4.65 furnace, \$5.05 foundry, Connellsville; West Virginia, \$3.90 furnace, \$2.10 foundry; New River foundry \$4.90; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are unchanged at the following rates: Lehigh lump, \$6.25; large egg, \$5; small egg, range and chestnut, \$5.25. Retail prices per ton are: Large egg, \$6.00; small egg, range and chestnut, \$6@6.25.

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

Pittsburg. March 31.

(From our Special Correspondent.)

Coal.—The fair stage of water in the Ohio River has enabled dealers to forward coal to the lower markets about as fast as boats were loaded, leaving the pools and the harbor bare. The week's shipments exceed 4,000,000 bushels. Prices show no change, rates being extremely low at all points. A new coal plant will be in operation May 1 on the Monongahela, in the second pool.

The company is composed of Cleveland capitalists and James Jones, of Monongahela City, who have purchased from the First National Bank, of Pittsburg, 500 acres of coal land for \$150 per acre. The entire plant will be remodeled and increased. Another big deal, one of the largest sales of coal land that has been made in Westmoreland County for a long time, was consummated by the transfer of 3,000 acres, owned by J. M. Guffey, Thomas Irwin and W. B. Howell, to Charles S. Peters, of New York, for \$100 per acre. The land all lies in Sewickly and North Huntingdon townships.

Connellsville Coke.—The shipments of coke last week was the lowest for some time. The fact that a number of furnaces have gone out of blast and others are preparing to do so has naturally cut down the demand. The outlook indicates a further falling off in the near future. A large dealer remarked: "Unless the demand improves, and that very soon, there is a strong probability that a large number of ovens will be put out of blast."

As it is now the companies are making very little money and should many more ovens blow out some of the workmen will be compelled to seek employment in other lines. The average run of the plants in the region was from 4 1/2 to 5 1/2 days. There are now 17,222 ovens in the region, of which 13,275 are in blast and 3,947 idle. Shipments to Pittsburg show an increase of 184 cars. The aggregate tonnage was 127,188 tons, distributed as follows: To Pittsburg, 2,266 cars; east of Pittsburg, 1,500; west of Pittsburg, 3,300; total, 7,066. The price of coke remains unchanged.

METAL MARKET.

NEW YORK, Friday Evening, April 1, 1892.
Prices of Silver Per Ounce Troy.

March.	Sterling Exchange.	London.	Pence.	N. Y. Cents.	Value of sil. in \$1.	March.	Sterling Exchange.	London.	Pence.	N. Y. Cents.	Value of sil. in \$1.
26	4.87 1/2	40		87 @ 85	.669	30	4.87 1/2	39 1/4		85 1/2	.662
28	"	39		85	.657	30	"	39 1/2		86 1/4	.667
29	"	39		"	.657	Ap. 1	"	39 3/4		87 1/2	.673

The collapse of the free coinage program in the House of Representatives, coupled with the fact that the Government secured its quota about the same time, produced an uneasy feeling in silver abroad, and the price fell to 39d.

Reports that some of the mines in Colorado have decided to close down till silver advances to 90c., has caused a sharp reaction and to-day bullion is firm.

The United States Assay Office at New York reports the total receipts of silver for the week to be 131,000 ounces.

Secretary of the Treasury Foster sent an answer to the House of Representatives on the 29th ult. to a resolution calling upon him for information as to the amount of gold, silver and minor coinage executed at the United States mints during the past year, and also as to whether the capacity of the mints is adequate to execute the coinage of the Government. He speaks of the necessity for better and enlarged facilities for the mint in Philadelphia. Of the 4,500,000 ozs. of silver required by law to be

purchased monthly nearly 4,000,000 ozs. are at present delivered at the mint at Philadelphia, Pa. About 60,000,000 ozs. of silver, over 2,000 tons, in the shape of bars weighing from 1,000 to 1,200 ozs. each, are at present stored in the basement of that mint. This is in addition to some \$55,000,000 in silver dollars and \$35,000,000 in gold. The Secretary concludes by saying that while the coinage authorized by law can be executed at the mints as at present existing, in his judgment it could be better and more safely executed if a new building was constructed for the mint at Philadelphia, Pa.

Silver Bullion Certificates.

