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sirable thing, a combination to regulate artificially the price of copper is a "misfortune" and an "evil." Apparently there is some deep and hitherto unrecognized moral difference between the two metals which makes the cornering of the one a public misfortune, while cornering the other is a public benefaction. Curious combination conundrum this. We give it up.

STATE MINING BUREAUS.

Although in our last issue we expressed the opinion that the advisability of an expenditure of the public money in fostering our mining industries was more than doubtful, we should welcome any step taken in those States, where the interests and welfare of the community would warrant it, in the direction of establishing a State Mining Bureau, whose duty should be the collection of statistics and to afford reliable information to miners and others interested in the mineral industry. A properly organized State Department of this nature would be a benefit to everyone, to the State itself, to investors desiring disinterested and reliable information of its resources, and to the miners engaged in developing them, and the appropriation requisite for such an establishment would be infinitesimal compared with the advantages to be gained. Take for instance the two points of statistics and information, though there are others in which the States could legitimately render aid to the mining industry. The importance of obtaining more rapidly than we now do the statistics relating to mining and the production of our mineral wealth can hardly be overrated.

If the work were executed by competent experts, it would also in many cases prevent the perpetration of mining swindles that now bring such discredit on the industry. This, however, would require more inflexible virtue than we have been accustomed to find in some such institutions in the past.

INFLUENCE OF WATER-WAYS ON COMMERCE.

One of the important appropriations last session of Congress was the sum of \$200,000 for the survey of a route for a ship canal between Lake Michigan and the Mississippi River. By "ship canal" it is not contemplated to build such a canal as that of Suez or the one under construction to Manchester in England, as the minimum depth to be provided is stated in the Act to be only seven feet, yet this would give tolerably free intercommunication by water between the great lakes and rivers, the dimensions of the locks to be provided being designated as 170 feet in length and 30 feet in width. What this would mean in advantage to Chicago and other points is hard to estimate, yet if we are to judge from the results achieved through the canalization of the Main up to Frankfort in Germany, the expenditure is likely to be very beneficial from a commercial point of view, apart from the object to be attained by the government and which is stated in the Act, of being able to pass gunboats in time of war, for purposes of defense, from the lakes to the rivers and vice versa. At Frankfort, which in one respect is quite a case in point, the depth of water being less than seven feet, the new navigation has been open only about two years and already is restoring to that city its old commercial character, it having recently, owing to the obstructions to navigation in the Main, become little more than a banking or financial center. The traffic of 1887 shows a forty-nine fold increase over that of 1881. While there is this enormous increase in water-borne trade, the railroads have been benefited also by the general activity, and show an increase of 36 per cent in their receipts in 1887 over the previous year.

To adduce another case in point nearer home, the work of improving the St. Lawrence between Quebec and Montreal for ocean going vessels to a channel of 27 1/2 feet in depth, has at last been completed, and as the channel has improved, so has the amount of shipping and trade, the tonnage last year being 870,773 tons, against 412,478 in 1873.

THE EFFECT OF HIGH PRICES OF COPPER ON ITS CONSUMPTION.

In our issue of October 27th we commented on the English Board of Trade returns as throwing light on the true situation of the copper market in England, and we now turn to the recently issued French Government returns for the aspect of affairs there as represented by cold official figures. Taking our data from the Economiste Français, it is evident that in the first three quarters of this year the quantity of copper manufactured in France was very much below the average, and therefore the consumption much less than usual, showing that high prices there have affected the manufacturing trade in the same way as in England. The value of the copper imported in the nine months is given at 47,205,000 francs, as against 23,769,000 francs last year, and as part of this there were 2,352,000 kilos of old copper imported, against 1,458,000 kilos last year.

The increase in import has been entirely in copper other than manufactured, the weight in manufactured imported decreasing from 24,300 kilos to 17,400, while the export and consumption show a falling off in value from 9,633,000 francs to 6,111,000 francs, which with a much

REFERRING to our editorial of the 24th ult. on the fate of the Panama Canal, the act of bankruptcy has commenced, and to-day the French Government have introduced a bill into the Chamber of Deputies to relieve the Canal Company from its liabilities of every description for a space of three months to see what terms it can arrange with its creditors. We suppose that from sympathy the bill will pass, but it will probably inflict great injustice on honest creditors to the advantage of others.

THE DIFFERENCE BETWEEN A COPPER AND A STEEL COMBINATION.

Our esteemed contemporary the Iron Age, in speaking editorially of the iron and steel beam combination, which has for a long time kept the price of iron beams at 3-3 cents per pound, or \$72.60 per net ton, says: "We are convinced that unbridled competition in the manufacture of beams would be a public misfortune."

On another page, speaking editorially of the copper syndicate or combination, which for some months past has kept the price of copper steady at about 16 1/2 cents per pound to manufacturer, it says: "We believe that the intervention of the syndicate is a misfortune to great interests, and that every day added to the period of its tenure of power must aggravate the evils of an artificial condition of affairs."

It would be interesting to know why, if a combination to regulate artificially the prices in iron and steel beams is such a good and de-

higher price on the goods means a very heavy falling off in quantity. In the details we have gathered from our French contemporary there are two things worthy of note: first, that there are more quotations for old copper and copper alloys of every description than for regular brands, which would appear to indicate that the supply of old copper is still coming forward, and therefore still aiding the manufacturers to get along with small purchases from the *Société des Metaux*, and, second, the curiosity of 59,200 kilos of copper coins being imported into France during the period under review against 7000 kilos last year. These must be the surplus stock of some nation that has either changed its coinage of small denomination, or that has taken advantage of the good market to realize on its surplus stock, not being able to put the coins into circulation.

From the consumptive point of view there appears to be a prospect of relief to a certain extent from a new quarter, if it be true, as is stated, that the German Government has decided to adopt brass cartridges for the whole of its field artillery, after testing the system thoroughly during the past summer, and that the English Government has also approved their use. The general adoption of this system by the armies of Europe would call for many thousand tons of copper, for some of the cartridge cases weigh as much as 12 pounds each.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

The Profits on Powder Sold to Miners.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The concession recently made by the Delaware & Hudson Canal Company to the miners in their employ of selling blasting powder to them at \$2 a keg in place of \$3, is a step in the right direction. Legislation has been invoked more or less successfully in many parts of the country, to prevent the abuse by employers of labor of their power, in what is known as the "truck" system, and this supplying of powder by the owners of mines at their own prices to the miners is really part of the same system and has been abused to a great extent. So much so that, if the evil is not cured, the question will probably be regulated by legislation. If the mine owners operating in the coal regions find that to carry on their business successfully they require the profit earned by providing the miners with powder at exorbitant prices, they had much better state the fact openly, and adjust the difference on the price of labor. But to charge \$3, or even \$2, per keg for powder which they buy for \$1.37, is an insult to the intelligence of the men they employ, or an imposition based on their position of employers.

The offer of the Delaware & Hudson Canal Company is contingent on the agreement of the other mine owners in the same district to charge the same price, but of this we should think there would be little doubt; for if the figures given by one of the Pittsburg papers are correct, the profit on the sale of powder accruing to the companies and others operating collieries must exceed \$1,900,000. FAIR PLAY.

THE COLORADO OIL FIELDS.

By Professor J. S. Newberry.

In a paper read before the New York Academy of Sciences, November 26th. President J. S. Newberry gave the following as the results of his recent investigations in Colorado:

The only wells thus far worked are at Florence, near Cañon City, in the valley of the Arkansas. Indications of gas and oil are, however, found over a very wide territory, and the industry is no doubt still in its infancy, although surface indications cannot always be relied on as indicative of workable wells. Thus in California, such indications are numerous and copious, yet the stratigraphical conditions are such that few paying wells can be sunk there, the oil having been mostly lost.

In Colorado the oil bearing horizon is the Colorado shales, the middle member of the Cretaceous group. The succession of strata is best shown in the northwest corner of the State, near Glenwood Springs. There the strata have been turned up at a high angle and show the following order within a distance of some four or five miles, Grand River running through the middle, viz.: 1, Granite; 2, Potsdam sandstone; 3, Palaeozoic limestone; 4, Trias; 5, Jura; 6, Dakota; 7, Colorado shales; 8, Laramie group; the last three Cretaceous. The shales at this point are black and over 2000 feet thick. On the plains, limestone takes their place.

Oil was found near Cañon City twenty years ago, but it was not till three or four years ago that the first paying well was sunk. At the time of the speaker's visit twenty-five wells had been sunk. Mr. Wallace, representing the company, reports the number now increased to forty. None of them are gushers, but they flow generally in a steady stream, yielding from 20 to 100 barrels a day, the average of the wells now being pumped being between 50 and 60 barrels. The daily yield is now about 1000 barrels.

About all the oil land in that portion of Colorado is owned by one company, some 50,000 or 60,000 acres, but borings have thus far been confined to a very limited area, not exceeding 500 acres. The advantage of the present field of operations is its accessibility to market, but the prospect for oil appears to Dr. Newberry good in other portions of the State which are underlain by the Colorado shales.

The Colorado oil fields add a new horizon to those from which oil has heretofore been obtained. The supply at Findlay, Ohio, Burkesville, Ky., and Collingwood, Canada, comes from the Lower Silurian, while in the great fields of Western Pennsylvania and Western New York the oil is

derived from the Devonian black shales which underlie that region and have a thickness of 500 feet. The oil of Mecca, Ohio, is taken from the Berea grit and originates in the Cleveland black shale which underlies it.

The Colorado oil has a pleasant, ethereal odor, in this resembling the oil obtained from tertiary rocks near Mantua, Italy, which was used for street lighting at a remote date, being, indeed, the earliest use of petroleum of which there is any historical record. It has, when crude, a gravity of 31 degrees B., and yields, on refining, 40 per cent of pure white oil, the clearest and finest known. It is very easily refined and deodorized. The residuum is rich in paraffine, making the most perfect lubricant Dr. Newberry has any knowledge of. It would be worth in eastern markets 50 cents to \$1 a gallon, but the company use it for fuel, and though this is bad economy, it makes an ideal fuel.

The origin of petroleum has been a vexed question, chemists holding one theory and geologists another. The eminent chemist, Mendeljeff, supposes it to be formed from inorganic elements by natural synthesis, but Mendeljeff had no personal acquaintance with our great American oil fields. His theory is a theory only. In volcanic and metamorphic regions the inorganic elements exist abundantly and in juxtaposition, but oil is never found there, thus refuting the theory. [Dr. Newberry omitted to mention the fact that Mendeljeff had actually produced petroleum by synthesis in his laboratory.—ED. E. AND M. J.]

The geologist finds that oil is always associated with bituminous shales or limestones. Near the outcrop of the Carbonaceous shales which underlie Western New York and Pennsylvania oil and gas springs are found associated in position, and evidently so in origin. South of Cleveland, Ohio, oil and gas are found above such shales. They seem to originate in these shales, and are formed from organic matter which goes on decaying. Coal, if left out in the open air, loses its volatile matter in the same way that these bituminous shales are doing. Thus spontaneous distillation is constantly going on, and petroleum and gas are issuing from decomposing organic matter. Petroleum, decomposing in its turn, throws off volatile gases, leaving tar, asphalt, ozocerite, albertite, grahamite (asphaltic coal), asphaltic anthracite, and as the last term of the series graphite, from which all volatile matter has escaped. The transition from oil to asphalt is very well seen in Canada, also in the Pitch Lake of Trinidad, which is fluid in the center and gradually solidifies toward the edges. At Canajoharie, petroleum oozing from the Utica black shales in ancient times has formed seams of anthracite from the thickness of a sheet of paper to those several inches thick. At a mine in Idaho eruptive rocks have formed dykes in Carbonaceous (Cambrian) shales, and fissures are filled with anthracite, also a residue from ancient petroleum. In the Laramie rocks of Northwestern Colorado are veins of albertite 10 to 20 feet thick, resulting from petroleum which came from the Colorado shales below.

All these examples indicate the methods of operation of natural agencies through secular periods. But similar processes are even now going on. We may see on a small scale the formation of oil in pools where vegetation is decaying. In such places, remote from the great oil fields, a thin film of oil is formed on the surface of the water, and on poking up the mud with a stick bubbles of marsh gas are set free from the bottom.

All these phenomena point clearly to vegetable tissue as the origin of the various hydrocarbons, whether gaseous, liquid or solid. Some small proportion may be of animal origin, as adipocere is not infrequently cast up by the sea, but the great deposits must be of vegetable origin. This is confirmed by microscopic examination of bituminous shales, which are found to be full of broken vegetable fibers. A possible source of oil and gas are the minute algæ, such as now in summer abound in some lakes to such an extent as to render the water green and opaque.

These considerations throw light on the question of permanence or failure of supply in gas and oil wells. If the theory of the speaker is correct, 1st, gas and oil springs and wells must be confined to strata overlying beds of organic matter, such as coal, carbonaceous shales, and bituminous limestone. 2d, gas and oil will flow from such deposits as long as any organic matter is left. 3d, the daily flow of gas and oil will be small, and great accumulations of either can only take place where fissures or coarse, porous rocks serve as a reservoir, and impervious strata above prevent escape and cause the accumulation of hundreds of years of daily product. Hence gas and oil wells will continue to flow for ages, but when the stock in reservoirs is exhausted or the current production is divided among many wells, the product may be so reduced as to be of little or no value.

The oil wells of Mecca, Ohio, prove the continual formation of petroleum. These wells are bored in the Berea grit, a sandstone which overlies the Cleveland shale, a sheet of carbonaceous matter. When first opened the Berea grit was found saturated with oil, and several hundred wells were bored in close proximity. These soon drained away the accumulation of oil, and within three months every well was supposed to be exhausted and was abandoned. Now a small but remunerative industry is maintained there by pumping each well a few days in the year. The quantity taken from each, though small, is constant, proving a continued production. As no oil has been obtained there below the Cleveland shale, and gas and oil are seen escaping from that in a multitude of places, we must conclude that they come from the shale.

History confirms this view of permanency in supply. The Chinese have used petroleum for two thousand years and the Hindoos for many hundreds, and the spontaneous flow upon which they have depended has been constant. On the shores of the Caspian enormous and apparently constant quantities of gas and petroleum have escaped from the ground from time immemorial. The Babylonian asphalt used as a mortar is a petroleum product furnished by the fountains of Hit, which are apparently flowing now as they did thousands of years ago. In all these localities the spontaneous outflow of oil (that is, the daily product of subterranean distillation) has been used, and such sources of supply are permanent, but the steam pump will certainly exhaust local reservoirs of oil, and numerous gas wells will exhaust a territory, however productive in the beginning.

In discussing the paper, Mr. Hidden took issue with the theory of the vegetable origin of petroleum, adducing the fact that carbon from me-

teorites has been distilled and oil obtained, and that quartz and granite are found sometimes heavily charged with carbonic acid, either gaseous or sometimes even in a liquid condition.

Professor Newberry replied that the granites which contain carbonic acid and graphite are sedimentary rocks which have been metamorphosed by heat, and their organic hydrocarbons distilled. He had only attempted to explain the origin of the petroleum of this world; we do not know anything about the conditions of things in worlds other than our own, but analogy justifies the inference that similar causes produce similar effects elsewhere as here.

THE SYLVANITE MINE, COLO.

The Sylvanite mine of Gunnison County, Colo., is a very interesting deposit, both from a geologic and an economic point of view.

One of our most distinguished geologists writes us concerning it as follows: "The Sylvanite vein lies on the northern edge of an immense laccolitic mass of diorite, of which Whiterock Mountain forms the center. A great deal of very rich ore has been discovered in and around this mass, but owing to great elevation and inaccessibility, they have not been thoroughly developed. Moreover, miners have been puzzled in trying to follow the ore from the apparent want of regularity in the occurrence.

"I find that in general the ore, even in the midst of the diorite, is not so much in that rock itself, as in included masses of sedimentary rock caught up in the eruptive mass, and now so metamorphosed that it requires a very experienced eye to distinguish eruptive from sedimentary rock, both being intensely metamorphosed. Heated solutions evidently deposited ore along contacts with these sedimentary bodies, from structural reasons, and in the sedimentary rather than the eruptive rocks, probably from some subtle chemical affinity.

"The mountain on the south side of which the Sylvanite deposit occurs is a mass of so intensely metamorphosed sedimentary strata that their original constitution or stratigraphic relations are difficult to decipher. They are traversed in every direction by irregular dyke-like masses of intrusive diorite, probably offshoots of the great mass which fills the valley to the south of the mountain, and extends up its foot below and not far from the Sylvanite. The new tunnel starts in in this mass. Owing to the accumulation of surface debris the outlines of the body are difficult to trace with accuracy. The deposits occur in a series of parallel fractures standing nearly vertical, and running in a general east and west direction, roughly parallel to the outline of the great diorite mass—whether they are to any extent contact planes I did not determine finally. When I was there two of them had been opened over a length and depth of several hundred feet, and the richness of the ore extracted from them was patent to the most casual observer.

"On account of its position and great altitude the working of the mine was attended with unusual difficulties. The proposed tunnel which was to open ground some 800 feet below present workings seems to me therefore a legitimate expense, though my tendency is to condemn the running of tunnels to strike veins in depth until they have actually been proved to extend to that depth, my reason being that such rock fractures as constitute veins do not necessarily extend continuously to great depths. They may and they may not. It is a study of the dynamic conditions which it is not always possible to make, which should determine the probabilities *pro* or *con*. In this case it seems to me, in view of the great saving in expenses of working, a legitimate expense, even should the vein or veins not be found to extend so far, provided a careful estimate of the ore-bodies actually opened in the upper workings justified this expense for the extraction of that ore. I think there is a very reasonable ground to expect that other rich ore-bodies may be found in depth, perhaps not in the very same plane of fracture, but on some parallel or associated fracture plane. And in working the mine they should map out these planes and study their courses and probable extensions.

"I did not make any sort of an economical estimate of the value of the mine, for evident reasons. I regard the geological conditions as extremely favorable. It is for the mining engineer to make a careful sampling of the vein as opened, and an estimate of the value of un-stopped ground. If this is done by one thoroughly competent; and except for the hard climbing and severe climate this should not be a difficult problem, for their ore smelters returns give results of actual working,—and he can see enough ore to repay the liberally estimated costs of the tunnel, it seems to me it ought to be a most inviting investment for mining capitalists.

"I am sorry my information is of so general a nature, but no one who has studied the geology of that region can fail to be impressed with the great mineral wealth that must lie hidden there. The only question is to find exactly where it lies. The Sylvanite mine seems to have developed one of the points where it is concentrated in its richest form. Of course such exceptionally rich deposits do not, as a general rule, have so great mass as the poorer ones. Still that is a point susceptible of more or less accurate measurement in ground already opened."

The property was examined in February, 1888, by Mr. J. E. Brothers, who says that he took a number of samples from the mine, which gave an average assay value of \$161.83 per ton—we presume on the usual assay basis of \$1.29 per ounce for silver—which would give 126 ounces per ton, and he estimated the ore in sight at 17,800 tons.

Mr. W. C. Wynkoop, mining engineer, of Denver, Colo., examined that portion of the mine above the main tunnel in May last, and reported on it. We make the following extracts from this report, and have had an engraving made from the map furnished us as showing the extent of the workings both above and below the tunnel level.

"* * * * * Everywhere in the levels and stopes above the tunnel level, except for 45 feet on the second level, the vein carries gold ore. It occurs in spots or pockets, which carry anywhere from a few pounds to a ton or more. These pockets of rich ore are seldom more than two or three feet apart, and they occur so frequently that every cubic yard in the vein, in the portion shown on the accompanying map as ore bearing, will pay.

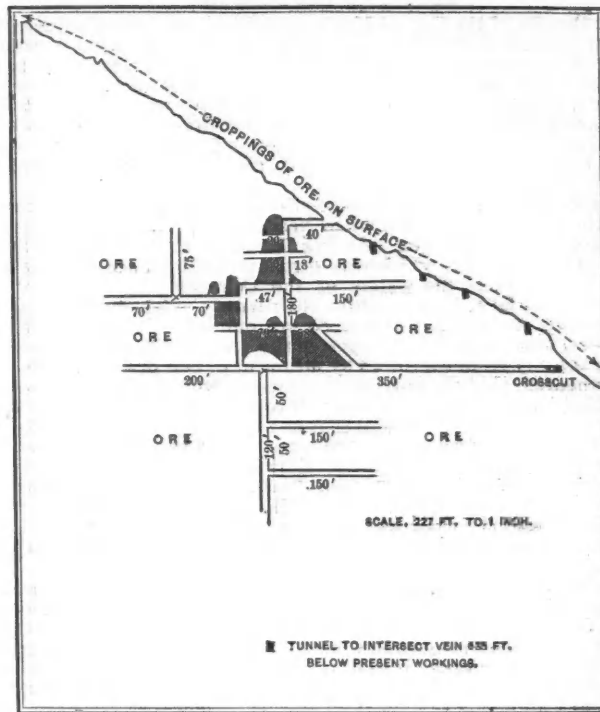
"It is a practical impossibility to sample the ore in a mine like this

with any certainty that the results will give an absolutely correct average of its value. I measured the drifts and stopes and upraise, and the width of the ore-bodies, and after careful inspection of every part of the workings, those samples which represented the various grades of ore in the proportion in which they existed. * * * * *

"The measurements demonstrated that the width of the ore-bearing portion of the vein is 31 inches, of which 22 per cent is waste, leaving 24 inches as the average of the ore.

"The average of the ore as shown by samples taken is 142.21 ounces per ton. Above the tunnel level one can reasonably calculate that there are 26,800 cubic feet of ore.

"The specific gravity of the ore is three and sixty-six (3.66) hundredths,



Sylvanite Mine.

giving a little less than 9 cubic feet to a ton. With 2977 tons in sight above the tunnel level, the average value being 142.21 ounces per ton, the ore in sight contains 423,359.17 ounces. * * * * *

"The books of the Denver Public Sampling Works show that the value of the ore sold by them from the Sylvanite mine during 1887 was \$24,812.36, giving an average value of \$31.75 per cubic foot. If the ore now in sight above the tunnel will yield as well as that yielded, its contents are 532,900 ounces. I have no doubt that this will be found nearer the contents than the amount shown by my samples. * * * * *

"The ore is generally a sulphide of silver, mixed with metallic and occasionally ruby silver. Some little iron pyrites is seen, but it is a low grade in silver. The gangue is quartz and baryta, while the country rock is diorite.

"The vein appears to be a fracture plane, quite crooked, but having a general northeast and southwest course. The ore is deposited along this plane, sometimes on both sides and sometimes upon only one. * * * * *

"The frequent changes from apparent barrenness to richness approaching the marvelous, are calculated to enthuse every beholder, and in this respect the Sylvanite is superior to any mine of which I have any knowledge. If, therefore, one departs from cold-blooded facts, and permits imagination to have the least reign, it would be at once suggested that these massive wire silver patches are liable to become more compact, and be the expected feature of this remarkable vein. Some geologists and practical miners who have made a study of this mine have asserted their belief in this very thing, and that the Sylvanite will at an early day become a mine of most marvelous productiveness and surpass the performance of any silver mine in the country."

Mr. Wynkoop frankly states his opinion that it is impossible to sample reliably such a mine, but we think he is in error in assuming that the ore shipments measure the value of the reserves left in the mine. It is an extremely rare thing for miners to ship only "average ore," especially when the cost of transportation is high, and it is always safer to assume that the mine "reserves" run considerably lower than the ore shipped.

Mr. John Morrissey, who is interested in the mine, and who is at present managing it, reports October 22d, 1888, that the ore in sight above the upper tunnel amounts to 5041 tons. This is the same ground in which Mr. Brothers estimated 10,312 tons of ore and Mr. Wynkoop estimated 2977 tons. Below the main tunnel Mr. Morrissey counts the reserves to amount to 11,693 tons, estimated by Mr. Brothers at 7500 tons.

Mr. Morrissey also bases his valuation of the reserves (as we believe erroneously) on the value of the ore already shipped. The discrepancies in the measurement of the tons of ore "in sight" in the mine, a simple matter to arrive at, having room, one would say, for little variation, throws some doubt upon the correctness of the sampling and estimates of value of this widely fluctuating quantity of ore.

It is rather remarkable that none of the experts gives any figures of the cost of working the mine, or of the net profits which have been earned by it in the past.

Every one knows that it is not the assay value, or even the quantity, of the ore reserves that constitute the commercial value of a mine to the investor; but it is the net profit that can be realized from the ore in sight. The property is, as we have stated, an extremely interesting one, and

should the vein be found productive at the depth of the new tunnel, it may become a very valuable one. While the stock of this company has certainly an intrinsic value far above that of the average New York mining stock, it does not seem to us at present to offer a good foundation for the high figures we hear predicted for it.

THE DRAINAGE OF THE VALLEY OF MEXICO.

Written for the Engineering and Mining Journal by Richard E. Chism, M.E.

(Continued from page 478.)

HISTORY OF THE DRAINAGE.

While the site of the City of Mexico continued to be a circumscribed and marshy island, the few inhabitants that it may have contained would pay no attention to a rise of a foot or two, or of a few feet, in the waters on which they led a semi-amphibious existence. It was not until the increasing area of dry land, formed by natural or artificial means, had encouraged the lake-dwellers to cultivate and to build some sort of permanent houses that the pernicious effects of the annual inundations became palpable and induced rude efforts to restrain the waters.

The authenticated record of these efforts commences about a century before the Spanish Conquest, when Netzahualcoyotl, King of Texcoco, at the request of the then reigning Emperor of Mexico, sent 20,000 Indians to build a dyke, which was eight miles long, across Lake Texcoco, so as to prevent the waters of the Cuautitlan River, which then flowed into that lake, from reaching the part of the lake near the city.

The position of the valley of Mexico, surrounded as it is by mountains on all sides, must soon have suggested the impossibility of completely securing the city from overflows by means of dykes or dams. It would be soon apparent that the only radical remedy would be the providing of an outlet for the waters and for their complete conduction away from the valley. Accordingly we find that as far back as the year 1604 there is some trace of a tunnel project, and that in the year 1607 this was definitely formulated by the engineer, Enrico Martinez, who in that year submitted to the Viceroy a plan to drain the whole valley by means of a tunnel pierced through its north side. The project was thought to be impracticable and the work was restricted to the drainage of Lake Zumpango and the regulation of the River Cuautitlan. This latter river was, at that time, supposed to be the sole cause of the inundations.

In pursuance of the latter project Martinez opened a tunnel through the mountain wall at the place where is now the Tajo or cut of Nochistongo, a canal, three miles long, with a dam to divert the River Cuautitlan into Lake Zumpango and a canal from the lake to the entrance of the tunnel. The tunnel is said to have been 3 meters wide and 4.20 high, and about 6600 meters long. There were also some 19 kilometers of canal, and all is said to have been finished in less than one year.

The tunnel was unlined and was constantly caving in, as its sides were undermined by the rushing water. It was afterward partially lined with masonry and the rest of the lining was being completed when, in 1629 there occurred what is recorded in the annals of the city as the great inundation. The tunnel proved inadequate for some reason to discharge the excess of water in the River Cuautitlan, and the city was overflowed in a short time to such an extent that the whole city was navigable by means of canoes.

Houses were destroyed by the undermining of their walls, and many thousands of persons perished by drowning, or through hunger or cold. This inundation lasted until the year 1634, when an earthquake opened some cracks in the ground through which the water escaped. Some years after it was resolved to convert the tunnel of Martinez into an open cut. This was a work that has no equal, even in our day of railroads. The Panama canal is the only modern enterprise that can be compared with the Tajo of Nochistongo, and even this is far inferior to it as a colossal work. It was finished in 1789, about a hundred and fifty years after being commenced, at a cost of \$5,550,000, without counting the labor of the Indians, of whom tens of thousands were employed at a time, and compelled to work for nothing. The completed work, as it exists to-day, appears more like a natural ravine than the work of man. It is 13 miles long, for 2624 feet its width at the highest point is from 278 to 360 feet, and its depth from 147 to 196 feet. For 11,483 feet its depth is from 98 to 164 feet. At the bottom it is from 9 to 13 feet wide, and the slope of its sides is from 40 to 45 degrees.

After the completion of this great work nothing was done for many years except as the imminent fear of inundation compelled the ephemeral governments of the revolutionary period to clean the canals and repair the dams and dykes or to dig out any obstructions that might have accumulated in the great cut.

In 1856 a commission was appointed by the government to pass upon several plans that had been submitted as the result of an invitation issued to engineers. The plan selected was that of D. Francisco Garay, an eminent Mexican engineer, a graduate of the Polytechnic School of France.

The plans of Garay called for a tunnel to be driven through the northern side of the valley, to which the water from all the lakes was to be conducted by a canal below their level. He also provided an elaborate system of irrigating ditches and navigable canals to extend over a great part of the valley, and to be supplied with water from Lake Zumpango. The surplus water from this system was to be carried off through the great canal and out of the valley through the tunnel. He proposed to drain Lake Texcoco entirely, and to reduce the other lakes to such dimensions as would secure the city and valley from all danger from their overflow. The tunnel was to commence on the northern shore of Lake Zumpango, and to terminate in an outlet in the side of a ravine called Ametlac, on the other side of the range, and was about 7,500 kilometers long.

It would have been supposed that the crisis of the work would have been passed with the official adoption of a project, meritorious in itself, and that nothing would have remained but to carry out the plans as adopted. Such was not the case. There were more revolutions in the government, and the plans of Garay appear to have been lost sight of in the multitude of projects that were presented by different engineers as

they were in turn placed at the head of the drainage works by successive political changes.

It is worth while to present a table of some of these plans, that their divergence may be noted.

TABLE OF THE PLANS PRESENTED FOR THE DRAINAGE OF MEXICO.

Plan of	Sections. Sq. meters.	Velocities.			Discharge per sec. Cubic meters.
		Superf.	Mean. Meters per second.	Bottom.	
Smith, 1848.....	5.57	1.80	1.44	1.08	8,028
Poumarade, 1848.....	1.60	7.33	5.87	4.41	9,400
F. Garay, 1856.....	39.00	1.00	0.85	0.64	33,150
M. Iglesias, 1866.....	15.84	3.25	2.60	1.95	41,184
R. Orozco, 1867.....	18.95	2.38	1.91	1.54	36,196
Drainage engineers, 1868.....	20.00	2.09	1.67	1.25	32,400
Do, do., 1877.....	7.787	....	2.25	....	17,500

REMARKS.

Smith, 1848: Plan formed during American Invasion.

Poumarade, 1848: This plan was of a siphon.

F. Garay, 1856: Plan officially approved and adopted.

R. Orozco, 1867: To drain through the Tajo of Nochistongo which was to be deepened.

Do, do, 1877: Plan now being carried out.

The difference in these plans is very great and turns upon the different ideas that have prevailed concerning the amount of water that was to be led off annually from the valley. It is impossible to ascertain just how much water is received by the lakes in the year. The estimates differ very widely on this point, and each engineer has adopted a different estimate as the basis of his plan. Some engineers think that the dimensions of the outlet should be sufficient to carry off all the water now existing in the valley in one year. Others think that the lakes should not be allowed to rise above a certain level, and that all the water in excess of this level should be carried off, and still others think that it will be sufficient to regulate Lake Texcoco, not allowing its waters to rise above a certain point and carefully refraining from draining it entirely for fear of the malarious influence that might arise during the drying up of the mass of detritus, the sewerage of the city during centuries, that forms the bottom of the lake. The latter is the position upon which is based the last plan in the list, now being carried out by the Drainage Commission.

The assertion as to the danger to the public health from the entire drying up of Lake Texcoco is supported by the opinions of some of the medical faculty of this city, yet I cannot help thinking that it is entirely erroneous. It seems to me that it will do less harm to the public health to dry up the lake at once, in the shortest possible time, than to leave it half drained with a wide border of swamp, alternately wet and dry.

In the first case the detritus will, in a short time, be permanently dry, and no further danger will arise therefrom, since dry mud is not infectious; in the second case every rise in the lake will leave behind as it recedes a wet and putrid mass that will always give trouble, while at all times the water will creep outward through the porous alluvium, and the borders of the lake will be a permanent stinking swamp, than which nothing can be more objectionable from a sanitary point of view.

As will be seen, then, from the above table, the plan of Garay has been quietly shoved to one side and the dimensions adopted for the work are entirely different from those recommended by him. Through some mistake in engineering, also, the direction of the tunnel has been changed. Parting from the same point on the northern shore of Lake Zumpango the line of the tunnel, as now laid out, diverges some ten degrees to the east of the line recommended by Garay and emerges at a different point in the ravine of Acatlan and not in that of Ametlac. The immediate effect of this unfortunate change is to make the line of the tunnel some two kilometers longer than is necessary, so that instead of being 7.5 kilometers, at it would have been had the plans of Garay been carried out, the tunnel by the present plan will be 9.521 kilometers, which will make a great difference both from an engineering and a financial point of view. As another point in favor of the plan of Garay it should be mentioned that his plan provided that the tunnel should open upon a hillside, so that the drainage waters would have had to fall perpendicularly a distance of some meters before gaining the bottom of the ravine. In the present plans the tunnel opens directly in the bottom of a narrow ravine which, moreover, makes an angle with the course of the tunnel, so that it is to be anticipated that there will always be trouble at this point from the accumulations of debris which will choke up the ravine and even the tunnel itself if not constantly attended to.

As it is, large sums have already been expended in improving the outlet to the tunnel at this point, and it is likely that as much more will have to be spent in the same manner. None of this expense would have been necessary with the Garay tunnel, whose mouth would have cleared itself for a hundred years at the least.

The cost of driving the tunnel under the present administration is about \$188 per meter, so that the difference in cost of the last tunnel over that recommended by Garay is approximately as follows:

2000 extra meters tunnel, at \$188 per meter.....	\$376,000
Work at outlet, say.....	50,000
Total.....	\$426,000

To this must be added at least \$1000 a year for all time as the cost of keeping open the mouth of the actual tunnel, and of maintaining the works for its protection, so that the total expense of this engineering blunder, even without adding interest on the extra outlay and the loss of time, will be something enormous.

The change of direction above alluded to took place in the year 1866. Work has been carried on along the erroneous line ever since that time, though at irregular intervals. Up to the present time about 1200 meters of the northern part of the tunnel have been finished, and thus, after all these years and the expenditure of untold amounts of money, for the earlier commissions were not so economical nor so honest as the present one, the tunnel is not yet as far advanced as it would have been had the Garay line been correctly traced and adhered to from the first.

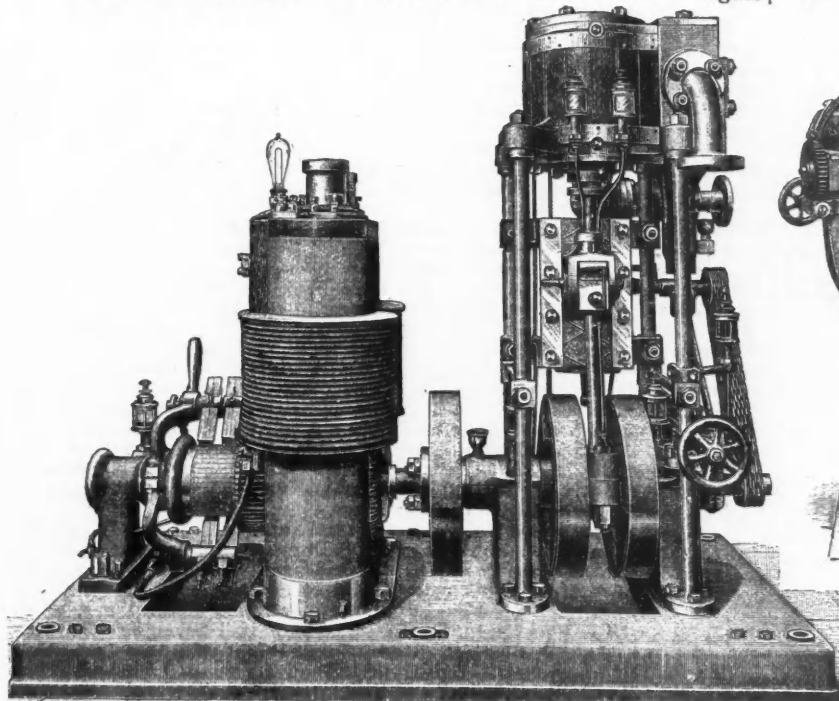
These facts have been often stated and unofficially recognized by the government, but the erroneous line has been persisted in through a dread of public censure should the wrong direction be abandoned, together with all the work so far done, and the correct line returned to.

The internal drainage of the city of Mexico is at present effected by a

network of covered gutters, about 2½ feet wide and say 3 feet deep, that run down through the middle of every street or at the side. These receive the surface waters through stone gratings placed at frequent intervals. From every house there is also a covered drain running out which connects with the street drain.

The street drains receive the contributions, both solid and liquid, of the streets and the houses, and are in a chronic state of choking up. Hence the constant presence in all quarters of the city of gangs of men who stand thigh deep in the black and foul water and rake into its depths to remove the obstructions. Every place of this kind is a center of infection in the shape of foul smells that poison the air for blocks around. Any sewage that succeeds in running its course through the drains gets at last to the subsidiary canals, of which there is a network in the eastern part of the city, and finally makes a slow and sullen exit through the main canal of San Lazaro, to Lake Texcoco, if the latter is low enough. If the lake is so high that there is no current the water simply stands in the sewers until part of it soaks away into the ground under the streets and buildings. As this kind of thing has been going on for centuries, it is easy to imagine what the condition of the subsoil of the city must be. As a fact, it is impossible to make an excavation over two feet deep in any part of the city, even in the heart of the dry season, without its being almost immediately filled with black, stinking water. And yet there are many thousands of people here who live on ground floors, in rooms where the light never penetrates except through an open door, and where the floor is of earth, or at best of boards, that rot every two years by the moisture that comes up from below. When we reflect on this it is no wonder that Mexico has a death rate of 40 per 1000, larger, I believe, than that of any other city in the civilized world, and which is constantly increasing even beyond this frightful figure.

As the rains continue and the level of Lake Texcoco rises still higher



PORTABLE DYNAMO AND ENGINE.

the city area is cut off from the lake by means of gates and dykes, and if the rainfall continues with the sewers full the water from these runs back, and for several hours each day the city presents a most extraordinary appearance. The principal streets and many of the side streets are, after a moderately heavy rain, overflowed from wall to wall with black water, charged with floating and suspended material of a peculiarly odoriferous and disagreeable character. The flooded streets are traversed by innumerable laden cabs and crowded horse cars, and every vehicle flings in all directions a shower of mud and water, destructive to the clothing and wearing to the temper. Here and there little islands of dry ground are seen occupied by ladies in a state of consternation and display. Porters are moving in all directions carrying ladies and gentlemen from one island to another, or depositing them in cabs to be taken home, and some more thoughtful or better provided pedestrians are seen wading ankle deep with their feet protected by high boots in the midst of a crowd of barefooted peasantry who are on the search for some one to carry and perhaps rob. Sometimes the flood comes after a calm and bright evening has tempted a crowd to visit the theaters. The rain comes down in a deluge, and the outpouring audiences are confronted at midnight with a lake of Stygian darkness, reflecting the electric lights as from a surface of polished pitch. Under these circumstances there are usually very few cabs and no porters to be had, so that the greater part of the audience must wade home through the inky waters as best they may. After one of these floods innumerable hand pumps are set at work all over the city to pump the water out of courtyards, stores and warehouses, and the poorer classes have hard work to bale out their rooms with basins and cups.