	H.	L.	Sales.
March 26.....	87 1/4	85 1/2	28,000
March 28.....	88	85 1/2	118,000
March 29.....	85 1/2	85 1/2	20,000
March 30.....	86 1/4	86 1/4	116,000
March 31.....	86 3/4	8 1/2	145,000
April 1.....	87 1/2	87 1/2	35,000

Total sales 460,000

Domestic and Foreign Coin.

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

	Bid.	Asked.
Trade dollars.....	\$.70	\$.75
Mexican dollars.....	.68 1/2	.70
Peruvian soles and Chilean pesos.....	.66	.70
English silver.....	4.83	.....
Five francs.....	.93	.95
Victoria sovereigns.....	4.86	4.90
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.76
Spanish doubloons.....	15.69	15.70
Spanish 25 pesetas.....	4.81	4.83
Mexican doubloons.....	15.50	15.70
Mexican 20 pesos.....	19.50	19.60
Ten guilders.....	3.96	4.00
Fine silver bars.....	.87 1/2	.88

Copper.—The copper market during the past week has been very irregular and rather easier. Buyers became rather frightened on the heavy decline in London, and several second hand lots being offered in the market, prices for Lake copper declined quite considerably. Some business was done during the week at 11 1/2c., but later on 11-8 1/2c. was paid, and at about this price odd lots are still to be obtained. First hands continue to be very firm, and mostly out of the market, principally the two largest companies. Then there has been so very little demand from consumers that very little actual business has resulted. We must call the market for Lake 11 1/2@12c. Common sorts are rather neglected and decidedly easier. We have to quote for good casting copper, according to brand and quantity, 11 1/2@11 1/2c., and Arizona copper has been freely dealt in at 10 1/2c., at which price there are sellers over.

Nothing further has transpired regarding the agreement to restrict production. It is said that negotiations are still going on with Europe, and the parties quite confidently expect that the agreement will be signed at an early date. Whether that happens or not, we still maintain that little or no difference in the actual state of the market will result, as the arrangement is practically so loose that it will not be binding upon any of the parties, and if copper were not able to stand on its own merits, prices certainly would not be where they are now.

The London market has been extremely irregular; the heavy failure in the iron trade caused a sharp decline in the beginning of the week, which brought prices down to £45 5s. cash, but since then a more hopeful feeling has been evinced, and the market for G. M. B.'s closes quite strong at £46 2s. 6d.@£46 5s. for cash and £46 12s. 6d.@£46 15s. for three months.

Consumers are very careful in buying in and trade is reported as not very brisk, and the heavy decline in silver has caused considerable quantities to be again shipped back from India to England. We quote: English tough, £49@£49 10s.; best selected, £50@£50 10s.; strong sheets, £50@£60; India sheets, £56@£57; yellow metal, 5 1/2d.

Statistics are cable over as showing a decrease of 1,200 tons for the last half of March, which certainly ought to have a good effect.

In our issue of March 26th a typographical error made us say that "1,000 tons of Arizona changed hands at 16 cents," when obviously 10 cents was meant.

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

To Liverpool—	Copper Matte.	Lbs.	
S. S. Cufic.....	3,226 bags.	367,556	\$17,000
"	173 "	31,500	3,938
To Liverpool—	Copper.	Lbs.	
S. S. Servia.....	538 pigs.	229,504	\$25,000
To Havre—	Copper.	Lbs.	
S. S. La Bretagne.....	373 pigs.	169,160	\$11,000
To Rotterdam—	Copper.	Lbs.	
S. S. Veendam.....	45 bbis.	56,250	
"	408 bars.	56,067	\$11,793
To Hamburg—	Copper.	Lbs.	
S. S. Russia.....	439 pigs.	112,004	\$12,000

Tin.—On the whole, tin has been much firmer. Early in the week some sales were made at 19-80c., but later on it was found out that a considerable short interest existed for April delivery, and a premium of 15@20 points was obtainable. Spot remains exceedingly scarce, and we have to quote it at 20@20 1/2c., and for April 19-90@20c.—and for May 19-90@20c. Shipments from the East for the last half of March are reported as 950 tons, 375 to the United States and 575 to Great Britain, but the total quantities shipped so far this year are very

small as compared with 1891. Consumption has been rather better lately.

From London all reports are very encouraging, and it is a noteworthy fact that in spite of the heavy decline in silver prices for tin have hardened somewhat instead of dropping, according to the decline in silver. It now looks as if the cheap period through which this metal has been passing during the last twelve months is now drawing to a close.