Thousands of dollars worth of goods are ruined every year for the merchants of this city by these floods, besides the injury to their trade by the streets being rendered impassible for days at a time. This year the city council has had long lines of wooden platforms made to extend along the flooded streets so as to enable people to move around without wading.

The receding waters leave behind them foul pools that have no outlet

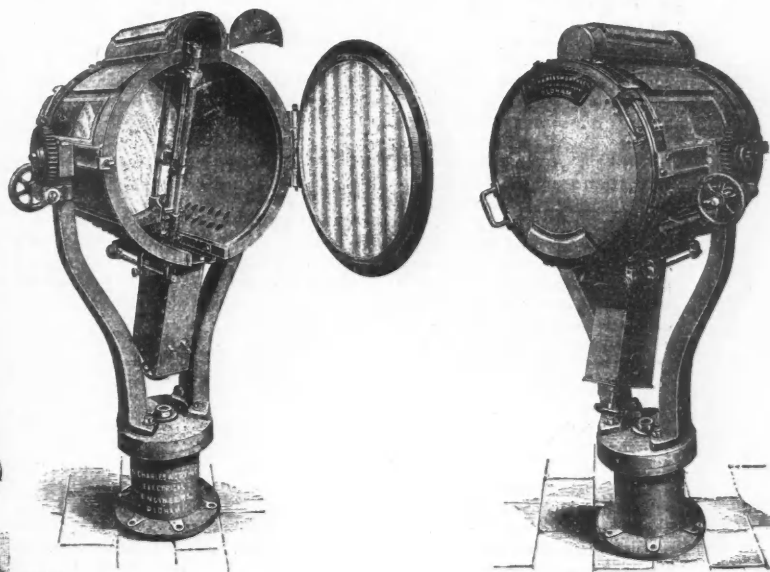
and accumulations of mud that teem with more than the thousand odors of Cologne, so that the rainy season is one long infection from which it is wonderful that any one can escape.

[TO BE CONCLUDED.]

ELECTRIC LIGHT NAVIGATION OF THE SUEZ CANAL.

The subject of maritime canal navigation is one of such great interest to the commercial and engineering community, that the improvements that have taken place in the conduct of the Suez canal traffic are worthy of notice at the present time. Until recently the passage of vessels at night was forbidden, and in consequence the carrying capacity of the canal was limited to the number of steamers that could be passed through it during the hours of daylight, which limit had been reached, so that delay frequently occurred, and the question was mooted of constructing another canal or widening the existing one, either of which expedients involved a large outlay of capital, and at least a temporary reduction of profits to the enterprise. In place of this unsatisfactory result to the shareholders a remedy was found which will for the present at least remove the necessity of any expenditure of capital, and which, in place of reducing the profits of the undertaking, will increase them very substantially. When the administration of the Suez Canal last year decided that the utility of the canal could be increased and the traffic carried on at night by the aid of the electric light as safely as by day, the regulations were changed, and steamers were permitted to pass through at all hours on satisfying the company's agents that they were provided: 1st, with an electric search light throwing a beam 1,200 meters; 2d, with an electric lamp and reflector suspended above the bridge and capable of lighting a circular area of 200 meters diameter.

These conditions could of course only be complied with by first-class



PROJECTOR SEARCH LIGHT.

passenger steamers, which carried for their own convenience electric light apparatus, or by those whose owners considered it of sufficient importance to avoid delay, to fit them out expressly in this respect for the canal passage. Obviously there would be many freight steamers using the canal which would not carry such appliances, and this year, to meet this want, the canal authorities have supplied to steamers unprovided, the use of a portable dynamo, with engine and projector search lamps, at a charge of \$50 for the passage. This convenience and saving to the ship owners has been largely taken advantage of, so much so that during the recent months about one half of the traffic through the canal has taken place at night, and it really means that the carrying capacity of the canal has been nearly doubled. The arrangement of the portable dynamo with its engine is so compact that we illustrate it with the projector search lamps, and should the traffic on the proposed Nicaragua Canal be more than can be conveniently and rapidly handled by daylight, this practical solution of the question of increasing the carrying capacity of a canal is ready made to enable them to deal with a welcome embarrassment. The dynamo is coupled direct to a Brotherhood's three-cylinder engine on one bed plate, and the weight of the whole, while interposing no difficulty to slinging it on board a steamer, is sufficient to render it unnecessary to bolt it to the deck, so that no time is lost or damage done in the use of it. The steam is supplied from the boilers of the vessel, and as the pressure is usually allowed to fall, owing to the slow rate of speed in passing through the canal, the engine has been constructed to work at a pressure of 40 pounds per square inch. The dynamo, running at 425 revolutions a minute, supplies sufficient current for a light equal to 12,000 C. P. for the search lamp in the bow of the steamer, and for 6000 C. P. in the lamp over the bridge. The former is placed close to the water, and illuminates the canal in front of the vessel for the whole width of the canal for a distance of 1300 yards, while the latter lights an area of more than 200 yards diameter, and enables both banks of the canal to be distinctly seen, as well as any vessel tied up by signal at the passing places.

The saving in time by the adoption of this means of relief to steamers is, more or less, 24 hours, and it is calculated that the saving in money annually to ship-owners from the tonnage using the canal is approximately £100,000.

THE METALLURGY OF STEEL.*

By Henry M. Howe.

(Continued from page 484.)

The meaning of a_{r2} and a_{r3} is not clear. The constant position of a_{r3} suggests that this point is the W of Brinell and the b of Chernoff: but the temperature, 810° to 900° C., which Osmond assigns it, seems rather lower than that of W and b, while the range of temperature 1,000 to $1,050^\circ$, in which Pionchon found his second absorption of heat, and which we may call Pionchon's a_3 , seems very near W and b.

The reason why raising the initial temperature and increasing the rapidity of cooling cause a_{r1} to occur at a lower temperature, may be that at the higher temperature the crystalline form becomes more firmly fixed, as in the burning of iron, § 263, and so resists more strongly the tendency to change on cooling past the critical point: and that, as we have already seen, the change from hardening to cement carbon is always a slow one.

We have so few facts concerning a_c that speculation were premature. One naturally asks whether retardations of heating, corresponding to and a little higher than a_{r1} , a_{r2} and a_{r3} respectively, exist, indicating that the changes which occur in cooling are each reversed at a little higher^a temperature in heating. In few if any cases is such a correspondence clear. Indeed, it seems evident that the lower elevation in heating, which we call a_{c1} , is not due to a change the reverse of that which causes a_{r1} .

Thus, while a_{r1} seems directly connected with the change of carbon from hardening to cement, a_{c1} does not seem to represent the reverse change: for it appears to be well marked in Pionchon's carbonless iron: Moreover, a_{r1} occurs between 690° and 705° C.: while the change of carbon from cement to hardening, and of steel from soft to hard, occurs only at a much higher temperature, a low yellow, say 1000 to 1100° . Whether its intensity, like that of a_{r1} , is proportional to the percentage of carbon is uncertain. No increase can be traced confidently with carbon rising from 0.05 to 0.16%, in *unhardened* steel. In hardened steel of 1.25% of carbon a_{c1} is very strong, but whether because of the high carbon or of the hardening is not clear. If of the hardening, a_{c1} might correspond to the change of fracture from F and D to H at about 700° C., which has no analogue in case of unhardened steel. We do not refer it to change from hardening to cement carbon, which probably continues to take place at 700° , as this should liberate heat and depress the heating curve, while a_{c1} is in this case a sharp elevation.

The study of fracture and of polished sections shows that changes of crystallization and of mineral species occur during heating and cooling. Some of these have been definitely located at V, and W. Others seem to occur progressively, but not necessarily at constant rate, when hardened steel is heated from the cold towards W. The position of others, *e. g.* that from F to E and from E to D, the formation of ferrite, cementite and pearlyte from the probably obsidian-like hardenite, is yet only roughly known. To these known and apparently sufficient causes it seems not unnatural to ascribe the flexures other than

a_{r1} and a_{r3} . Indeed, in case of ferro-manganese, Osmond does refer the series of perturbations which occurs between 900° and the melting point, to such changes, or, as he puts it, to liquation.

These evolutions of heat are not confined to iron. Person found that the alloy, bismuth 8 parts, lead 5, and tin 3, after solidifying at 96 to 94° C., cooled regularly till it reached 57° : its temperature then rose one or two degrees, with marked expansion. If the molten alloy be quenched, so as to prevent the molecular change which evolves heat, after removal from the water it grows too hot to be held in the fingers, evidently because the heat-yielding change which was prevented by quenching now occurs.^b

Osmond's Theory.^c—The resemblance between the effects of quenching and of cold-working on iron and steel appears to Osmond so close as to indicate that these operations act through causing a common chemical change. As cold-working does not change the condition of carbon, an allotropic change in the iron itself is invoked. He imagines two allotropic modifications,

α iron, which predominates in annealed metal, soft and malleable, and

β iron, hard, strong, and brittle, which characterizes quenched and cold-worked iron. In which it is mixed with more or less α iron, according to the intensity of the causes which have formed it.

α iron is changed to β , I, by cold-working, II, by raising the temperature past a certain critical point or range. β iron changes to α at temperatures which, though high, are below this critical point, freely if carbon be absent, slowly if it be present, carbon acting as a brake. Hence both cold-worked iron and steel and hardened steel are softened by reheating, β changing to α . High-carbon steel is hard after quenching, because its carbon has impeded the change from β to α iron, soft after slow cooling because change from β to α has had time to occur in spite of the retarding effect of the carbon. Carbonless iron is not hardened by quenching, because this change has not been checked; while with intermediate percentages of carbon quenching produces intermediate degrees of hardness by impeding this change more or less.

Discussion.—Osmond's theory implies three distinct propositions, (1) that the wonderful difference in hardness, ductility, coercive force, etc., between suddenly and slowly cooled steel is a feature of an allotropic change, call it the $\alpha\beta$ change, which occurs spontaneously with certain changes of temperature: (2) that the $\alpha\beta$ change is distinct from though influenced by the change in carbon-condition: (3) that distortion in the cold (as in cold-rolling) produces the $\alpha\beta$ change. Here we have three known changes, that in hardness, strength, ductility, coercive force, etc., which we may call the *hardness-change*: that in carbon-condition, the *carbon-change*: and that due to cold-working, the *cold-work change*: and one hypothetical change, the $\alpha\beta$ change. Experiments which I will describe later go to show that the only direct evidence of the existence of a separate $\alpha\beta$ change during heating and cooling is untrustworthy.

In a later section, treating of cold-working, finding that the ulterior and tangible effects of cold-working iron and

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^a At a slightly higher point, because, if crystalline tendency or chemical affinity changes at a certain point, we may suppose that at that point itself equilibrium between the two crystalline tendencies or between the two chemical affinities exists. In heating or cooling we must pass an appreciable distance beyond that point before departing far enough from exact equilibrium to overcome chemical inertia.

^b Comptes Rendus, XXV., p. 444; also Ledebur, Stahl und Eisen, VII., p. 450, 1887.

^c Osmond, op. cit.; also Ann. Mines, 8th ser., VIII., pp. 42, 65; Comptes Rendus, CIII., pp. 743, 1135; CIV., p. 985. Cf. Ledebur, Stahl und Eisen, VI., p. 374, 1886; VII., p. 447, 1887; VIII., p. 364, 1888; also Müller, idem., VIII., p. 291, 1888.

steel resemble those of cold-working the other metals as much if not more than those of heating and quenching steel, I infer that the proximate effects of cold-working iron are classed more reasonably as like in nature to those of the like process of cold-working the other metals (which hardly creates β brass, bronze, German silver, etc.), than as like in nature to those of the unlike process of quenching. If I am right here, Osmond's theory is superfluous.

Turning now to the first two propositions, as suddenly and slowly cooled steel are so unlike that one would hardly suspect from mere physical examination that they were different forms of the same material, we would not quarrel with Osmond for terming the change from one to the other allotropic. The word may be applied legitimately to less striking changes.

Next, if we divide the phenomena which occur during rising temperature provisionally into those noted at V (a sudden absorption of heat, a sudden loss of magnetism, a sudden change in thermo-electric power), and those observed at W (the change in carbon-condition, in fracture and probably in appearance of polished sections, the sudden accession of the hardening power, the momentary loss of elastic limit, the surprising welding noted by Coffin), or into the V and the W groups, we may admit that the V group is distinct from the carbon change, for two reasons. First, the carbon change as shown by nitric acid spotting does not occur till the temperature rises above V, nearly or quite to W; the force of this is lessened by the fact that we are not absolutely certain that the nitric acid test gives sure indications of the carbon-condition. Second, because at least one member of the V group has been detected by Pionchon in wholly carbonless iron, reduced by hydrogen from pure ferric oxide. In this a sudden absorption of heat was indicated in the following way. The iron was heated and at once cooled suddenly in a calorimeter, and the operation was repeated at a gradually rising series of temperatures. The total heat of cooling increased regularly up to about 660° C.; but between this point and 720° C. it increased suddenly and greatly, showing that in cooling from this range, which includes V, some change occurs which evolves heat, and which does not occur in cooling from below V. This indicates that a corresponding absorption of heat occurs in heating past V.^a

Further, he detected the loss of the magnetic properties simultaneously with the absorption of heat, apparently either in this same iron, or in another containing only traces of carbon and silicon, in which the absorption of heat was practically identical with that in the absolutely carbonless iron.^b

But the fact that the V group is distinct from the carbon change does not help Osmond's theory, for the carbon change and the hardness change are both members of the W group.

The question then arises, are the members of the W group simultaneous effects of a single change, or have we here two or more essentially distinct changes, one of carbon-condition, the other from soft to hard steel? During cooling the changes of this group, while probably most

^a Pionchon proved that this absorption of heat was not due to experimental error, by showing that it did not occur with other metals.

^b A striking feature of this V group is that it does not seem to include a sudden change of tensile strength, elastic limit or ductility: these properties seem to change gradually as V is passed, though it is possible that a momentary weakening in passing V may be detected hereafter, like that in rising past W and in falling past V. This reminds us that, tremendous as are the changes caused by sudden cooling, this operation does not affect the modulus of elasticity greatly. Whether we regard the hardening changes as the result of mechanical, physical, crystalline or chemical changes, the relative constancy of this property while the others are revolutionized is at first sight most surprising.

marked at V, seem to be spread out over a greater range of temperature than during heating: and if the group really consists of two distinct changes we might expect them to occur at different periods during cooling if anywhere.

We have seen that the position and intensity of a_{r1} indicate that it represents the carbon-change. Can we go further and identify the other retardations, saying that a_{r1} represents only the carbon change, the other changes of the W group being represented by this other retardation, the V group by that? Osmond attempts this, but I think that one cannot do it confidently without either more data or a more searching and much more impartial analysis of our present data than he gives us. In fact, I see no strong evidence that these retardations do not represent simply successive similar steps of one great change, including both the V and the W groups, a_{r1} being a vast stride, a_{r2} and a_{r3} timid fumbblings.

Admitting that a_{r1} represents the carbon change, he holds that a_{r2} and a_{r3} represent the hypothetical $\alpha\beta$ change. Were this true, then since the intensity of the hardness-change seems roughly proportional to the size of a_{r1} (§ 258), but without relation to that of a_{r2} and a_{r3} , one would still regard the hardness-change as a feature of the carbon-change and not of the $\alpha\beta$ change.

Thus a_{r3} is slight in the non-hardening iron with 0.05% of carbon and in the intensely hardening high-carbon steel, while extremely high in the non-hardening electrolytic iron (curves 1, 11 and 3).

The position of a_{r2} indeed bears some relation to the intensity of the hardness-change, for the temperature at which it occurs descends as the carbon rises. Its intensity, however, not its position, should be but is not proportional to that of the hardness-change. Most marked in the but slightly hardening steel with .20% of carbon, and in the well hardening chrome steel, it is slight or absent in the slightly hardening steel with 0.16% of carbon, in the non-hardening ferro-manganese, and in the intensely hardening high-carbon steel. In the latter indeed it is perhaps swallowed up in a_{r1} . It is more marked with 0.05 and 0.08% than with 0.16% of carbon, more marked with .20% than with .57% of carbon if we may judge by its steepness in the curve for the latter.

The crucial test, however, is to quench at some point below a_{r3} and a_{r2} but above a_{r1} : when, on Osmond's theory, the steel should be soft while the carbon is hardening: on the carbon theory, which regards a_{r1} as identical with Brinnell's V and a_{r3} as probably identical with his W, the metal should be partly softened and should have part of its carbon in the hardening, part in the cement state. From this test neither Osmond nor I have shrunk. He reports that when steel of 0.57 of carbon is quenched from A, curve 7, it is hard and the carbon hardening; while if quenched from B it is soft, the carbon still being hardening.^c This is, I believe, the only direct evidence of the existence of a distinct $\alpha\beta$ change; it therefore merits attention.

(TO BE CONTINUED.)

NOTE.—The publishers of the ENGINEERING AND MINING JOURNAL will thank the readers of this article if they will promptly call attention to any inaccuracies they may observe in it.

^c "19^e chauffage (rapide) à 770 S; refroidissement à l'air jusqu'à 697.8; trempé à 697.8; métal trempé; carbone de trempé. 20^e chauffage (rapide) à 784.1; refroidissement à l'air jusqu'à 658; trempé à 658; métal doux; carbone de trempé." Trans. du Fer, etc., p. 87 "Essays en fin les échantillons ainsi préparés, à la lime, pour juger de leur dureté et à la touche par l'acide azotique, pour vérifier l'état du carbone." Idem, p. 38. However untrustworthy these methods may be, they may properly be used in rebuttal of Osmond's representations of what they themselves show; and in this way I use them in the experiments which I am about to describe.

PERSONAL.

The establishment of a school of mines in the bituminous coal regions of Western Pennsylvania is under consideration.

Mr. Carl Henrich, Mining Engineer and Metallurgist, of Noble, Ill., has been appointed Superintendent of the Comet Smelting Works, of Frisco, Utah.

Mr. Jean F. Webb, mining lawyer, who has had a long and practical experience as attorney, manager and superintendent of mines, has opened an office in St. Louis, Mo.

Mr. Daniel Jones, Controller of the Philadelphia & Reading Coal and Iron Company, is very dangerously ill with typhoid fever. He has been confined to his home in Philadelphia for three weeks.

The National Association of Builders, which has already twenty-four of the largest cities in the country in its organization, will hold its next convention in Philadelphia the second Tuesday of February next.

Mr. W. R. Davenport, of Erie, Pa., the head of the extensive Erie Car Wheel Works, and owner of the controlling interest in a large car building plant at Erie, died suddenly on the 13th inst. in Buffalo, N. Y.

Mr. O. H. Hahn has resigned as Superintendent of the Pueblo Smelting Company at Pueblo, Colo., and removed to San Francisco for a permanent residence. He is succeeded by Mr. Arthur Dwight, late chief chemist at the works.

Mr. Joseph Hunt has resigned his position as general manager of the Cameron Iron and Coal Company, at Emporium, Pa., owing to variability of climate, and will spend the winter in the South. The resignation takes effect on January 1st next.

Mr. Joseph J. B. Frey, manager of the Martin Iron Works, was killed on the 11th inst., while returning home from a visit to a relative in Elizabeth, N. J. Mr. Frey's body was picked up on the Newark Bay bridge of the Jersey Central Railroad, and it is supposed he was accidentally thrown off the train.