The closing quotations in London are £89 15s. for spot and £90 for futures, the figures during the week not having changed much.

The first consignment of domestic tin which has reached New York from the Temescal mines of California arrived on the 30th ult., on the Pacific Mail steamship "Newport." Balfour, Williamson & Co., of this city, are the consignees. Mr. Simpson, of the firm, stated that the consignment consisted of 334 pigs of tin, equal to one carload, or 20,000 pounds. He said it would be sold in sample lots.

Lead.—Lead has been very firm and prices are somewhat higher. There is very little available material here and the demand, which has been good all through the winter, has improved of late quite considerably. The resumption of operations in the Idaho district has, under the circumstances, not made any depression in the market. On the contrary, the ores are very badly wanted by everybody. We have to quote 4-22 1/2@4 27 1/2c.

The London quotation for Spanish lead is £16 17s. 6d. and for English £11.

Chicago Lead Market.—Mr. H. R. Post telegraphs us as follows: "The market shows signs of improvement. Sales 200 tons of desilverized at 4-05c. Ten cars of Missouri at the same price. The closing is strong with 4-10c. asked."

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows; "Lead continues very strong with sales of about 700 tons at 4c. The metal has buyers at close at 4c. with few sellers below 4-05c."

Spelter.—Spelter has been dealt in in quite considerable quantities at steady prices, and the stocks in the West have dwindled down to quite insignificant proportions, and we quote 4-55@4-60c. New York. The London quotation for good ordinaries is £21 15s., and for special brands £21 17s. 6d.

Antimony.—Antimony is in moderately good demand, with no pressure to sell from any side. We quote Hallett's at 10 1/2@11c., L. X., 12 1/4@12 1/2c., and Cookson's 15 1/2@16c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 1.

Pig Iron.—Very little of interest can be reported of the iron market this week. Dealers, especially those who trade in Lehigh irons, report a slightly improved business at the low prices now ruling. Some of the better Southern grades have also been in better demand, although all the trading has been of the same character as of the past few months, i. e., hand-to-mouth buying. Nevertheless, a thorough canvass of the trade shows that furnaces, both in the North and in the South, have no desire to make contracts which call for delivery later than July, owing to the widespread belief that higher prices will prevail then. More encouraging reports continue to come from the various iron centers. Prices remain unchanged. We quote this week: Northern No. 1 X, \$16; No. 2 X, \$15; Southern No. 1 X, \$15.50@16; No. 2 X, \$14.50@15.

Spiegeleisen and Ferro-Manganese.—A few sales of ferro-manganese at \$62 are reported. In spiegeleisen nothing has been done and the market has been exceedingly dull. We quote: 20% spiegel, \$26.50@27.

Steel Rails.—We hear of no sales during the past week; the rail market is in a state of great dullness. Quotations remain \$30 f. o. b. mill, and \$30.75 tidewater.

Rail Fastenings.—Absolutely nothing is doing in this market. We quote nominally as follows: Fish and angle plates, 1-70@1-80c.; spikes, 2-10@2-15c.; bolts and square nuts, 2-70@2-80c.; hexagonal nuts, 2-80@2-85c.

Merchant Steel.—The usual amount of business has been done in merchant steel. Prices continue unchanged as follows: Mushet's special, 48c.; English tool, 15c. net; American tool steel, 7@8c.; 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.

Tubes and Pipe.—Manufacturers continue to report a fair business in this market. Prices remain unchanged and we therefore continue to quote ruling discounts as follows: Butt, black, 57 1/2%; butt, galvanized, 47%; lap, black, 67%; lap, galvanized, 55%; boiler tubes, under 3 in. and over 6 in., 55%; 3 in. to 6 in., 60%.

Structural Material.—While no actual sales of any magnitude are reported yet manufacturers claim that they have a busy season before them owing to a great amount of work which must be done this year, and a better feeling prevails in this market. Quotations show no change. Beams

2'30@2'50c.; angles, 1'90@2'10c.; sheared plates, 1'85@2c.; tees, 2'40@2'60c.; channels, 2'40@2'50c. Universal plates, 2'10c.; bridge plates, 2'10c. on dock.

Old Rails.—This market continues dull and featureless. No transactions are reported. Quotations are nominally as follows: Old tees \$18.50 @ \$19; wrought iron scrap, \$18@ \$19.

Chicago. March 30.

(From our Special Correspondent.)

There is not a particle of buoyancy to the crude iron market, but furnace men and agents are satisfied that bottom has been reached, and that anything lower means bankruptcy or going out of blast. Buyers apparently begin to appreciate that values are unlikely to go lower and orders have been rather more frequent. The Calumet furnace at Cummings, near Chicago, with a yearly capacity of 50,000 tons of coke foundry and mill iron, went out of blast yesterday and will stay out until the market improves. The reduction of freight on Alabama iron to Chicago is 15c.; it was \$4 and is now \$3.85. That Birmingham dispatch in our last issue was misleading, as the 50c. reduction affected only a few points such as Baltimore and vicinity, where the transportation was part rail and part water. During April some 25 stacks are to be blown out in Alabama, some for repairs and others on account of depressed situation. Manufactured material generally is in better condition than pig iron, though the latter is believed to be good property at current rates.

Pig Iron.—There is the usual run of small orders being entered for coke iron with demand generally somewhat improved, and the extremely low prices of a week or two ago are no longer current. Any change now must be toward a betterment, as curtailment is making fair progress, and there are in this district only three furnaces making coke foundry iron, Calumet having gone out of blast this week. Several orders from 200 to 500 tons were placed, and from consumers generally there is a better inquiry. Southern coke and soft iron is in moderate demand, and the reported reduction of 50c. per ton in freight charges from Alabama led to numerous inquiries from buyers. Lake Superior charcoal iron is still very dull, orders running from carloads to 50 or 100 tons, and prices are less irregular than on coke grades. On the whole the market is in better shape than it was several weeks ago.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.75@ \$17.25; Lake Superior coke, No. 1, \$14.50@ \$15; No. 2, \$14@ \$14.25; No. 3, \$13.75@ \$14; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@ \$16; American Scotch, \$17@ \$17.50; Southern coke, foundry No. 1, \$15; No. 2, \$14.50; No. 3, \$14; Southern coke, soft, No. 1, \$14.50; No. 2, \$13.75; Ohio silveries, No. 1, \$17.50; No. 2, \$17; Ohio strong softeners, No. 1, \$17.50; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17.50; No. 2, \$17; Southern standard car wheel, \$20@ \$21.

Structural Iron and Steel.—There is a large amount of work in sight, and prospects are far ahead of last year. The figures are all in for the Hartford Deposit Company's building (cor. Madison and Dearborn Sts.). It will require 800 tons of steel beams and columns, and \$25,000 worth of ornamental iron work. Regular quotations car lots f. o. b. Chicago are as follows: Angles, \$2@ \$2.10; tees, \$2.20@ \$2.30; universal plates, \$2.05@ \$2.15; sheared plates, \$2.10@ \$2.15; beams and channels, \$2.25@ \$2.50.

Plates.—Business is more active from warehouse and mill, one order alone from latter being 500 tons, which was taken at the equivalent of a little over 2c. Chicago. Tubes are in bad shape, as regards price. Steel sheets, 10 to 14, \$2.40@ \$2.50; iron sheets, 10 to 14, \$2.20@ \$2.30; tank iron or steel, \$2.10@ \$2.15; shell iron or steel, \$3@ \$3.25; fire-hox steel, \$4.25@ \$5.50; flange steel, \$2.75@ \$3.25; boiler rivets, \$4.10@ \$4.25; boiler tubes, 2 3/4 in. and smaller, 55%; 7 in. and upward, 65%.

Merchant Steel.—Mill agents continue to report large orders for soft steel from implement trade, and indications point to further heavy business for some time to come. Tool steel continues active. We quote: Tool steel, \$6.50@ \$6.75 and upward; tire steel, \$2.25@ \$2.30; toe calk, \$2.40 @ \$2.50; Bessemer machinery, \$2.10@ \$2.20; Bessemer bars, \$1.75@ \$1.90; open hearth machinery, \$2.40@ \$2.60; open hearth carriage spring, \$2.25@ \$2.30; crucible spring, \$3.75@ \$4.

Galvanized Sheet Iron.—Some improvement is noted in demand from warehouse. Discounts are unchanged at 70% off on Juniata from mill, and 67 1/2% off from warehouse, and 67 1/2 and 5% off on charcoal.