Professor Forest Shepard died in Norwich, Connecticut, on the 8th inst., of pneumonia, aged 88 years. He was Professor of Science in the Western Reserve College at Hudson, Ohio. He made a thorough study of economic mineralogy and mining, and was well known as a specialist in all parts of the country.

It is reported in Baltimore that Mr. Chas. F. Mayer will be appointed to succeed President Spencer, of the Baltimore & Ohio Railroad Company, at the meeting of the directors on December 19th. In this event a selection of a successor to Mr. Mayer as President of the Consolidation Coal Company, of Maryland, will be necessary.

The American Chemical Society has elected the following officers for the ensuing year: President, C. F. Chandler; Vice-Presidents, A. A. Breneman, T. Sterry Hunt, C. E. Monroe, A. C. Hale, U. P. Mason, and J. W. Mallet; Corresponding Secretary, M. Alsbery; Recording Secretary, D. Woodman; Treasurer, J. H. Stebbins, Jr.; Librarian, W. Rupp.

Mr. J. Z. Davis, president of the Society for the Prevention of Cruelty to Animals, in San Francisco, Cal., has donated to the State Mining Bureau Museum, in Pioneer Hall, an extensive collection of shells from the seacoasts of various countries. They are being arranged, cleaned and catalogued by A. Madsen, a Swedish conchologist. The majority of and the best shells come from the beach of Madagascar and the West Indies.

The American Forestry Congress, in session at Atlanta, Ga., last week, elected the following officers: President, Governor J. A. Beaver, of Pennsylvania; Vice-President, H. G. Joly, of Quebec; J. Y. W. French, of Boston; Charles Moore, of Mobile; Hubert Welsh, of Philadelphia, and George H. Parsons, of Denver. Secretaries, J. B. Hudson, of New Hampshire, and N. H. Eggleston, of Washington. The next meeting will probably be held in Philadelphia.

The Engineers' Society of Western Pennsylvania will hold its regular meeting at the rooms, Penn Building, Pittsburg, on December 18th, at 8 o'clock P.M. Mr. J. E. Greiner, Civil Engineer, will present a paper on the new Pittsburg B. & O. depot. The subject for discussion will be Mr. T. P. Roberts', C. E., paper on the railroad situation of Pittsburg. It is expected that an interesting discussion will occur on this important question, a number of prominent railroad engineers taking part.

Mr. David A. Stewart, of the firm of Carnegie, Phipps & Co., was found dead in his bed on the morning of the 14th inst., at his home in the east end of Pittsburg, Pa. He retired in good health the night previous, and made no complaint of feeling unwell. Mr. Stewart was Chairman of the Edgar Thomson Steel Company, had charge of the other interests of Carnegie & Co., and was also President of the Pittsburg Locomotive Works. He was in the prime of life, not being over fifty years of age, and it is supposed that he died from heart disease.

The delegates to the annual convention of the American Federation of Labor, numbering 47 in all, and representing 83 labor organizations of the United States, with a constituency estimated at 635,000 in round numbers, and said to be the most powerful labor organization in the country, assembled in St. Louis on Tuesday last. The session has been continued through the week. In the annual report of President Gompers it was recommended that

some day be set apart at this convention, not later than 1890, when the working people of the entire country shall be called upon to simultaneously demand the enforcement of eight hours as a day's work. The consideration of the eight-hour question, the advisability of strikes and boycotts, and several arrangements of the Knights of Labor have been the principal events of the session thus far.

Gen. James C. Lane died at his office, in the Alpine Building, New York, at midnight, on the 12th inst. At the time of his death he was associated with Mr. Robert L. Waters as engineer and surveyor in the survey of the new parks beyond the Harlem River. Gen. Lane served with distinction throughout the civil war, taking part in sixteen battles. He was born in New York city, Greenwich village, July 23d, 1823. After prosecuting a thorough line of scientific studies he made a specialty of architecture and civil engineering in all its branches. He entered the United States Coast Survey at Washington and led several explorations in New Granada. He was afterward engaged in mineralogical surveys in San Domingo, Porto Rico and Cuba. Since the close of the war Gen. Lane had been engaged in mineralogical surveys through California, Arizona, Nevada and Lower California, as well as in archaeological surveys in Palestine and of the River Jordan, and as chief engineer of the South Side and the New York, Woodhaven & Rockaway railroads of Long Island.

INDUSTRIAL NOTES.

It is reported that the Westinghouse Electric Company's plant in Pittsburg, Pa., will be removed to New York in the spring.

The Eiffel Tower has passed 200 meters and still climbs upward, being already 100 feet higher than the Washington obelisk.

The tack-works of Messrs. Thomas & Sons, at Norristown, Pa., were burned on the night of the 10th inst. The loss is reported to amount to \$55,000.

The extensive blast and puddling furnaces and wire mills of Mercer & Lynn, at Bellefonte, Pa., which have been idle for over four years, resumed operations on the 10th inst.

Oley Furnace, at Semple, Pa., owned by the Clymer Iron Company, which has been idle for some years, is being dismantled. It is one of the oldest furnaces in the country, having been erected in 1772.

The new works of the Keystone Iron Works Company, of Kansas City, Mo., builders of boilers, engines, and general machinery, are ready for occupancy, the completion of railroad facilities being the only thing which is now awaited before removing to the new establishment.

The new tube mill of the Reading Iron Works, in Reading, Pa., was shut-down on the 8th inst. for an indefinite period. The shut-down is said to be caused by dullness in trade and a desire of the management to curtail expenses. The firm's other tube mill is running full handed.

The new furnace of the Gadsden, Alabama, Furnace, Company, Gadsden, Ala., making the Etowah brand of coke iron, has got up to 120 tons per day. The iron is very tough and dark, resembling charcoal iron. It is rumored that L. S. Colyar, president of the company, will retire in December.

The Birmingham Mining and Manufacturing Company has completed and blown in its 100 ton iron furnace. The company will hold a meeting on the 27th inst., at its office at Birmingham, Ala., to consider issuing \$300,000 of bonds. The building of an additional furnace is contemplated.

Tasmania proposes to take up systematic irrigation, and some of the lakes are to be utilized for this purpose. About 30,000 acres are available for irrigation from lakes Crescent and Sorell in the Tambridge district, and it is estimated that the land hitherto unproductive may be rendered very valuable by this means.

A new process in the manufacture of steel, which, if successful, will practically revolutionize the manufacture, it is said, is now being perfected by Hon. John W. Bookwalter, of Ohio. In eight to nine minutes, it is claimed, pig-iron can be converted into steel at a cost less than by any other known process. This new process, it is further claimed, is particularly well adapted to the manufacture of castings.

The Diamond Prospecting Co., of Chicago, Ill., general agents for the Sullivan diamond prospecting core drill, reports contracts recently completed at Monticello, Ill.; Lexington, Ill.; Ponca, Neb.; Arlington, Ill., and Ladd, Ill. This company now has diamond drills at work on prospecting contracts at Saratoga, N. Y.; Dayton, Tenn.; Lewisport, Ky.; Big Clifty, Ky.; St. Mary's, Kan., and Rulo, Neb.

Under a decree rendered in October last, in the chancery case of the Fidelity Trust and Insurance Company, of Philadelphia, against the Shenandoah Iron Company, of Page County, Virginia, the company's works were offered for sale on the 8th inst. Only \$85,000 being offered, the property was bid in. Exceptions to the Commissioner's report in this case were to be heard in Baltimore this week.

The Metric Metal Company, at Beaver, Falls, Pa., whose primary business is to manufacture meters that will measure the supply of natural gas to consumers for domestic and other purposes, has begun operations,

and has turned out the first manufactured goods. The company expects to begin the new year by turning out fifty meters per day, and will also manufacture, in addition, some special improved natural gas appliances.

The Barr Pumping Engine Co., of Germantown Junction, Philadelphia, Pa., reports that business in trade pumps as well as special work is rapidly increasing. The company has lately enlarged its plant and working force to meet the growing demand for its pumps. For the convenience of Western customers the company has established a branch office at 35 Fifth avenue, Chicago, with Messrs. Raze & Davis as managers.

The Carnegie Brothers & Co., Limited, proprietors of the Edgar Thomson Steel Works, at Braddock, Pa., are making arrangements for the erection of a foundry and machine shop at Braddock. The intention of the firm in putting up this structure is to make all its own castings for the blast-furnaces, etc., which work it has always been obliged to get done by outside firms. A 15-foot boring mill has been ordered for the machine shop.

A controlling interest in the Katahdin Charcoal Iron Company, in Piscataquis County, Me., has been purchased by Fred. W. Hill and Charles D. Stanford, of Bangor. The works are running steadily, with Ernst Sjostedt in charge as superintendent, and turning out daily about fifteen tons of fine charcoal iron. Numerous crews are in the woods and altogether about 15,000 cords of wood will be cut and hauled this winter to supply the works.

The East Pittsburg Improvement Company has been organized by Geo. Westinghouse, Jr., John Caldwell, John R. McGinley, H. H. Westinghouse, Charles Paine, Robert Pitcairn, Caleb H. Jackson, John Daltzell, William Scott, T. A. Gillespie and Walter D. Uptegraff. Capital stock, \$500,000. The object of this corporation is to effect a saving of natural gas by selling property in the heart of the gas territory to manufacturers. It holds for this purpose about 600 acres lying between Turtle Creek and Wilmerding. This property is all to be sold out as a new town.

Three quarters of the large iron ship building plant of the Globe Iron-Works, in Cleveland, O., was destroyed by fire on the 8th inst. The burned portion of the ship yard contained \$100,000 worth of valuable machinery. Besides the shop buildings and stock consumed by the flames the office was gutted. Valuable models and drawings, the accumulation of years, were ruined. Four large steel vessels in process of construction were upon the stocks within a few feet of the burning buildings, but the ships were saved from damage. The rebuilding of the plant will begin as soon as the insurance is adjusted.

The Central Iron and Steel Company, of Brazil, Ind., has added a department to its works for the manufacture of turn-buckles used by bridge builders and others. The new department consists of a train of rolls, with the necessary heating furnaces, four presses, a special machine with six spindles to tap the buckles right and left, a large bolt cutter, lathes, etc., and is under the special management of Mr. Williams, formerly with the Cleveland Forge Company. A feature in the work introduced by him is the manufacture of the buckles in two pieces instead of four, which has hitherto been customary.

The Ball Electric Light Company, of New York, is doing a large business. Among the sales made recently were those to the Wilmington City Electric Company, Wilmington, Del., an increase of 75 arc lights; American Electric Light Company, of Kansas City, Mo., an increase of 75 arc lights. Each of these companies before purchased of them a K. 75 light, 2000 C. P. arc dynamo complete, and now increase as above with a second dynamo of the same size. This dynamo appears to be attracting special attention for street and commercial lighting, and it occupies less floor space than most dynamos carrying but 85 lights. Like all other dynamos of its system it requires no foundation whatever, but is simply fastened lightly with wooden blocks to the floor.

A correspondent writes us that the new steel plant of the Phoenix Iron Company, Phoenixville, Pa., has been erected on the site of part of the old iron works, and consists of two 15-ton open-hearth furnaces of the latest improved type, arranged for additional furnaces when required; one 30-ton ladle crane, two 10-ton ingot cranes and a massive ingot extractor. The ingot pit is faced with fire-brick, lined with heavy cast plates, and the charging floor is very strongly built. There are two, and arrangements for four ingot furnaces, capable of heating six ingots at a time, served by hydraulic cranes. There are 16 gas producers, steam jet blast, built four in a block, with provision for increasing the number as occasion may require. A broad gauge track connects with the Pennsylvania, Schuylkill Valley and the Philadelphia & Reading railroads, bringing the fuel alongside the producers. The gas is distributed to the ingot and melting furnaces in a pipe 7 feet 6 inches diameter lined with fire-brick. The blooming mill is driven by a pair of 83 by 48 inch reversing engines, geared two to one. These engines weigh 400,000 pounds, and it is said are the strongest built for such work. The reversing blooming mill is of equally massive proportions and weighs 350,000 pounds. The tables are built for the largest ingots, driven by a pair of reversing engines located below the floor line. The ingots are manipulated by "Heron's patent" machine, that does the work without manual labor. Next to the forward rolling table is the shear table, operated by a pair of reversing engines, and 81 feet from the rolls stand the enormous shears having unlimited capacity for cutting

blooms, driven by a single engine. The product is handled by a rapid hydraulic crane. A steam crane capable of lifting 20 tons commands the engines and roll train. The boiler-house contains two 800 H. P. "Hazelton boilers," 29 feet high and 13 feet 6 inches diameter over all, with room for others when required. The pump-house adjoins the boiler-house, and contains two massive Worthington pressure pumps, boiler pump, together with several machine tools to facilitate repairs, and the store-room adjoins and contains such supplies as are necessary to the working of the plant. The plant was designed and erected by Mr. Frederick Heron, assisted by his brother, Joseph Heron, and reflects great credit on them as well as the contractors and builders, for, without doubt, it is the best piece of work ever put together in Phoenixville.

CONTRACTING NOTES.

Our list of machinery and supplies wanted will be found on page xii. Manufacturers of machinery, engineers and contractors should also consult our directory of "Contracts Open" on page xii. This week, proposals are invited for the following new contracts: No. 1211, Construction of Water-Works; No. 1212, Furnishing and Delivering Cement; No. 1213, Electric Lighting; No. 1214, Furnishing and Delivering Bituminous Coal; No. 1215, Dredging; No. 1216, Dredging; No. 1217, Dredging; No. 1218, Dredging; No. 1219, Constructing Jetties for River Improvement; No. 1220, Furnishing Illuminating Gas for the City of New York; No. 1221, River Improvement; No. 1222, Electric Lighting.

Proposals have been invited for supplying the Ordnance Department of the Navy with one 8-inch and eight 15-inch pneumatic dynamite guns, carriages and the necessary machinery to fire and handle the same; also ten unloaded shells with fuses for each gun.

The East End Electric Light Company, a Westinghouse concern, has contracted to illuminate the entire city of Pittsburg, Pa. To do this it will require 2000 400 candle-power arcs, and 2800 25 candle-power incandescent lights, at a cost of \$120,000 per annum.

Judge Hallett, of the United States Courts at Denver, Colorado, on the 5th inst. rendered a decision of importance to all contractors and corporations. It was the case of the Niagara Bridge Company versus the Colorado Midland Railway. This bridge company agreed to furnish the bridge over Maroon Creek, near Aspen, by the time the railway was in readiness to use it. The bridge company failed to get the bridge up in time, and the railway company claim to have been put to a loss of \$20,000. Therefore the railway company did not pay the stipulated price for the bridge, and the bridge company brought suit to recover. Judge Hallett held, as in the case of Carnegie versus Titch, that the railway company was entitled to damages, but not in the resultant damages asked for.

The following proposals for water tube boilers for new steam heating plant at the Capitol have been received by Edward Clark of the Capitol, Washington, D. C.: Charles Ward, Charleston, W. Va., 50 H. P., \$1000; 400 H. P., \$7200. Babcock & Wilcox Boiler Co., New York, 51 H. P., \$1244; 368 H. P., \$6928; 416 H. P., \$7754. National Water Tube Boiler Co., New Brunswick, N. J., 50 H. P., \$1134; 400 H. P., \$6174; 400 H. P., in 2 batteries, \$6570; 350 H. P., \$5393; 350 H. P. in 2 batteries, \$6120. John L. Gill, Jr., Philadelphia, Pa., 50 H. P., \$1100; 320 H. P., \$5250; 368 H. P., \$6200. Abendroth & Root Mfg. Co., New York, 51 H. P., \$995; 350 H. P., \$5349; 420 H. P., \$6070. Hegeman & Caldwell, New York, 450 H. P., \$7665. E. J. Codd Co., Baltimore, Md., all boilers, \$5750; with brickwork, \$6600.

The South American Construction Company, of which Gen. George S. Field is president, has secured a contract with the Chilean Government for the construction of 650 miles of railway and equipment, involving a money valuation of \$17,500,000, and the Pacific Mail steamship "Newport" this week carried several contractors bound for the field of operations. The main line to be built is a prolongation of the great Southern trunk line from Santiago to a point called Victoria and a little further south to Valdivia and Orsono. The branch lines run either from the coast up the fertile valleys or from the trunk lines up toward the Andes in the same fertile valleys. There will be about 50 bridges, ranging from 150 feet to 3500 feet in length. There is one tunnel of over 3000 feet and several smaller ones aggregating a thousand feet more. Much of the construction, however, is high level through fertile valleys, and will not be what railroad men call heavy work. The company had to give a guarantee bond to the amount of \$1,000,000. The contract is for the building of bridges, stations, machine shops, and everything complete for operation. The work is to be finished in from two to five years, the long-term work being the longitudinal main line, the three year work the longer branches, and the two year work the shorter roads connecting with the trunk line. The contract calls for the commencement of the shorter lines in one month from the signing of the same, of the three years line in two months, and the five years line in three months. Work on the shorter lines was begun last month. Among the American contractors are James Ross, D. D. Mann, Messrs. McKenzie, Holt and Wagner, Farquair & Ross, of Montreal; McArthur & Brothers, of St. Paul; J. H. Hanson, and Homans & Hinkley, of Little Rock. The labor will come principally from the native population, but the government has authorized the importation of skilled artisans and common laborers to the extent of 1000 of the former and 6000 of

the latter, and allowed \$60 and \$50 respectively to pay their passage to Chili. The rolling stock and bridges, worth between \$3,000,000 and \$4,000,000, will be built in North America.

GENERAL MINING NEWS.

Lake shipments of iron ore have now been entirely suspended, the season ending on the 3d inst., the same date as last year. Since our last report was published several additional cargoes of ore have been shipped from Escanaba. The season has now finally closed at that port, and the record of shipments from the mines of the following districts stands as follows, according to the Marquette Mining Journal's figures:

	Tons.	Tons.
	1888.	1887.
Marquette, Marquette District.....	844,694	803,411
St. Ignace, ".....	107,399	91,544
Escanaba, ".....	876,313	869,296
" Menominee District.....	1,119,728	1,151,711
" Gogebic District.....	206,924	51,701
Ashland, ".....	1,016,414	1,040,727
Two Harbors, Vermillion District.....	450,475	390,467
Total tons.....	4,621,947	4,398,857

The appended statement shows the shipments of iron ore in gross tons of 14 of the larger mines of the Marquette, Menominee and Gogebic ranges:

Name of mine.	Tons.
Marquette range, Lake Superior.....	228,593
" " P & L A.....	225,414
" " Republic.....	201,332
" " Cleveland.....	181,706
" " Champion.....	167,143
Menominee " Chapin.....	267,729
" " Florence.....	139,421
" " Vulcan.....	129,541
" " Dunn.....	112,358
" " Iron River.....	107,143
Gogebic " Norrie.....	379,204
" " Colby.....	202,435
" " Aurora.....	176,777
" " Ashland.....	141,218
Total.....	2,658,066

This is over half the entire quantity shipped by water this season from all the mines in the Lake Superior region. The mines of the Vermillion range are omitted from this enumeration of the larger mines and their work, for the reason that we get only a "lump" report of the shipments from Two Harbors, Minn., and can not, therefore, give the shipments of any of the mines on that range separately.

In our last issue we gave the lake shipments of the different Gogebic mines.