Black Sheet Iron.—New orders except in car loads are light and most mills are running on stock. Regular quotations are 2'85c; Chicago on mill lots for No. 27 Common; dealers quote 3@ 3'10c. from stock, same gauge.

Bar Iron.—Some mills with a probable strike July 1 by the Amalgamated Association staring them in the face, positively refuse to quote less than \$1.50 mill as the prospective business during the next three months is being encouraging and most mills have a large tonnage sold. Some mills quote \$1.60, Chicago having an overstock of certain sizes. Current orders are light. From stock quotations are \$1.85@ \$1.75, as to quality.

Nails.—Wire nails are in better demand, but mill price is less strong at \$1.85 and from store \$1.90. Steel cut nails are in improved inquiry from the jobbing trade at \$1.60 regular average and \$1.70 from stock.

Steel Rails.—While we hear of no large deals being closed during the week, there is a continued good demand for heavy and light weight sections in small quantities and all indications are of a favorable character. Eastern mill agents report carload sales at \$32.75. Chicago local mills quote \$31.50 and upward. Track repair material is in fair demand at 1'80@ 1'85c. for steel or iron; spikes at \$2.15@ \$2.25 per 100 lbs. track bolts; hexagonal nuts, \$2.65@ \$2.70.

Scrap.—The less said the better. Very little doing and quotations nominal. No. 1 railroad, \$17; No. 1 forge, \$6; No. 1 mill, \$2.50; fish plates, \$18; axles, \$21; horseshoes, \$17; pipes and flues, \$9; cast borings, \$7; wrought turnings, \$9.50; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$11.50; coil steel, \$14; leaf steel, \$15; tires, \$15.50.

Old Material.—Demand is about on a parity with that for scrap. Old rails are offered at \$19 without buyers. Steel rails are lower at \$14 for selected and \$13 for short lengths. Car wheels are dull at \$15.50@ \$16.

Louisville. Mar. 26.

(Special Report by Hall Brothers & Co.)

There has been a steady volume of business during the week past at about current figures. Deliveries have generally ranged inside of six months, though longer deliveries could easily be had from some furnaces if they were wanted; but buyers have not seemed inclined to contract any farther ahead even at present low prices. The demand for small lots for immediate delivery is growing, indicating an increase in consumption generally. We quote:

Hot Blast Foundry Irons.—Southern coke No. 1, \$14@ \$14.25; Southern coke No. 2, \$13@ \$13.50; Southern coke No. 3, \$12.75@ \$13; Southern charcoal No. 1, \$16@ \$17; Southern charcoal No. 2, \$15.50@ \$16; Missouri charcoal No. 1, \$17@ \$17.50; Missouri charcoal No. 2, \$16.50@ \$17.

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

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

Philadelphia. March 31.

(From our Special Correspondent.)

Pig Iron.—The lowering of Southern freight rates has unsettled asking prices, and postponed the placing of large orders, which were certainly expected this week. Apart from this there has been an increased activity in nearly all kinds of Pennsylvania irons. To-day the rumors are that there will be large orders certainly placed next week. It is probable that a good deal of Southern iron will be sold in Eastern Pennsylvania within two weeks. Several offers have been made, and acceptances are hourly expected. Southern makers are offering iron quite freely here and elsewhere in the North, and it looks as though there would be quite a brisk business. Quotations for Pennsylvania No. 1 range from \$16.50 to \$17.25; No. 2, \$15@ \$15.75. Lehigh foundry has sold this week at \$16 for No. 1, and \$15 for No. 2. Southern forge, \$14, and Pennsylvania, \$14.50. Everything is unsettled, and it will be several days before satisfactory report can be made of this market. Buyers are quite anxious to purchase. There seems to be a general expectation that business is about to improve.

Muck Bars.—Very little muck bar has been sold this week, and the few sales heard of were at \$25 delivered.

Billets.—A few sales of steel billets have been made at \$25 tide water. There is a good deal of talk of heavy transactions being near at hand.

Merchant Iron.—There is an increased demand in a small way for merchant bar all through the State. Stocks are low with storekeepers. Quotations range from 1'60c. to 1'70c.

Nails.—A brisk retail demand has sprung up for nails for immediate delivery on account of the greater activity in building. Quotations are \$1.65 @ \$1.75.