The Joint Convention of Miners, in Columbus, Ohio, which resulted in the organization of the National Progressive Union of Miners and Mine Laborers, to which we referred last week, held its final session on the 7th inst. A constitution and by-laws were adopted, and the following officers were chosen: President, John McBride, Ohio; Vice-President, Thomas W. Davis, Pennsylvania; General Secretary, W. S. Lewis, Ohio; Financial Secretary-Treasurer, Patrick McBride, Pennsylvania. Three members of the Executive Board, with the President and Secretary, who are members ex-officio, form a board of five instead of seven, as at first arranged. Those elected are: James Cantwell, of Pennsylvania; John Young, of Illinois, and J. J. Fitzpatrick, of Pennsylvania. Columbus was chosen as the seat of headquarters for next year.

ALABAMA.

FORT PAYNE COAL AND IRON COMPANY.—This company, to the organization of which we referred in our issue of November 24th, has issued a circular offering stock for subscription. Forty thousand shares of the stock of the company are offered for sale at \$25 per share, or \$1,000,000 in all; 10,000 shares of the stock will be left in the treasury, to be sold as the directors may determine. The money from the sale of the 40,000 shares pays for the entire property purchased, and leaves \$250,000 cash in the treasury for working capital, in addition to the treasury stock. The property purchased comprises about 32,000 acres of land. In selling the 40,000 shares of the stock the subscriptions are to be made with the understanding and agreement that the stock shall be pooled for the first year in the hands of the trustees, and only the treasury stock of 10,000 shares be offered for sale within that time. The stock will be listed on the stock exchanges of Boston and New York. Messrs. Cordley & Co., of Boston, Mass., have been selected as trustees. It is stated that stock has already been subscribed for \$25 per share.

ALEXANDER CITY, Dec. 1.

[From our Special Correspondent.]

Birmingham is 80 miles west of this place and has a large amount of capital invested in mining, mostly coal and iron, but a considerable amount in gold mining as well.

CLAY COUNTY.

"THE IDAHO" GOLD MINE.—This was worked a long time ago, and, tradition says, profitably. The ore is a micaceous schist, and the principal vein is 50 feet wide and about one and a half miles long. The ore has an average milling value of about \$2 a ton. There is another vein 10 feet wide, about 200 feet north of the big vein, and with a milling value of about \$10 a ton. There is also rich placer mining on this property, and all the mining to supply ore for any sized mill could be done for many years by hydraulics. Water for the purpose is within half a mile, and could be brought cheaply.

The large vein, which is fully developed by shafts, tunnels, open and cross-cuts, has a hanging-wall of talcose slate with a foot-wall of gneiss. The micaceous

schist forming the vein is finely laminated and highly mixed with crystallized quartz.

The whole expense of dry mining and milling this ore does not exceed 30 cents a ton, and with hydraulics would be done for one-third less, besides yielding handsome profits in the sluice boxes. It is located on the "divide," the very highest point in the country, and I think for profitable mining would be hard to equal. A small 10-stamp mill is used to reduce the ore, each stamp weighing only 350 pounds, and the impression made in the mine in one year is too small to estimate.

It is owned by drygoods merchants who took it for debt, and who take no interest in it further than to allow it to be worked in an indifferent manner.

A few thousand dollars judiciously expended would certainly prove of great advantage to the owners.

THE HARROLDSON MINE.—This is about two miles from the Idaho, and has a 10-stamp mill in full operation, and is reported as doing well. I did not visit the mine while I was at the Idaho, where I spent several days. I did not learn particulars, but was told that Mr. Harroldson was satisfied with results.

THE MAY VIRGINIA.—Here I spent three days. They were operating a Wiswell mill and Grass Valley bumper. The ore was somewhat refractory from the presence of pyrites of iron. The assays run from \$6 up to high figures, but as their milling was a free process results were very unsatisfactory. The mill worked very nicely, but the ore requires roasting. Mr. J. M. Sullivan is also president of the May Virginia.

There are a number of other mines being prospected, and rich pinnings are reported and different parties are talking about erecting mills soon.

The gold territory in Alabama is large, and its development will take time.

All the mines now in operation were worked prior to 1849 and abandoned for the supposed richer fields of California.

CLEBURNE COUNTY.

ANNA HOWE GOLD MINING COMPANY.—There is now something of a "boom" in gold mining, owing principally to a very flattering report made in New Orleans on this property, which is situated in the Arbacooche District. Ten assays made at the mint gave an average of \$54 a ton.

The veins are small, the largest, so far as developed, being but 2 feet; but there is a rich deposit about 5 feet thick and covering an area of 300 by 4000 feet assaying an average of about \$23 a ton.

Seventy per cent of the ore is free milling and very friable.

The sulphurets are richer, averaging about \$90 a ton.

The mine has been stocked and subscribed in New Orleans and Birmingham. They have all the money in the treasury they require, and will proceed at once to erect a mill for reduction.

The plant will not be very large, having only 50 tons a day capacity, but will be very complete for free milling and concentrating. For the latter Frue vanners will be used.

R. S. Miner and Geo. D. Stonestreet, M.E., of Birmingham, are president and consulting engineer, respectively.

THE MOSSBACK.—This is another new mine with very flattering prospects. I should rather say that this is an old mine reopened. There are several veins, principal among them being one of 8 feet. I do not know of any assays, but I panned a quantity of the ore sent to me and should say it would mill \$15 a ton. The ore is friable and easily milled and free milling.

The mine is wet, but an 8-foot vein is cheaply mined, no matter how wet the ground. With the pumps as now improved there is no difficulty in draining any of our mines to any depth we are likely to sink them. The Mossback is a close corporation. They have a mill about ready to start, and a large amount of ore on the dump. At this mine the safe and wise plan was pursued of thoroughly developing the mine before thinking about a mill. Good mill management will make this mine pay to the satisfaction of all interested in it. Mr. J. M. Sullivan, of Birmingham, is the president.

TALLAPOOSA COUNTY.

THE TEN ACRE GOLD MINE.—This is situated 13 miles from the nearest station on the Savannah & Western Railroad. Like the other mines now being reopened, it was worked 50 years ago. The property consists of 10 acres of land, square in shape and somewhat elevated, so that it has a natural drainage for a large amount of ore. There are several large quartz veins running through it northeast and southwest, two of which are now open. These are about 10 feet in width on an average, and assay all the way from \$5.50 to \$26 per ton.

The ore is both hard and soft, solid and honey-combed, but seems quite uniform in value in the mill after a few feet from the surface is reached, being much better below than at the surface.

The people working it have a small, 425-pound 10-stamp mill, of old pattern, and only 4 1/2 feet in length of copper plate. The mill was put up to test the mine, and the test having been satisfactory, they will, next summer, erect a 50-stamp mill of the most approved pattern and as perfect in appointments as a mill can be made for working this class of ore. Water for hydraulic purposes is very convenient, and it is expected to cost something less than one dollar a ton to mine and mill the ore.

It seems to have been difficult to save the gold heretofore, but these people have made the amalgamation of gold ores a study for a long time, and their success here has been the cause of giving gold mining in the state a new start, which promises to become almost a "boom."

The gold here carries some silver, and is worth about

\$17 or \$18 an ounce. Coal is but a short distance from the mine. Wood is worth 80 cents a cord. Square edged lumber \$10 a thousand laid down at the mine, either oak or heart pine (yellow). Labor \$1 a day. Other very extensive mines have been prospected in the county and show well, but are lying idle.

ALASKA.

A. P. Swineford, Governor of Alaska, in a letter to the Secretary of the Interior, represents that through what he believes to have been, to say the least, an absurd decision of the late judge of the United States Court for Alaska, private parties have secured possession of the government wharf at Sitka and now monopolize the coal trade. He says the vessels of the Pacific Coast Steamship Company refuse to land coal for anybody but the parties in possession of the wharf, and they in consequence are able to extort exorbitant prices. The governor asks that the senior naval officer stationed there be authorized to supply the civil authorities with coal at cost. The letter has been referred to the navy department.

Mr. George W. Sessions has left for San Francisco to make arrangements for placing the Squaw Harbor property upon the German market. Some of our San Francisco readers will remember with what a flourish this property was introduced to their notice some three years ago. In Mr. Sessions's office in Nevada Block there was on exhibition a magnificent display of specimens showing free gold. The ledge was stated to be some 1500 feet in width, and the quantity of ore in sight on the surface almost inexhaustible. A company was formed and considerable stock sold. Mr. Mackay and other prominent mining men of the Pacific Coast were invited to invest in the enterprise. Mr. Mackay sent Pat. Kerwin to Alaska to look at the property in his interest. Kerwin's report was laconic and emphatic. Nothing there—assay values of samples about 37c. per ton. A subsequent proposition by Mr. Sessions to Mr. Mackay met with a very cold response, and Mr. Sessions no longer visits Mr. Mackay to discuss financial operations.

San Francisco is not likely to regret the removal of Mr. Sessions operations on his Squaw Harbor property to Germany. Whether Germany will open her arms and take in Squaw Harbor remains to be seen.

ARIZONA.

The Arizona Mineral Belt Railroad, 40 miles in length, was sold at Prescott last week at sheriff's sale to satisfy liens amounting to \$40,000.

ARKANSAS.

SEBASTIAN COUNTY.

Natural gas is reported to have been struck near Mazzard Prairie, near Fort Smith. The steam gauge attached to the pipe registered 200 pounds at first and the gas has continued to flow. The pipe runs down only 225 feet.

CALIFORNIA.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—An official circular issued to the stockholders says: "Our advices from Plymouth indicate that damages by the recent fire are less than anticipated. The main shaft is in good order, and is being used to its full capacity in hoisting water."

"When the mine was opened the water had risen to within 1170 feet of the surface. It has been reduced to 1400. Total depth, 1600 feet."

"The engines are now run day and night removing water, and we expect to have the mine clear of it by the end of next week."

NEVADA COUNTY.

GREENHORN.—San Francisco parties have leased this quartz mine for a term of years and contemplate at once proceeding with the work of erecting necessary machinery. Water-power will be utilized, arrangements to that end having been effected with the South Yuba Company. The lode to be worked is a very heavy one, carrying a large amount of sulphurets, which contain gold and silver. This is the old Central mine, worked for a brief season two or three years ago for silver.

SANTA CLARA COUNTY.

QUICKSILVER MINING COMPANY.—At the regular monthly meeting of the board of directors, on the 12th inst., the following statement of the company's assets December 1st was presented: Deposited in Mechanics' Bank, \$5217.27; in Bank of California, \$51,750; quicksilver on hand, valued at \$172,640. Total assets, \$229,607.27, against which there are unpaid pay-rolls amounting to \$8000. The production for the month of November was 1400 flasks; sales for the month aggregated 239 flasks.

COLORADO.

CLEAR CREEK COUNTY.

A company has been organized in Kansas recently on the following lodes situate near Georgetown: Morning Star, Allen, Rising Sun, New Hope and Kate Vorse. The price paid for this group of lodes is reported to have been \$1,000,000.

LAKE COUNTY.

Complications involving the future success of the Leadville Mines Company, Limited, of London, have come to light recently. We referred fully to the formation of this company in our issue of October 20th, and expressed our opinion as to the transaction. The company worked the mine for a short time, but the low grade of the ore prevented it from making any profit; on the contrary, the mine was run into debt. When this fact became known in London, the directors of the new company protested against putting more money into the enterprise and requested a suspension of their obligations pending a thorough investigation of the affair. The directors are now

trying to come to some compromise with the vendors, but we fancy there is not much prospect of success in that quarter.

HELENA MINING COMPANY.—This company is preparing to sink the shaft deeper, which work will probably be commenced in February. Arrangements are proposed also for mining and dressing the low-grade ore of the mine. There are bodies of this opened from which an output of 25 tons per day could be made, which will assay from 20 to 25 per cent lead and 10 ounces silver. At the present time that ore is being broken and shipped to the smelter, mixed with the ore of higher grade.

LEADVILLE CONSOLIDATED MINING COMPANY.—We are informed by Secretary Cameron that the property of the company will probably be leased to Messrs. Estey and Mudd, of Leadville. A proposition for this purpose has been sent to these gentlemen, and their reply is daily expected. The Leadville papers say that there is a considerable body of ore in the mine that will handsomely repay the lessees.

LAS ANIMAS COUNTY.

[From our Special Correspondent.]

I am informed (and the informant is thoroughly reliable) that Trinidad, which has for a long time, in the matter of freight rates from the south, southwest and east, been a common point with Denver and Pueblo, an arrangement considerably to the advantage of those two cities, is soon to have the same privileges on all kinds of freights, including those from the north and northwest. Assurance of this has been given to a prominent business man of Trinidad, just returned from a trip to Denver, where he urged the justice of Trinidad's claim to equality in this respect so strenuously that the general freight agents of the various railroads concurred in an explicit promise. This will inure greatly to Trinidad's benefit, probably ultimately place it in the van of the trio as a smelting point by reason of the much cheaper fuel, opening it up as a market for such of the ores of Utah, Montana, Idaho and Wyoming as now are shipped to Pueblo or Denver. With coal at the prices offered manufacturers locating here (50c. per ton for slack, 90c. for mine run and \$1 for screened) and coke at proportional rates, it is difficult to see how either of the other cities can now compete with Trinidad as a location for a commercial smelting works. The St. Helens Smelting Company's works being built will be largely also a refining plant for the mattes which the smelting companies elsewhere cannot handle profitably, a valuable and a suggestive feature.

PARK COUNTY.

LONDON MINING COMPANY.—The property was recently sold under a trust deed. It was bought in by the present owners.

PITKIN COUNTY.

The Durant-Bonnybel case is set for trial in the United States District Court, Denver, for January 15th. Preliminary examinations and surveys are now being made.

ASPEN MINE.—Judge A. W. Rucker has brought suit against Harvey Young, J. B. Wheeler, W. B. Devereux and the Compromise Mining Company to recover a one sixth interest in the Aspen mine and for an accounting for ores extracted. The complaint sets forth that on the 20th of October, 1884, Harvey Young was the owner of a part of the Aspen mine and that on that day said Young entered into a contract with plaintiff in which he bound himself to convey one sixth of the mine to plaintiff upon the payment to him by plaintiff within 10 days the sum of \$105. It was further provided that if plaintiff failed to pay the \$105 within 10 days he was to have a conveyance if he should pay \$15,000 within 20 days. After the expiration of the 10 days plaintiff alleges that he made a tender of the \$15,000 within the time specified, but that Young refused to make him a deed. Subsequently Young sold all his interest to J. B. Wheeler, and the latter transferred a one twelfth interest to W. B. Devereux. The plaintiff avers that all the present owners of parts of the interest originally held by Young had knowledge of the contract between Young and the plaintiff. He asks for an order compelling them to transfer the one sixth to him and for an accounting for his share of the same. When seen by an ENGINEERING AND MINING JOURNAL reporter, Mr. J. B. Wheeler said in reference to this suit: "The statement of the complainant is virtually incorrect. We are certain that our title to the property is perfectly valid, and we are firmly resolved to defend it."

ASPEN MINING AND SMELTING COMPANY.—The lease of the Aspen smelter by this company, Fred. G. Bulkeley, manager, made August 11th, 1888, to H. K. Devereux, was filed on record in the county clerk's office at Aspen on the 4th inst. The consideration is \$3500 per annum, which carries the entire smelter plant, including the grounds, water-power, machinery, appliances, tools and all the appurtenances of the business. The lessor is allowed \$1000 for repairs, but agrees to keep the furnace in blast, after it first blows, during the entire two years for which the lease runs, except such times as he can't get a sufficient quantity of suitable ore to melt. The fact that this lease, says the *Aspen Chronicle*, has been filed and that Mr. Devereux said about the time he obtained the lease that he would blow in three or four months, makes it probable that active operations will soon be begun at the smelter.

We are officially advised that the net profits of this company for the eleven months of 1888 to December 1st were \$607,334, and after paying all the indebtedness that had accumulated in the last two years and a half, as well as a dividend of \$40,000, there is left

in the treasury \$96,000. The yield of the mine and dumps for the eleven months amounts to 1,155,588 ounces pure silver, and 597,580 pounds of lead. During the same period an aggregate of 29,427 tons of ore were mined and shipped from the dump. The total amount of development work was 19,072 feet.

SAN MIGUEL COUNTY.

UNION.—The mine in Marshall Basin has been shut down for the winter. It will pass into the hands of a Scotch syndicate, who will take charge of the property next February. Under the new management extensive work will be begun.

SUMMIT COUNTY.

MIDAS MINING AND MILLING COMPANY.—The reports recently published that this company, which is operating at Chihuahua, has been dissolved, are denied by the Leadville *Herald-Democrat*, which states that although it is at present a little behind hand in paying its accounts, it is only on account of temporary trouble. Mr. J. H. Haverly, the president, has just closed some business in San Francisco, from which he has realized sufficient money to pay all outstanding accounts of the company in full, and to enable him to continue work on the Midas property all winter. The company is at present making regular shipments to the Central Public Sampling Works of Pueblo, and they show steady improvement both in quality and quantity.

DAKOTA.

BLACK HILLS.

It is stated that the contemplated purchase of claims by Mr. David Cook, representing an English syndicate, to which we referred in our last issue, has been carried out, and that the sum of \$165,000 has already been paid. The principal vendors are said to be Rev. H. A. Nan Cleft and Judge Prindle, of New York State.

LAWRENCE COUNTY.

BUXTON MINING COMPANY.—It is rumored that when Mr. Clark has completed his contract with the Deadwood Reduction Company he will erect another large plant on Whitetail Creek for this company.

PENNINGTON COUNTY.

HARNEY PEAK MINING COMPANY.—Work on the properties of this company, commenced at the direction of Professor Vincent, is being vigorously prosecuted, according to the *Rapid City Journal*. On the Cowboy two shifts are at work sinking the old shaft deeper. This was down about 60 feet. On the Coates a force of men, in three shifts, has about finished getting the water out of the shaft. This is about 140 feet deep. It is not known whether it will be put down any further this winter. On the Excelsior the work of preparation for the tunnel is still under way.

IDAHO.

ALTURAS COUNTY.

KING OF THE WEST.—This mine has closed down, and the Ketchum *Keystone* is authority for the statement that creditors and miners unable to get their pay have covered the property with attachments.

BOISE COUNTY.

IDAHO GOLD AND SILVER MINING COMPANY, LIMITED.—This company has recently been attached by its creditors for \$30,000 indebtedness. The mill and mining property is at Grabam, Silver Mountain, and the attachment will doubtless suspend operations in that camp for the winter. The headquarters of the company are in London. It is said there are enough goods on hand and on the road to satisfy all creditors. The mill is of twenty stamps, with a capacity for twenty more, fitted with both water and steam power, and all the latest improvements.

CUSTER COUNTY.

DICKENS CUSTER MINING COMPANY.—Close following the disclosure of the mismanagement of the Sonora mine, of Mexico, and the resignation of the officials come rumors of trouble in the Dickens-Custer Company. A few weeks ago we alluded to the carelessness of the directors in supplying information to the shareholders. The dissatisfaction with the Board has been growing, and before long the storm of indignation will burst. That there is something radically wrong with the management of the property there can be no doubt, and it is openly stated in some quarters that the shareholders' interests are being imperilled and that an inside clique who are figuring on making the shareholders pay a good round sum for property they were under the impression already belonged to them. Some six months ago the directors informed the shareholders of the existence of £18,000 worth of unretired debentures of the old Dickens Company, and stated they could be acquired for some £8000. This was represented as the only thing standing in the way of the company's success, and the directors stated they were in a position to pay the £8000. What then is this new difficulty about the Mountain Boy claim, which was supposed to belong to the property? It is stated that it was only held on a lease for one year, and with such conditions as the company are unable to fulfill. With such names as Wolsey as president and Gladstone as secretary, even though they are not the most distinguished bearers of these names, the shareholders had a right to believe that their affairs would be capably and honestly managed. Is the want of candor due to crookedness, or is it simply the incapacity of a "guinea pig" administration?

INDIANA.

CLAY COUNTY.

The strike of the Vandalia switchmen at Brazil has been declared off and the strikers have returned to work. They demanded \$2.10 a day, the sum paid Indianapolis and Terre Haute switchmen, but a compromise on \$1.90 was made, an advance of 20 cents. The Vandalia owns fifty miles or more of side track and branches reaching the coal fields, and handles

three or four hundred cars of coal daily for the Chicago & Indiana, Chicago & Eastern Illinois, and Evansville & Terre Haute roads.

MICHIGAN.

CLINTON MINING COMPANY.—At a special meeting of this company, whose charter has expired, a resolution was passed to wind up the affairs of the company, and sell its real and personal property. Negotiations are going on with outside parties for the sale of the property, and it is expected they will do some exploring on it this fall. Thos. H. Emmons was elected president, and Alfred Meads re-elected secretary and treasurer.

COPPER MINES.

At the beginning of the year but eight mines were regular producers—Calumet & Hecla, Tamarack, Quincy, Atlantic, Franklin, Osceola, Huron and Central. During 1888 the Copper Falls, Kearsarge, Allouez and National have been added to the list, making a round dozen now actively at work.

CENTENNIAL MINING COMPANY.—This company has been reorganized with a capital of \$2,000,000, in 80,000 shares. It is stated that the amount of stock actually paid in is \$400,000, and the cash value of property, real and personal, conveyed to this corporation contemporaneous with this organization is \$1,600,000. The directors are Daniel L. Demmon, H. J. Stevens, Samuel L. Smith, Frank E. Robinson, and William J. Rainey. The term of existence of the corporation is thirty years. The Michigan *Copper Journal* says the original Schoolcraft Company, which the Centennial succeeds, was organized in 1883. Its property joins the Calumet & Hecla on the north being the southeast quarter of section 12, town 56, range 33 west. A shaft was sunk to the Calumet & Hecla conglomerate. The company failed to make it a paying mine, and shut down for want of funds and encouragement. The mine was next leased to Capt. William Harris, who expended considerable money in working the burrows, but with no success. The property in 1876 was sold at a bankrupt sale, and its purchasers two years later organized into the Centennial Mining Company, with a capital stock of \$1,000,000, in 40,000 shares. After working the mine for a considerable period it was abandoned as unprofitable, and has lain idle until the present time. Work will be resumed at once. It is said the company expect to sink the present shafts 3000 feet before reaching rich ground.

COPPER FALLS MINING COMPANY.—The mineral output of this mine for November was 71 tons; from January 1st to November 30th, 708 tons.

KEARSARGE MINING COMPANY.—The Kearsarge mine is said to be earning \$18,000 to \$20,000 per month, and the company is expected to have \$75,000 cash in hand by January 1st.

NATIONAL MINING COMPANY.—The stamp-mill has started up the single head of stamps, beginning to pound National rock on the 6th inst., and all is working well.

MINNESOTA.

The total shipments of ore from the Vermillion range up to date are as follows:

	Tons.	Tons.
1884.....	62,124	1887.....390,476
1885.....	225,484	1888.....520,000
1886.....	304,399	
Making a total of 1,502,471 gross tons since the range first opened.		

Tests made by the Minnesota Iron Company of the iron deposits near Tower, with a diamond drill, proved the deposit in three places. At a depth of 450 feet it cut 47 feet 10 inches of clean ore, the drill cutting at a light angle.

MISSOURI.

CALLAWAY MINING AND MANUFACTURING COMPANY.—The bondholders of this company of Missouri are notified to present their bonds without delay to Samuel C. Perkins, attorney for surviving trustee, No. 627 Walnut street, Philadelphia, and receive the pro rata dividend from the proceeds of sale of the property of the company under the mortgage. The surviving trustee is Robert B. Davidson.

MACON COUNTY.

Advices from Bevier, Mo., dated the 10th inst., state Governor Morehouse called out two companies of militia, in order to restore peace between the striking miners and the new men who had supplanted them. A fire on the 9th inst. destroyed the greater portion of the business district of Bevier. There is no doubt that the fire was caused by an incendiary, but there is no evidence upon which any one can be convicted of the crime. It is understood that the militia, under the direction of Governor Morehouse, will disarm both factions and at least temporarily restore order.

MONTANA.

LEWIS & CLARKE COUNTY.

HOMESTAKE MINING COMPANY (LIMITED).—This company has been organized for the purpose of working the Homestake mine, situated at Stemple, Stemple mining district, near the Jay Gould mine. Besides this mine the company own valuable water rights and 160 acres of patented placer ground in the immediate vicinity. The mine, formerly owned by Heishfield, Jacobs & Negus, has been purchased by F. M. Chadbourne, E. J. Carter, T. H. Carter and others. Vigorous work for developing and placing machinery for large production will at once be begun. Owing to the death of Messrs. Jacobs and Negus, who owned two thirds of the mine, all work has been suspended for the past two years. The mine is capitalized at 250,000 shares \$2 each. Of this stock 50,000 shares have been sold for working capital.

SILVER BOW COUNTY.

LXINGTON MINING COMPANY.—Official reports to us show that the production for November amounted

to \$15,438 36 in gold, \$90,852.18 in silver—a total of \$106,290.54, and a grand total for the eleven months of 1888 of \$1,017,361.41.

NEVADA.

ELKO COUNTY.

The trial of the suit of the Found Treasure Mining Company vs. the North Commonwealth Company was in progress last week. On the 4th inst. the evidence for the prosecution was all in, and the examination of witnesses for the defense was commenced.

EUREKA COUNTY.

The United States Government, through the United States District Attorney, has entered suit against various corporations and individuals of Eureka, for amounts aggregating \$13,000,000, for cutting wood and lumber off unsurveyed Government land. Among the heaviest claims made are the Eureka Consolidated Mining Company for 473,000 cords of wood valued at \$3,500,000, the Richmond Mining Company 333,000 cords valued at \$6,250,000 and Eureka & Palisade Railroad Company for 74,000 cords valued at \$750,000. An attachment has also been levied upon the property of the railroad company, which has consequently ceased running, and as this is the only means of transporting fuel, smelting operations will have to be entirely suspended as soon as the limited supply of coke and wood now on hand is exhausted. In our issue of October 27th we discussed this suit thoroughly, and since then the situation has not been altered. Among the New York stockholders of the Eureka Company the whole affair is regarded as a blackmailing scheme. As we have stated in previous issues, however, should these suits against the company be successful its recent troubles would be trifling compared with this one. At all events, the legal expenses occasioned by these suits will be a serious drain upon the financial resources of the company, which has just begun to recover from the embarrassments of last summer.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle*:

The November pay-rolls of the different Comstock mining companies amounted to \$217,261.

Late test runs of the Nevada mill stamps by electric power have proved entirely satisfactory to the electricians. Another run will be made, however, before the mill commences to crush ore regularly.

Confidence has been forced to reduce ore shipments to the Bruuswick mill on account of the shutting off of steam power. The ore that is shipped, about 100 tons daily, is averaging \$30 per ton by assay of samples.

Navajo has a cash balance of \$2003 and Standard \$4191. Nevada Queen has an indebtedness of \$38,929; North Commonwealth, \$1750; and North Belle Isle, \$19,083.

BALTIMORE MINING COMPANY.—At the annual meeting the following officers were elected to serve for the ensuing year: John H. Dickinson, President; E. M. Hall Vice-President; Alfred R. Grim, Secretary, and E. Strother, Superintendent. The superintendent's report contains the following information of interest: The total operating expenses for the past fiscal year were \$70,827.83. A width of two feet of ore, assaying \$58.38 per ton, is showing in the upraise above the 338-foot level. Another seam of high-grade ore, developed on the 338-foot level, was followed upward 86 feet, and varies in width from 4 inches to 4 feet.

CONFIDENCE MINING COMPANY.—The total bullion production for November amounted to \$105,689.51.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—Up to the 5th inst. the company has shipped bullion valued at \$190,473 on November account.

CROWN POINT MINING COMPANY.—The Crown Point Mining Company has received four bars of bullion, the net proceeds of which in coin are \$8611.73. The bullion came from small lots of ore worked during the month of November.

MEXICAN MINING COMPANY.—At the annual meeting of this company the following directors were elected: Charles H. Fish, President; A. B. Hull, Vice-President; A. W. Havens, Con O'Connor and George Frier. Charles E. Elliot was re-appointed Secretary, D. B. Lyman Superintendent and the Nevada Bank Treasurer. The Secretary's financial sheet shows receipts for the year of \$76,975.90, and a cash balance on hand December 1st, 1888, of \$13,167.93. The Superintendent's report is a brief statement of the work performed during the year. The interest in the mine now centers in the 1465-foot level, and about the work at that point the Superintendent writes: "For the purpose of penetrating and exploring this company's ground at this depth (1465 feet) the Ophir shaft was adopted as the base of operations as being the most economical and convenient plan. On the 17th of August last from the east drift from the Ophir shaft station on this level, at a point 150 feet east from the station, a joint Mexican and Union drift was started to run north through the Ophir ground to the Union Con. south line. This drift in a distance of 470 feet reached the Mexican south line, and has been advanced in Mexican ground 153 feet. No attempt has been made to prospect the ground passed through, and none will be made until this joint north drift has been extended to the Union Con. south line and the joint work ceased; then this company will proceed to cross-cut its ground opened laterally from its southern to its northern boundary line. The Sierra Nevada, Mexican and Union shaft has remained closed during the past year. The buildings, machinery, etc., remain in a fair state of preservation, and the property is guarded with a day and night watchman."

NEW MEXICO.

GRANT COUNTY.

AZTEC MINING COMPANY.—This company, of Pinos Altos, has leased the 15-stamp mill of the Bremen Mining Company. The mill will be started up shortly.

SOCORRO COUNTY.

PEACOCK MINING COMPANY.—According to the Las Vegas *Optic* the numerous holders of this company's bonds have been informed by J. A. Miller that if they send the bonds to one of the Chicago national banks they will receive ninety cents of their face value for them.

PENNSYLVANIA.

A verdict was given, on the 8th inst., for defendants in the suit of the Tyrone Mining and Manufacturing Company against James Cross and others. The trial, which involved nearly \$500,000, was to decide the location of certain warrants granted in 1787, and in which were located valuable ore beds. The suit contained many fine law points, this being the second time it was tried, having been returned from the State Supreme Court to be retried. The verdict is a reversal of the previous verdict.

National District Assembly No. 135 has issued a call for a convention of miners to be held in Pittsburg on the 20th inst. The order is presumably to enforce a uniform rate among the railroad miners, but labor men here think it is to learn the sentiment of the men as to whether they will leave the Knights of Labor or not. From present indications the miners will abandon the Knights of Labor and join the National Miners' Progressive Association or the Federation.

COAL.

A convention of miners of the Harrisburg district will be held in Pittsburg on the 18th inst. to take measures to enforce the Columbus scale of 79 cents per ton.

Negotiations are pending for the sale of 6000 acres of land in Elk County, known as the Shawmut coal. It was opened out in the '60s, but there was then but one line of railroad tapping it, and the expenses of getting it to market were so great that it could not be mined profitably. Finally the mines were shut down. Within the last twenty years, however, two new railroads have entered the region, which is now reached by the Philadelphia & Reading, the Buffalo, Rochester & Pittsburg, and a branch of the Pennsylvania Railroad.

HILLSIDE COAL COMPANY.—The company's breaker at Moosie, about five miles below Scranton, was entirely destroyed by fire on the 11th inst.

LEHIGH VALLEY COAL COMPANY.—This company is surveying a railroad which will open a rich valley north of Mount Carmel, Llewellyn and Nagle. It has built a new breaker, and will reopen the abandoned Black Diamond mine.

PHILADELPHIA & READING COAL AND IRON COMPANY.—The company's chief mining engineer has been busily engaged during the past six months in improving the company's collieries and opening new shafts, with a view to largely increasing the coal product of that company during the ensuing year. The management has had under contemplation for some time past the removal of the offices from Pottsville to Philadelphia, but it is said that it has been finally decided to allow them to remain in Pottsville.

NATURAL GAS.

INDEPENDENT NATURAL GAS COMPANY.—This company, organized less than a year ago in Wilkesburg, is entertaining, or at least considering, two propositions. One is from Fug & Co., a prominent Pittsburg iron firm, to pay them \$75,000 for the gas well that spouted under its drill eight miles east of Pittsburg last week at a depth of 1,740 feet and with at least 450 pounds pressure. The other is said to be from George Westinghouse, of the Philadelphia Natural Gas Company, offering \$80,000 for the well. This, it will be noted, is for a single gas well that cost probably not more than \$3000 to sink, and was put down under the auspices of a corporation formed from citizens of the borough who resisted the exorbitant charges of the existing city gas monopoly, went back to coal temporarily, subscribed three or four shares apiece at \$50 each to drill a well, and, to use the drillers' vernacular, "Struck it rich."

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to December 8th:

	1888.	1887.
	Gallons.	Gallons.
From Boston.....	4,423,090	3,837,486
Philadelphia.....	127,309,113	154,753,551
Baltimore.....	6,835,545	8,193,251
Perth Amboy.....	20,050,068	16,160,659
New York.....	350,683,372	356,369,653
Total exports.....	509,306,388	539,314,630

TENNESSEE.

RHEA COUNTY.

FOX COAL AND IRON COMPANY.—This company, at Graysville, reduced the wages of miners 10 per cent on the 1st, and all of the miners have struck for the old wages.

WHITE COUNTY.

BON AIR COAL COMPANY.—The company is opening new veins at its mines six miles from Sparta. It is putting in a 60 horse-power engine to operate seven machines with a capacity, it is claimed, of mining 200 tons per day.

UTAH.

SALT LAKE COUNTY.

BROOKLYN LEAD.—This company, at Bingham, has extended its tramway round the point to the Brooklyn mine. The extension is 7600 feet long, with a raise of 217 feet, making a nice grade. Ore is being

sent to the concentrating mill, which will run all winter, having between 15,000 and 20,000 tons of ore on the dump ready to be sent down for concentration. The management has decided to increase the working force in the mine to its full standard, and they propose to pile up the product, that is, concentrates and first-class ore, and hold until prices are satisfactory. The force in the Lead mine has been reduced to twenty-two men for the purpose of opening up new levels. They have just cut into the vein on the 900-foot level, and will now sink to two other levels and open them before extracting more ore. The Salt Lake Tribune says that the draught on this mine has been very heavy the past eighteen months, and development work was not pushed ahead as fast as it should have been done. Extensive improvements have lately been made on the mill, which now is classed at 70 tons capacity in twenty-four hours.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF ONTARIO.
According to reports, natural gas has been struck at Thorold at a depth of 240 feet, and near St. Catherine's at a depth of 312 feet.

[From our Regular Correspondent in Algoma.]
SILVER MOUNTAIN, EAST END.—Unusual excitement in camp to-night, on account of an interesting strike of rich smelting ore (chiefly argentite) made in west drift from 400-foot level. Shipments of this ore will be made to Liverpool. Work has only recently resumed in this direction, and as they have yet 750 feet of vein before intersecting the "West End" Mining Company's limits there is ample space to retrieve lost time.

THE WEST END.—This company has completed its new shaft-house, blacksmith and machine shops, a large ore-house and sorting room, besides several new buildings for married employes. Drifts east and west on the vein from the main shaft are being energetically pushed forward, placing in sight a large amount of ore, while at their east shaft, 750 feet off, they are sinking and drifting in rich ore, and as a matter of fact, this company has at present a large quantity of high-grade ore awaiting better transport facilities (sleighing), when shipments will be made to Denver via Port Arthur.

Force employed exceeds 30 men. H. N. Nichol in the absence of his brother (now in Denver) is in charge here.

Capt. Silas Griffin, of Chicago, is opening up a claim near the West End mine, with fair prospects of success.

BADGER.—Vigorous drifting on 3d level on east and west of main shaft goes steadily on here. Distance east of shaft, 115 feet; westward, 127 feet. This, the third level, is 70 feet below the second. Since last report a winze has been sunk 100 feet east from shaft connecting Nos. 1 and 2 levels. A winze has also been commenced 160 feet west of shaft, which will reach No. 3 or lower level in a week, and thus open out a large area for stoping. At date of visit, stoping was being conducted in 1st and 2d levels. The ore from this section is exceedingly rich, and is being barreled for shipment, and Mr. Shear intends working up a full car load by the 10th inst. The dump of mill rock is also swelling into respectable proportions, and to-day (December 1st) contains at least 900 tons of good milling ore.

ELGIN.—Captain Emmons is sinking on his second 100 feet contract here. The vein is developing into fine dimensions, and ore picked up at random on dump gives good results. Mr. Thomas Hooper is developing this property, and not the Beaver Company, as I erroneously stated in a former letter. The Elgin ores are identical with those of the Beaver, and assay of selected pieces yield 600 ounces.

BEAVER.—The new shaft-house and ore-houses built to replace the No. 2 recently burnt, are now finished in such a workmanlike manner, and with such improvements as should go far toward reconciling the company to late disaster.

The steam hoist is also operating. The depth of No. 2 shaft from landing stage to lower level is over 400 feet. At this point the Beaver lode is producing rich silver, both black and white.

VICTORIA.—This lode traverses the Beaver mine road. It is a strongly defined vein upon which its owner, Mr. Coulter, is now making development work that shows black and leaf silver, although yet in the trap overflow peculiar to this region.

MANILLA (on the C. P. Ry.)—This is our station for the silver mines. A long-felt want has just been supplied us there by the company erecting a new station and freight sheds. Also locating a siding for our mining industry.

We are informed by Prof. Alfred R. C. Selwyn, Director of the Geological Survey of Canada, that he never said that the "Algoma district was non-auriferous," as erroneously stated by our special correspondent in his letter in our issue of 1st inst.; nor did he say that "diorite is not a gold-bearing rock."—Ed. E. AND M. J.

MEXICO.

The city of Mexico has just succeeded in placing in London a 7 per cent. loan at par for the sum of £400,000, the proceeds of which are to be devoted to carrying out the great drainage tunnel and canal, of which we are giving a description in another column by Mr. Richard E. Chisty. The loan is repayable by an annual sinking fund of one per cent, and the whole is repayable in not more than thirty years. As the revenues of the city amount to nearly \$2,000,000 yearly, and the city has no other debt, the investment should prove a safe one.

CHIQUAHUA.
GOLD MINES OF CERRO COLORADO.—These mines maintain the character for richness, says the *Courrier du Mexique*. Recently it is stated that two enormous nuggets were discovered.

RUSSIA.

Reports from St. Petersburg state that the Rothschilds have contracted to construct at Batoum fifteen reservoirs for storing kerosene, with a capacity of 150,000 poods each. The dispatch adds that the Russians are aghast at this proceeding, and demand that the government restrict this operations of the Rothschilds. [A pood is a little more than four gallons.—Ed. E. AND M. J.]

SOUTH AMERICA.

BRAZIL.

We learn from Montreal that a syndicate of Canadian and American capitalists is undertaking a vast scheme for the development of the natural resources of the interior of Brazil. The syndicate includes Mayor Abbott, of Montreal, who is a director of the Canadian Pacific, and Duncan McIntyre, an ex-director of the same company. A line of steamers will be established between Montreal and New York and Para, in conjunction with a steamboat and railway system extending to the headwaters of the Amazon. S. R. Poulin, civil engineer, who had charge of the surveying party, has just returned from Brazil. Steam craft will ply between Para and a point 300 miles up the Rio Tocantins, a tributary of the Amazon. Dangerous rapids will be overcome by a railway 65 miles in length. At the Western terminus of the proposed railway, connection will be made with two steamboat lines to run on the Rio Tocantins and several of its affluents into the interior, over 1,500 miles from the Atlantic. No contracts for the carrying out of the scheme have been made, the Brazilian authorities agreeing to pay all preliminary expenses if the plans should prove unsatisfactory. Concessions to the syndicate will include mining rights for 99 years on the Rio Tocantins and tributaries, and the privilege of purchasing all the land required at one cent per acre.