Sheet Iron.—Quotations range from 2'20c. to 3'50c. for best refined. The only change is that there is more inquiry this week.

Wrought Iron Pipe.—Quite an increased demand has set in for wrought iron pipes and tubes, but all the orders are small.

Plate and Tank Iron.—Some orders were booked this week for plate at as low as 1'80c. and 2'70c. for flange iron. The volume of business is not at all heavy, but there are multitudes of small buyers provided for immediate wants, and this has caused a better appearance of the market.

Structural Material.—"We are very near to a heavy business," is the latest assertion of one of the leading manufacturers. There is no doubt that a large amount of business will be placed in April. Small building requirements will be urgently presented, and prompt deliveries will be wanted. The outcome of this will be that mills will be sold up for immediate deliveries very soon.

Beams, channels and tees are quoted at \$2.30@ \$2.40; bridge plate, \$1.85.

Steel Rails.—There is talk again of large orders for steel rails being hooked soon, but no one seems to know anything satisfactory about them. The statement is repeated that negotiations are pending for large amounts, but no further details are to be had.

Old Rails.—Old iron rails are very hard to get; there are several orders in, but supplies are not to be had. Quotations, \$20@ \$21.

Scrap.—There is a good deal of scrap wanted at \$19.50.

Pittsburg. March 31.

(From our Special Correspondent.)

The improved feeling among leading dealers that we announced last week continues, values being steadily maintained, and for certain descriptions higher prices have been demanded. Several round lots of city made Bessemer were disposed of at \$14.75. Taken as a whole the market looks decidedly more healthy. As usual there is considerable difference of opinions.

Many of the consumers look upon present low prices as rock-bottom and are therefore buying sufficient to cover the requirements for several months. This anticipation of future wants has not been general, and there is quite a number of consumers who continue to purchase only what they require for immediate consumption. Stocks are very heavy, but there has been a continual reduction in the number of furnaces in blast and there are indications of a general blowing out or banking of furnaces during the coming month.

It is reported that considerable Southern pig iron is being sent to various parts of this State, freights being more favorable than formerly. The competition of the iron of this section is likely to be more seriously felt in the near future, as the Southern trunk lines have made a reduction of from 15 cents to 40 cents per ton in freight rates that went into effect on March 28th.

A well-informed dealer says: "The iron business has reached a point at which it is felt that as matters cannot be worse they must of necessity soon begin to get better, and this is undoubtedly the actual fact. Be that as it may, we have failed to hear of a single instance in which a seller has thought it worth while to entertain any proposition for business which would involve any concessions in prices, but numerous cases have been met within which dealers refused to duplicate recent transactions."

The furnace owners of the Mahoning and Shengango Valleys have decided by reason of the bad condition of trade to put notices of a reduction of 10% in wages of all employes of the blast furnaces. The notice will take effect April 10th, at some furnaces and April 15th, at others, according to date of pay day. It is probable the employes will refuse to accept the reduction.

Muck Bar is dull; prices a shade lower; the demand has been restricted for some time. Bessemer pig finds numerous buyers; more sales are reported than for some time past. Grey forge is steady, but not very active. Ferro-manganese is weak; sales reported at a decline. Skelp iron sold at a slight decline, as did also bloom and beam ends. Old rails and scrap material are dull, and prices irregular.

Coke Smelted Lake and Native Ores.

8,000 Tons Bessemer, June, July, Aug., Sept.	\$14.60 cash.
5,000 Tons Bessemer, city furnace	14.75 cash.
4,000 Tons Bessemer, city furnace	14.75 cash.
3,000 Tons Bessemer	14.75 cash.
3,500 Tons Bessemer	14.60 cash.
2,000 Tons Grey Forge, city furnace	43.00 cash.
1,200 Tons Grey Forge	12.90 cash.
1,000 Tons Bessemer, May, June, July	12.85 cash.
1,000 Tons Bessemer	13.00 cash.
1,000 Tons Grey Forge	39.75 cash.
500 Tons Low Phos. Bessemer	14.25 cash.
500 Tons No. 2 Foundry	15.25 cash.
300 Tons No. 1 Foundry	14.25 cash.
200 Tons No. 2 Foundry	16.40 cash.
150 Tons Silvery	17.00 cash.
100 Tons Silvery Extra	17.00 cash.

Charcoal.