PERU.

The famous silver mines of Hualgayoc, in the vicinity of Cajamarca, are now to be worked by an American company, said to be well equipped with the means of successfully developing their undertaking, and the gold washings of Carabaya, near Arequipa, are in the hands of a responsible organization formed in London by the late Admiral Garcia y Garcia.

ORE MARKETS.

(Special report.)

LEADVILLE.—Ore is bought in this market almost exclusively on private contracts, and the prices paid depend so greatly upon what may be only a temporary requirement of one or two smelters that prices frequently offered are very misleading as to the average value of that particular grade. Carbonate ores high in lead, that is to say, 25 per cent and over, and containing but a small percentage of silica, are always in good demand, but this class of ore in the Leadville district generally carries less than ten ounces of silver per ton, and when lead is selling in New York for less than 4½ cents a pound, the price which smelters can afford to pay scarcely justifies the mines in producing. The schedule is approximately as follows:

Ninety-five per cent of New York quotation for the silver; 25 to 30 per cent lead, 40c. for each unit, less \$4 per ton working charges; 30 to 40 per cent lead, 45c. for each unit, less \$3.50 per ton working charges; 40 per cent or over lead, 50c. for each unit, less \$3 per ton working charges.

Lead basis, \$4.50 per hundred; add or deduct 1c. for each 5c. change in New York.

Gold is paid for at the rate of \$18 per ounce for one tenth of an ounce and over; if under one tenth, nothing is paid.

When zinc is present in carbonate ores, or the silica is in excess of the iron contents, the working charge is higher, and less is paid per unit for the lead.

The sulphide ores usually carry considerable zinc and the presence of this objectionable element, together with the fact that such ores require roasting, make them much less desirable than carbonates and they are bought on a scale somewhat as follows:

For the silver 90 to 95 per cent of New York quotation; 10 to 20 per cent lead, 25 to 35c. per unit, less \$14 to \$16 per ton working charge; 20 to 30 per cent lead, 30 to 40c. per unit, less \$14 to \$15 per ton working charge; 30 to 40 per cent lead, 35 to 40c. per unit, less \$13.50 to \$14.50 per ton working charge; 40 to 50 per cent lead, 40 to 45c. per unit less \$12.50 to \$13.50 per ton working charge.

Lead basis, \$4.50, add or deduct 1 cent for each 5 cents change in it of quotation.

Zinc basis, 10 to 13 per cent, deduct 50 cents for each per cent in excess of basis.

Iron sulphides, containing little or no zinc and silica, command prices nearer those prevailing for carbonates, and straight clean iron pyrites with no lead, zinc or silica, fetch good prices, owing to the roasted product being so high in oxide of iron. Some of the Colorado sulphides might be utilized by manufacturers of sulphuric acid, if the roasting was so conducted as to leave the silver in the ore.

Dry ores, that is to say oxidized ores containing no lead, are at present very much sought after, and readily sell for 90 to 95 per cent of New York quotation for the silver, less \$12 to \$15 per ton working charge.

The demand for the better grades of iron fluxing ore continues to be about equal to the production,

and the ruling prices are: For ore containing 8 to 13½ oz., 45 to 50 cents per oz.; over 13½ oz., 95 per cent of New York quotation, less \$5.25 to \$5.50 working charge. Basis, 40 per cent excess of iron manganese over silica; add 10 cents for each per cent over 40 per cent; deduct 12 to 20 cents for each per cent under basis.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 14.

Statistics.

Production of Anthracite Coal for week ended December 8th and year from January 1st:

Tons of 2240 lbs.	1888.		1887.
	Week.	Year.	Year.
P. & Read, R.R. Co.....	123,757	6,856,361	7,189,942
Cent. R.R. of N. J.....	122,419	5,469,777	4,607,188
L. V. R.R. Co.....	160,000	6,481,793	5,559,333
D. L. & W. R.R. Co.....	115,233	6,590,965	5,742,336
D. & H. Canal Co.....	89,620	4,271,199	3,781,066
Penna. R.R.....	68,710	4,284,781	3,541,815
Penna. Coal Co.....	26,024	1,581,304	1,538,456
N. Y., L. E. & W.....	20,000	898,210	716,457
Total.....	729,763	36,384,390	32,646,593

Increase..... 3,737,593
The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:
1883..... 30,566,188 | 1885..... 29,744,198
1884..... 30,123,973 | 1886..... 30,891,656

Production of Bituminous Coal for week ended December 8th, and year from January 1st:

Tons of 2240 lbs.	1888.		1887.
	Week.	Year.	Year.
Phila. & Erie R.R.....	1,546	62,194	18,623
Cumberland, Md.....	67,974	3,385,574	3,116,791
Barclay, Pa.....	4,524	148,921	165,950
Broad Top, Pa.....	10,690	352,661	352,166
Clearfield, Pa.....	77,328	3,178,838	3,016,025
Alleghany, Pa.....	20,740	758,400	787,065
Pocahontas Flat Top.....	29,935	1,298,503	869,478
Kanawha, W. Va.....	31,481	1,529,043	1,369,524
Total.....	243,378	10,724,134	9,775,622

WESTERN SHIPMENTS.			
	Week.	Year.	Year.
Pittsburg, Pa.....	14,053	687,164	533,069
Westmoreland, Pa.....	36,142	1,473,474	1,353,166
Monongahela, Pa.....	4,344	366,523	361,664
Total.....	54,539	2,527,161	2,247,919

Grand total..... 297,917 | 13,251,295 | 12,023,541

Production of Coke on line of Pennsylvania R.R. for week ending December 8th and year from January 1st, in tons of 2000 lbs.: Week, 98,653 tons; year, 3,851,060 tons; to corresponding date in 1887, 3,488,186 tons.

Anthracite.

The coal trade is extremely dull, and very little is doing on new orders. At least very little is doing at circular prices. Some of the companies maintain rates, but there is a great deal of coal to be had at considerable less than full prices, and some of it is company coal. In one office we learn that nothing is being done because they are "too honest." In another office we learn that though prices are not shaded when coal is asked for, and in fact that any intimation of cutting rates is somewhat indignantly received, yet the would-be purchaser is given to understand that if the coal "should be found dirty" on delivery, he should let the seller know the fact. There has been some friction in the trade for the last week or two, but we believe that before our next issue matters will have been straightened out and a serious curtailment of production will be enforced. Several of the companies have already reduced their output very considerably. The Lackawanna, it is said, has reduced more than 50 per cent. The Central of New Jersey has also reduced. The Reading has cut down its output quite largely. The Delaware & Hudson is stocking coal at Rondout and is not to bring it to tide water. The Pennsylvania Coal Company has also reduced. The Pennsylvania Railroad Company is pushing out its coal as rapidly as possible. It is said to have some eleven hundred loaded cars standing at South Amboy to-day. We hear of no immediate prospect of any change in prices to be made by the companies. It is too early yet to decide upon spring prices. They will no doubt be lower than at present, whenever they are announced.

Bituminous.

The demand for bituminous coal continues in excess of the supply. We hear of some of the producers having to buy coal for immediate delivery. They have to pay full circular rates, \$3.50, at New York shipping port. Some contracts have already been made for next year, and we suppose that the usual course will be pursued; that is, to take all the large orders at best obtainable prices, and afterwards arrange for the pool price list and denounce every one who don't thereafter live up to it. This is the most convenient way of getting around the difficulty of "cutting of prices."

The Northwest Coal Trust.

The great coal trust of the Northwest has extended its grasp over another broad expanse of territory. At a secret meeting at Springfield, Ill., on the 11th inst., a committee from the Northern Illinois Soft Coal Association met a committee of the Central Illinois operators to discuss the question of output and devise means of maintaining prices in the Northwest. The Central Illinois operators joined the pool by agreeing, for a secret consideration, not to enter into competition with the Northern association in Iowa, Minnesota, Wisconsin, Nebraska, Dakota, or Montana. It

was decided by both associations to maintain a uniform price throughout the West and Northwest for the entire output, the price to be regulated monthly during the season of greatest consumption.

Boston. Dec. 13.
[From our Special Correspondent.]

Our market has not afforded the coal companies any satisfaction, and I suppose none was expected. The truth is, dealers are quite well supplied here. There is considerable delay and demurrage on rail shipments to the inland towns and cities, but the coal is long since bought, and stocks generally are fairly large to say the least. Perhaps they are larger than usual, but this is due in part to the mild, wet weather. We have a touch of winter just now, but the output of coal has not been as large as usual in the first weeks of winter.

Jobbers and agents have offered anthracite here, since I last wrote, at lower figures than at any time since the weakness of the market became noticeable. It is difficult to quote prices. The companies make more or less of a form of holding to circular rates, but nobody pays them. Rates vary considerably on individual coals, but run down to \$4.50 on stove, \$4.15 on egg and \$3.85 on broken, all f.o.b. at New York. There is an oversupply of everything, though chiefly in the larger sizes. It is said that restriction will soon be felt, and it must be, or a further decline will come.

In bituminous coal there is considerable hustling to fill small orders. Spot coal is in demand, particularly spot Cumberland. The market is firm on the basis of f.o.b. prices of, say, \$2.45 @ \$2.65, with but little at the lower figure. It is too early for contract talk.

Freights continue high and strong. Small vessels, particularly, are in demand, and there is an actual shortage in this class of tonnage. Outside rates are for small vessels.

We quote vessel rates, exclusive of discharging: New York, \$1.05 @ \$1.25; Philadelphia, \$1.55 @ \$1.65; Baltimore, \$1.65 @ \$1.75; Newport News and Norfolk, \$1.55 @ \$1.65; Richmond, \$1.75 @ \$1.80; Provincial, \$1.90 @ \$2.25.

The retail movement has a touch of activity from the colder weather, but is only fair.

Delivered prices are: Stove and Nut, \$6.50; Egg, \$6.25; Broken, \$6; Franklin, all sizes, \$7.75; Lehigh Egg, \$6.50; Broken, \$6.25. Wharf prices 50 cents less than the above. Bituminous coal, \$4.25 on the wharf.

Buffalo. Dec. 13.
[From our Special Correspondent.]

The anthracite coal trade is dull and prices unchanged as far as published quotations show. Cutting wholesale rates is reported in some quarters, and reduction of output is already an established fact. The stocks on hand here are accumulating, and if the weather continues as mild as has been experienced in this vicinity for some weeks past, the consumption for the winter months will fall far below the quantity used in 1887-88. Open weather is a blessing to the poor and a boon to all using coal for fuel, but to the seller it means curtailment of spending money through lessened profits.

The bituminous trade is quiet and prices remain firm. Supply about equal to requirements, and buyers have now their choice of the several varieties.

Coke quiet and unchanged. We have heard no complaints lately of the lack of rail transportation facilities. We therefore conclude that the supply of cars is adequate.

The statement was rather premature that lake navigation had closed for the year. The weather continues extraordinarily mild and favorable for the going and coming of vessels. During the past few days several steam craft arrived and two others are on their way down from Chicago, and propellers have left for Lake Erie ports. Of course, it is a risk these vessels are taking, but all signs indicate that they will reach their destinations in safety.

A proposition to erect an ice palace here has brought out another idea which is to substitute coal for frozen water! Much has been written and published showing its feasibility, novelty, etc. Mr. E. L. Hedstrom, the coal merchant, emphatically sets his foot down upon the suggestion, saying that the cost would exceed a building constructed of cut stone; that to the coal men themselves it would be absolutely of no value, as no amount of advertising can help the wholesale trade, which is governed entirely by supply and demand; and lastly, from a financial standpoint he cannot regard it in any other light than as an unwarranted piece of extravagance.

The work of improving the Port Clair ship canal will be continued during the winter months, so that good navigation will be assured thereon next season.

A contract has been entered into for making 1400 feet additional wharf and pier frontage at Sault Ste Marie canal. Work will be commenced immediately if weather permits.

The Buffalo Merchants' Exchange members are petitioning Congress for a special appropriation for harbor improvements for their port. The fact is that the annual appropriation for several years has been nearly all expended in repairing the old work which was not constructed successfully to withstand the storms of Lake Erie.

Pittsburg. Dec. 13.
[From our Special Correspondent.]

Coal.—The shut-down on the Monongahela has passed into history, and is probably the first that was ever inaugurated on account of the low prices in the West and South, together with the markets being over stocked. One year ago the shipments by the Ohio River were 56,000,000; to-day the shipments are 105,091,000 bushels; add to this the Kanawha River shipments, estimated at 50,000,000, and you will be able to find

out the reason of the low prices that rule in the lower markets.

Prices in the pools are:
PRICE OF COAL PER 100 BUSHELS = 7000 LBS.
First pool.....\$4.75 Fourth pool.....\$3.25
Second pool.....4.25 Railroad coal.....5.00
Third pool.....3.75

Connellsville Coke.—Market firm. All the principal coke works in the region in full blast. Advance to take place January 1st. A large number of new coke ovens are building at various points. The outlook for a big winter and spring trade is all that could be desired. The car famine is now a thing of the past, and unless there is a strike for wages business will continue to boom.

The rates are: Blast-Furnace, \$1.25 per ton; to dealers, \$1.35; foundries, \$1.50; crushed, \$2.20.

Freight rates to Pittsburg, 70c. per ton; to the Mahanoy and Shenango valleys, \$1.35; East St. Louis, \$3.20; to Cleveland, \$2.80; to Chicago, \$2.75; to all other points the same proportions.

FREIGHTS.

The organization of a big river-transportation company by Pittsburg capitalists is almost completed. Freight will be taken to all points on the Ohio, Mississippi, and Missouri rivers, and at St. Louis there will be a traffic arrangement with railroads for shipments to inland points. Tennessee and Alabama ore is to be brought to Pittsburgh for the first time, and Lake Superior ore for the vast number of iron furnaces in Western Pennsylvania will be brought via St. Paul instead of on the lake route, as heretofore. Immense ore docks are to be erected at St. Paul, and a combination made with the "Diamond Jo" line of steamers which ply between St. Paul and St. Louis. By abandoning the lake route the expensive rehauling of the ore is avoided.

The latest coal charters per ton of 2240 lbs.
From Baltimore to:—Bangor, Me., 1.60; Bath, 1.60; Boston, 1.75; Bridgeport, Conn., 1.45; Bristol, 1.25 @ 1.30; Brooklyn, 1.15 @ 1.20; Charleston, 1.00; Fall River, 1.50; Galveston, 3.00; Gardner, Me., 1.75; New Bedford, 1.45; Newburyport, 2.25; New Haven, 1.45; New London, 1.45; New York, 1.25; Portland, 1.75; Portsmouth, N. H., 1.85; Providence, 1.45 @ 1.50; Quincy Point, 1.50; Richmond, Va., .70; Roxbury, 1.50 @ 1.55; Salem, Mass., 1.75; Savannah, 1.30; Somerset, 1.35; Williamsburgh, N. Y., 1.25; Wilmington, 1.25.

From Philadelphia to:—Bangor, 2.00; Boston, 1.50 @ 1.60; Charleston, .90 @ 1.00; Chelsea, 1.55 @ 1.60; Com. Point, Mass., 1.60; E. Boston, 1.70; East Cambridge, 1.50; Fall River, 1.15 @ 1.25; Galveston, 3.00; Gardner, Me., 1.60; Georgetown, D. C., 1.00; Lynn, 1.75 @ 1.85; New Bedford, 1.15 @ 1.25; Newburyport, 1.75; New York, .90; Norfolk, .70 @ .75; Portland, 1.50 @ 1.60; Portsmouth, N. H., 1.60 @ 1.70; Portsmouth, Va., .65; Providence, 1.15 @ 1.25; Richmond, Va., .80 @ .85; Rockport, 1.22 @ 1.30; Saco, Me., 1.75; Salem, Mass., .90; Savannah, 1.25; Washington, 1.00; Weymouth, 1.15; Wilmington, N. C., .60.

* And discharging. 3c. per bridge extra. † Alongside. ‡ And towing.

METAL MARKETS.

NEW YORK, Friday Evening, Dec. 14, 1888.
Prices of silver per ounce troy.

Dec.	Sterling Exch'ge.	London Pence.	N. Y. Cts.	Dec.	Sterling Exch'ge.	London Pence.	N. Y. Cts.
8	4.87½	42½	927-16	12	4.88¼	427-16	92¾
10	4.88	42½	92½	13	4.88¼	429-16	93
11	4.88¼	42½	92½	14	4.88¼	429-16	93

Silver improved slightly this week, as a natural reaction after recent decline, combined with easier money market in London and higher exchange here.

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 5 per cent. During the week the bank gained £186,000 bullion, and the proportion of its reserve to its liabilities was reduced from 40:35 to 46:16 per cent, against a reduction from 46:93 to 46:16 per cent in the same week of last year, when its rate for discount was 4 per cent. Thursday the bank gained £9000 on balance. The weekly statement of the Bank of France shows a loss of 1,100,000 francs gold and a loss of 2,850,000 francs silver.

Copper.—Had it not been for the report which was circulated shortly after our last issue to the effect that the Anaconda mine had been shut down by arrangement with the syndicate, who had agreed to pay the proprietors an indemnity of 4c. per lb. on the copper not produced for the ensuing 6 months, the past week might have been described as entirely devoid of interest as regards the copper market. It was previously known that operations at the mine had been suspended for a few days, but as this was said to be owing to some strike of the engineers, little importance was attached to that fact, it being expected that a difference of that nature would soon be adjusted. The rumor above referred to was promptly denied, and information was received from Butte that work at the mine would be continued. In the meantime, however, it has leaked out that the resumption of operations is only to continue up to the end of the present month, when the works will be shut down for a period of about six months. Official confirmation of this has not yet been obtained. Regarding the fire in the Calumet & Hecla reports are rather contradictory, and although it may be supposed that the fire is being gradually brought under control, it can at present only be a matter of conjecture when everything will be in order again.

Early in the week some transactions in Lake copper took place at 17:40, but later on December copper was offered by certain parties down to 17½. It is understood, however, that the parties referred to are themselves buyers at slightly under the last named figure.

As the quantity of lake copper remaining outside the stocks controlled by the syndicate has now dwindled down to less than half a million pounds, and evidently some short sales still remain to be covered for this and a few succeeding months, the "bear" sellers will shortly be compelled to come into the market again to cover their sales unless they are able to make some arrangements with the syndicate.

Casting copper remains exceedingly scarce at 16½ @ 16¾c.

The European markets show no change. Both Chili bars and G. M. R. copper have been very steady at £77 10s. @ £77 12s. 6d. for spot and £78 5s. @ £78 15s. for three months, and even the announcement this morning of the long-dreaded collapse of the Panama Canal scheme has not yet had any disastrous effect on the market. Refined sorts have been rather pressed for sale lately, and quotations are now about £80 for Tough, £81 for Best Selected and £83 for Strong Sheets.

The producing mines of Lake Superior, now numbering eleven in all, produced the following amount of mineral this year:

	1888.	1887.	Inc.
	Tons.	Tons.	Tons.
November.....	5,680	4,136	1,544
Jan. 1 to Nov. 30.....	49,680	45,374	4,306

The total Lake Superior product for the month of November figures at fully eight and three-quarters million pounds of fine copper, and for the eleven months at about 75,000,000 pounds. After allowing for the Calumet & Hecla fire, the December product ought to be at least 5,000,000 pounds, and probably considerably more. The year 1888 doubtless will close with a record of from 80,000,000 to 82,000,000 pounds of copper produced by Lake Superior mines.