150 Tons Cold Blast	26.00 cash.
100 Tons Cold Blast	26.50 cash.
75 Tons Warm Blast	18.50 cash.
50 Tons No. 3 Foundry	20.50 cash.

Steel Slabs and Billets.

4,700 Tons Billets, May, June, July	23.25 cash.
4,000 Tons Billets	23.00 cash.
2,000 Tons Billets	23.40 cash.
1,000 Tons Billets May, June, July, August	23.50 cash.
1,000 Tons at maker's mill	33.25 cash.
500 Tons Billets, specials	25.00 cash.

Muck Bar.

1,000 Tons Neutral, extra	25.75 cash.
1,000 Tons Neutral	25.25 cash.
250 Tons Neutral	25.30 cash.

Ferro Manganese.

100 Tons 80% foreign delivery	62.40 cash.
100 Tons 80% foreign delivery	62.00 cash.
75 Tons 80% domestic	63.00 cash.

Skelp Iron.

500 Tons Sheared Iron	1.75 4m.
400 Tons Narrow Grooved	1.52 1/2 4m.
300 Tons Wide Grooved	1.75 4m.

Steel Wire Rods.

750 Tons American Fives, at Mill	32.60 cash.
Blooms, Beam Rail and C Ends.	
1,000 Tons Bloom and Beam Ends	16.75 cash.
600 Tons Rail Ends	17.00 cash.

Old Iron and Steel Rails.

1,000 Tons American F's	21.75 cash.
300 Tons American F's	22.00 cash.
300 Tons American F's	21.75 cash.
300 Tons American F's	21.85 cash.
250 Tons Old Steel Rails	16.25 cash.

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

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from March 26 to April 1, and Sales. Lists various companies like Adams, Alice, Amador, etc.

*Ex-dividend. †Dealt at in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. ¶Dividend shares sold, 5,945. Non-dividend shares sold 43,875. Total shares sold, 49,820.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, including columns for Name of Company, dates from Mar. 25 to Mar. 31, and Sales. Lists companies like Atlantic, Bodie, Bonanza Development, etc.

Dividend shares sold, 12,587. Non-dividend shares sold, 8,965. Total shares sold, 21,552.

COAL STOCKS.

Table of Coal Stocks, including columns for Name of Company, dates from Mar. 26 to April 1, and Sales. Lists companies like Cambria Iron, Cameron Coal & I. Co., etc.

Total shares sold, 520,771.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, including columns for Names of Stocks, dates from Mar. 25 to Mar. 31, and Closing Quotations. Lists companies like Alpha, Alta, Belcher, etc.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENT, DIVIDENDS, NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENT. Lists various mining companies and their financial details.

G. Gold, S. Silver, L. Lead, C. Copper. * 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...

STOCK MARKET QUOTATIONS.

Table with columns for stock names and prices. Includes Aspen, Helena, Mt., and Baltimore, Md. sections.

Table with columns for company names and prices. Includes Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Table with columns for company names and prices. Includes Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas, etc.

Table with columns for company names and prices. Includes Pennsylvania Gas Co., People's Natural Gas Co., Philadelphia Co., etc.

Table with columns for company names and prices. Includes Adams, Colo., American & Nettie, Colo., Bi-Metallic, Mont., etc.

Table with columns for company names and prices. Includes Bullion, Caledonia, Calumet, Cambrian, Carthage, etc.

Helena, Mont.

Table with columns for stock names and prices. Includes Bald Butte (Mont.), Benton Group, Bi-Metallic, etc.

Table with columns for stock names and prices. Includes Am. Cotton Oil, Am. Sugar Refineries, Distillers' & Cattle Feeders', etc.

Table with columns for stock names and prices. Includes Alaska Treadwell, Amador, Cal., American Belle, Colo., etc.

Table with columns for stock names and prices. Includes Adams, Colo., American & Nettie, Colo., Bi-Metallic, Mont., etc.

Table with columns for stock names and prices. Includes Bullion, Caledonia, Calumet, Cambrian, Carthage, etc.

CURRENT PRICES.

Large table listing various commodities and their current prices. Includes Acid, Alcohol, Alum, Ammonia, Asbestos, etc.

THE RARER METALS.

Table listing prices for various rare metals. Includes Arsenic, Barium, Bismuth, Cadmium, Calcium, etc.