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

To Liverpool—	Copper Matte.	Lbs.	Inc.
By S. S. Arizona.....	Sacks.	946	124,500
By S. S. Spain.....	Sacks.	3,506	383,032
	Ore.		
By S. S. Spain.....	Casks.	86	7,168
To Hamburg—	Copper.		846
By S. S. Amalfi.....	Casks.	40	51,840
To Hull—			
Old Copper from Bonded Warehouse.			
By S. S. Buffalo.....	Casks.	106	27,738

Tin.—Renewed efforts have been put forth by bears to depress the market, which have not failed to produce a somewhat unsettled feeling; but in spite of this all quantities offered at low prices have found ready buyers, and the quantity of tin actually available at present quotations is comparatively small. So far, the deliveries for December have been much better than for the preceding month, and as arrivals are very light, we look for an improvement in the statistics at the end of the month. We quote to-day: Spot, 22½; December, 22½; January, 22½; February, 22½; March, 22½.

In London prices improved at the beginning of the week to £99 5s. spot and £100 three months, but, under the influence of the operations above alluded to the improvement was not sustained, and prices gave way slightly, closing to-day at £98 spot and £98 17s. 6d. three months.

Lead.—This market was rather firm until about the middle of the week, when more pressure was observed on the market and several large lots were offered, with no buyers forthcoming. What we have repeatedly predicted then took place, and it was soon demonstrated that our market was not in a condition to withstand any serious pressure of sales. A few days ago nothing could be obtained under 3:80 spot, but quotations have since relaxed to 3:70.

This being the time of the year when consumption is at its lowest ebb, the present depression is not at all surprising, especially as consumers' stocks are rather large. Some of the white lead manufacturers in the West are known to have shut down from four to six weeks for repairs, and others are to follow the same course before the holidays, and this must also have a depressing influence on the market.

The London market has been even more depressed than this side, owing to large quantities held there for American account still hanging over the market, and also because ordinary supplies are in excess of the demand. Spanish lead has relaxed to £12 7s. 6d., with sellers over, and English lead is quoted £12 12s. 6d. to £12 15s., according to brand.

Chicago, Ill.—Messrs. Everett & Post telegraph us to-day as follows: Our market has advanced slowly since our last report, under small spot sales at 3:60c. Latterly, under quiet free offering, declined to 3:50 @ 3:55c. Absence of buyers, and probability of store lead coming on the market, is affecting values.

St. Louis, Mo.—Messrs. John Wahl & Co. telegraph us to-day as follows: There has been considerable more inquiry for both hard and soft lead, in consequence of which sellers have been asking a little more, but only a moderate amount of business has been transacted. Sales will probably foot up 600 tons at prices ranging from 3:50 @ 3:57½c.

Spelter is quiet, but firm, with a fair amount of business doing. We quote prime Western domestic 5 @ 5½; Refined, 4½. Foreign is very scarce at 6 @ 6½. No change is to be reported in the London quotations.

Antimony is very firm, but business is checked owing to the small quantities available. We quote: Hallett's, 10½ @ 11½c.; Cookson's still obtainable at 13c. Maker's prices in London are, Hallett's, £44 10s. to £45; and Cookson's, £47.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Dec. 14.
Heavy Chemicals.—The developments of the week in the heavy chemical trade have been far from startling, and aside from an improved demand for carbonated soda ash, which gives the market an appearance of greater activity, a search for "features" is absolutely fruitless. Spot business, as usual, is not of vast proportions, but contracts for delivery over 1889 have been made a little more freely. Nothing further has been heard concerning the general alkali combination abroad; but whether it is consummated or not, it has certainly been a successful "bull" argument with dealers in this city, and a number of contracts at stiff prices for the coming year have doubtless been closed on the strength of these rumors. On the other hand, these reports in some quarters have made consumers rather reluctant to close contracts until something definite for next year is actually decided upon. There is, however, a feeling of strength and confidence apparent throughout the trade, and dealers are firm in their views as to prices for the new year, now almost at hand.

Electricity and its application is fast becoming a subject which it behooves all chemical manufacturers to carefully consider. On another page we print a description of an electrolytic process for decomposing sea salt into sodium and chlorine, which will be of interest to those engaged in the manufacture of soda ash and caustic soda.

We have prepared the following table from the report of the Bureau of Statistics, just issued, giving the imports of chemicals during October and for the ten months ending October 31st, compared with the corresponding periods in 1887:

	1888.		1887.	
	Oct.	Ten mos.	Oct.	Ten mos.
Soda, caustic, lbs.....	8,837,400	68,125,667	9,359,267	74,003,426
Carbonate, including sal soda and soda ash.....	30,533,848	240,909,391	19,394,364	222,765,732
Bi-carbonate, lbs.....	63,324	1,354,525	202,314	1,384,898
All other salts of, lbs.....	1,743,234	15,483,494	1,262,841	13,436,056
Nitrate, lbs.....	13,776,680	136,174,272	5,945,363	143,378,458
Sulphur, crude, tons.....	5,044	96,415	2,024	74,503
Salt, tons.....	28,741	268,411	47,364	292,874

Messrs. J. P. Brunner, of Liverpool, writes us as follows on the 28th ult:
 "Trade generally in heavy chemicals is quiet at the moment, but prices are well maintained, as in most cases makers are well supplied with orders. Soda ash is scarce, several manufacturers being fully booked with orders to the end of the year. Spot quotations are: Caustic Ash, 48 per cent, 1 to 1 1/2 d.; High Test, 1 to 1 1/2 d.; Carb. Ash, 48 per cent, 1 to 1 1/2 d.; High Test, 1 to 1 1/2 d. For forward delivery, 7s. 6d. to 10s. per ton advance on spot prices is asked by makers. Soda crystals have been moving off more freely of late, and £2 10s. to £2 12s. 6d. per ton are nearest values for prompt delivery.

"Caustic soda is rather firmer this week. Last week sales were made at £6 2s. 6d. and £7 2s. 6d. for 60 and 70 per cent respectively, but orders at these figures have since been declined, and we quote to-day: 60 per cent, £6 3s. 9d. @ £6 7s. 6d.; 70 per cent, £7 3s. 9d. @ £7 7s. 6d.; 74 per cent, £7 15s. Retailers are now pretty well cleared out, and this has steadied the market. Makers are hoping that the restricted make ordered for next month will cause stocks to be very light at the end of the year and enable them to start with good prices at the turn of the year. Bleaching powder has been offering more freely and £7 17s. 6d. has been accepted in several cases, while some makers hold for £8. Chlorate of potash at 5 1/2 @ 5 3/4 d. for prompt delivery. There are a fair number of inquiries in the market, but little actual business. Bi-carbonate of soda in good request at £4 12s. 6d. @ £4 15s. per ton, according to brand and quantity."

In New York, carbonated soda ash, 48 per cent, is in good demand at 1 1/2 @ 1 3/4 c., according to quantity, the latter being the usual figure for small lots from store. Contracts over 1889 have been freely placed. The ruling quotations for large quantities are 1 1/2 @ 1 27/8 c. In Boston, dealers ask 1 1/4 c. for anything less than 5 casks. Caustic soda ash, 48 per cent, is quiet. Little business of moment is reported in this article. Quotations are somewhat nominal, ranging from 1 1/2 @ 1 3/4 c., according to quantity and quality.

Caustic soda continues rather neglected by buyers, but on account of the stronger advices from Liverpool this week, as well as the limited supply on the spot, former quotations are maintained, and in some instances an advance is asked. The general range of the market, however, for the higher tests is from 2 1/2 @ 2 3/4 c. for large lots, although quotations of 2 1/4 c. for 70 per cent are reported. In 60 per cent there is little doing; quotations are nominally 2 1/2 c. Sal soda is quiet at former prices, 95 @ 1 c. for large lots on the spot and 95 c. to arrive.

Bleaching powder is inquired for quite liberally for delivery next year, but we are unable to learn of any important contracts being closed as yet. The action of the bleach makers in confirming their combination over all 1889 is, of course, an element of strength to the market. Spot business is only in a small way at 2 1/2 @ 2 3/4 c., according to quantity. For contracts, 1 9/10 @ 2 c. is quoted.

Acids.—As usual, at this time of the year, many consumers are disposed to defer heavy purchases until after the 1st of January, in order to make as good a showing of cash assets at the end of the year as

possible. Consequently, the orders at present are small, being only for immediate needs. During the month of October the exports of acids of all kinds from the United States were valued at \$13,785, against \$6188 in October, 1887. For the ten months ending October 31st, 1888, the total valuation was \$90,498, against \$84,787 during the same period last year.

Acetic acid is dull for prompt delivery at 2 @ 2 1/4 c. A number of contracts for delivery over 1889 have been placed at less than 2c., and it is reported that one of considerable importance was placed as low as 1 7/8 c. This, however, we have not been able to verify.

Nitric and muriatic acids are quiet, and without features of interest. Prices are unchanged.

Tararic acid is rather weak, owing to the lack of demand. We continue to quote 43c. for crystals in quantities of 3000 pounds or more, 44c. in barrels and 45c. in 50-pound boxes. For powdered, these prices are advanced one cent per pound.

Oxalic acid is moving in a jobbing way at 8 1/2 @ 9c. per pound, according to quantity, for prime English and German makes, ex dock or store, New York, Philadelphia and Boston.

Sulphuric Acid.—Prices are steady and the volume of trade is still very fair. Ruling prices for 66 degrees are 95 @ 1 05c. for large quantities, and for 60 degrees 90 @ 95c. For small lots for prompt delivery 1 10 @ 1 25c. is asked.

Fertilizers.—Business continues brisk, and prices seem to be well sustained for all articles. The revised price-list is about as follows: Azotine, \$2 55 @ \$2 65 as to quality; dried blood (city), low grade, \$2 55 per unit; Western high grade, \$2 65 @ \$2 70 per unit for ground material; tankage, high grade, \$2 5 per ton; low grade, \$2 2 @ \$2 3 per ton, as to quality. Fish scrap, \$2 5 per ton f.o.b. factory. Sulphate of ammonia, \$3 40 @ \$3 45 per cwt.

Refuse bone-black, guaranteed 70 per cent phosphate, is quoted at \$19 per ton. Dissolved bone-black is 95c. @ \$1 per unit for available phosphoric acid, and acid phosphate 75 @ 80c. per unit for available phosphoric acid.

Steamed bones, unground, \$19; ground, \$25 @ \$26. Charleston rock, undried, \$5 per ton; kiln dried, \$6 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, is held at \$10 @ \$10 50 ex steamer at New York. Our correspondent at Charleston sends us the following statement of the shipments of phosphate rock from that port during the month of November:

	Crude.	Ground.
	Tons.	Tons.
To domestic ports.....	16,266	.....
" foreign ".....	51	.....
Total, tons.....	16,317	.....

This is an increase of about 35 per cent over the shipments in November, 1887.

Muriate of Potash.—All arrivals continue to go almost directly into consumption, and consequently there is no accumulation of stocks. Contract prices for next year have been fixed at 1 7/7 @ 1 c. Spot quotations remain at 1 55c., and 1 80 @ 1 82 1/2 c. to arrive.

Double Manure Salts.—Next year's prices have not been officially fixed as yet, and the market for futures is therefore unsettled. Spot quotations are 1 15 @ 1 20c. on a basis of 48 per cent potash. High grade sulphate of potash is quiet at \$2 30 per cwt., basis 90 per cent.

Kainit.—This article is in the same position as last reported, and, indeed, as it has been for weeks past. As there is nothing on the spot unsold, it is useless to quote, but for shipment we may quote \$9 50 @ \$9 75 per ton.

Brimstone.—Spot supplies are very scarce, and quotations for this position are consequently nominal. The usual quotations for best unmixed seconds to arrive are \$20 25 @ \$20 50. For thirds to arrive, \$19 25 @ \$19 50 probably represents the market, although we have heard of one lot offered at \$19.

Nitrate of soda is firm at 2 40c. on the spot, and 2 25 @ 2 35c. to arrive.

Acetate of lime is meeting with little attention, and ruling quotations are now 2 @ 2 10c. for gray and 1 @ 1 05c. for brown.

Minerals.—Sulphate of baryta is quiet, with no alteration in values. For special brands of imported, \$21 50 is asked.

China Clay.—No business of importance is noted. Prices are steady at \$12 50 @ \$13, according to quality.

Chalk.—Owing to the reduction in freight rates, the prices of this article have eased off a little, and \$2 90 @ \$3 probably now represents the market.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Dec. 14.

The total number of buildings projected in this city during the eleven months ending November 30th, 1888, is 2577, valued at \$43,598,978, against 42-18, valued at \$64,945,800, during the same period in 1887. These statistics are certainly an array of cold facts, discouraging to those who predict a more active building season next year, and it must be remembered that in this vicinity there will be few important works like the Croton aqueduct to absorb our materials. Efforts are being made to interest the builders of this city in the work of the National Association of Builders, which holds its next convention in Philadelphia on the second Tuesday of February, 1889. Some of the important matters which have so far been taken up by the association are as follows: "The Uniform Contract," "The Apprenticeship System," "The Lien Law," "Rules and Conditions for Estimating Work," "Permanent Arbitration with Employes," "Uniformity

of Measurements," "Uniform Size of Brick." Also to be brought up at the coming convention: "Insurance against Accidents to the Public," "Establishment of a Department for giving Sureties for Contractors on Submitted Estimates or upon Contracts," "The Establishment of Trade Schools," "Profit Sharing." Mr. Marc Eidlitz, of this city, is one of the directors of the organization.

Locally, there is nothing new to report. The week has been rather quiet on the Exchange.

Bricks.—As usual, the medium grades are easily disposed of, and cargoes this week have not been long on the market. Efforts are also being made to get a little more for better grades, but it is doubtful if the existing demand will warrant any advance upon former quotations. Pales continue about as previously noted. The river season is very nearly closed, if not entirely. The only change worthy of note is an advance in the quotations for medium grades of about 25c. per M.

Lime.—Arrivals during the week have been light and nothing is due immediately.

Cement.—Canal navigation being closed, all orders for interior trade are being shipped by rail, thus greatly increasing the cost of transportation. The imports of cement for ten months ending October 31st, 1888, aggregate 1,668,485 barrels, against 1,162,726 barrels during the same period in 1887. The imports for the month of October, however, are 67,459 barrels less this year than last.

Clay.—According to the report of the Bureau of Statistics just issued, the total imports of clays or earths of all kinds, including kaolin or china clay, for the ten months ending October 31st, 1888, were 39,756 tons, valued at \$267,496, against 34,356 tons, valued at \$244,504 in 1887. The imports for the month of October alone show an increase of 470 tons in quantity, but a decrease of \$106 in value as compared with last year.

For prices of building materials and wages of laborers, see our register of current prices.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 14.

The iron trade does not improve, and the effect of the tonic which was administered at the recent meeting of the steel rail association is wearing away. In pig-iron the Southern furnaces are still taking the market, and the Western furnaces and mills are cutting off the outlet for Eastern works. There is no prospect of high prices here, and, in fact, there is a general impression that quotations will be somewhat lower at the opening of the new price lists. The whole line of the iron trade is not in a very booming condition.

Steel mills finding the profits on rails cut down to a minimum are turning on to structural forms and are, consequently, preparing for a reduction in prices of these until the profits in that line disappear also. The same course will continue on through all the forms down to merchant iron and steel, until each in its turn is over-supplied. The result of the autumn's business has been disappointing, especially to those who had built great hopes upon the effect of the success of the Republican party in the last election. As our readers will remember we asserted then that it would make little difference which side won, business would go on about as before, and this has proved to be the case, any change that has occurred having been toward lower prices and less business. Wall street promptly took an unfavorable view of the election, and the same view has been gaining ground in other directions. Now it is said that the uncertainties of the tariff, which were supposed to have disappeared with the defeat of the tariff reformers, are the cause for the present depression. A revision of the tariff appears to be inevitable, and it is not at all certain that no reduction will be made in duties on articles of the iron trade.

The rate war between the railroads has undoubtedly had a bad effect upon business generally, and possibly the financial question and Wall street have also had something to do with the state of trade. Whatever the cause may be, the position is not as favorable as it was some time ago, though we still know of no cause for despondency in next year's outlook.

American Pig.—This market remains unchanged in prices and dull in demand. We still continue to quote \$18, \$17 and \$16 as the nominal and ruling prices of the different numbers of standard brands of Lehigh irons. Southern irons are coming forward at a shade below these prices. We hear more of them, however, in the East than here.

Scotch Pig.—Prices in Europe have advanced about 6d. a ton, and freights still rule very low, at 3s. 6d. a ton. Nevertheless there is no change in prices here and very little business doing. We can continue our quotations of a week ago, as follows: Coltness at \$21, Dalmellington at \$19 50 @ \$19 75, Clyde about the same, Langloan about \$20 25 @ \$20 50.

Structural Iron and Steel.—We hear of a contract of 10,000 or 12,000 tons for Brooklyn elevated roads at the regular prices for beams. This article is almost the only one which holds to its nominal quotations. Other kinds of steel and iron appear to have an extremely high elastic limit in prices, for they can be bent and yet react according to circumstances and to the ability of the seller.

A large quantity of plates have been contracted for for some of the new Government vessels, it is said, at 2 1/2 cents a pound all round, including boiler and ship plates. Our quotations for these and other forms of iron and steel will be found in our usual table of current prices on another page.

Steel Rails.—The contract for the Union Pacific

Railroad is reported to have been taken by the North Chicago Rolling Mill at 27½, or possibly a little below this. The contract amounts to 17,000 tons. The competition for this order was chiefly between the North Chicago and the Edgar Thomson works. The Missouri Pacific order for 20,000 tons is in the market and it is expected will be closed before our next issue. The associated steel rail mills have sold this year 1,251,177 tons, and have still to sell about 200,000 on their allotment. At least these were the figures on the 1st of December. It is understood, however, that the quantity of rails sold has now increased to not far from 1,400,000 tons. It is reported that 270,000 tons have been sold for next year's delivery, but several large contracts have since been placed, so that the amount already under contract for next year is probably nearly 400,000 tons. Some of the Eastern mills have taken a large proportion of this amount. It is not pretended that the prices obtained are up to the standard, but they are higher than some of the sales recently reported in Pittsburg and Chicago.

Old Rails.—The Old Rail Market continues in an anomalous condition. We hear of sales of a few thousand tons on the basis of \$23 on the cars here for Tees, and we hear of 2000 tons double head to arrive, offered ex ship at \$25, a price which might possibly be shaded.

The price of old rails remains, in Pittsburg, at very nearly the price of new rails, and since there is no prospect of higher prices for new rails, the price of old must apparently decline. At present the mills that use them run on light stocks, and when they run short are willing to pay abnormal prices; but some of the best informed parties in the trade believe that present rates cannot long continue to rule.

Nails.—The cut-nail manufacturers of the Ohio Valley from Steubenville to Ashtand, Ky., and including Ironton, Middleport, Bellaire, Mingo, and the Wheeling mills, met at Wheeling, W. Va., on the 11th inst. It was agreed to form an association for the better maintenance of prices and to secure the strict carrying out of contracts. The name of "Western Cut-Nail Association" was adopted, with J. N. Vance, of Wheeling, president, and Edward Hazlett, also of Wheeling, supervisor. A \$1.90 card rate with the usual terms was agreed upon. The association is in no sense a pool, and there is no restriction on production, but the efforts of the organization will be confined to bettering the general condition of the manufacturers and imparting a more healthy tone to the market at all times.

Louisville. Dec. 11.

[Special report by Messrs. HALL BROTHERS & Co.]

The volume of the week's business shows some improvement, though there have been no transactions of any great importance, the larger demand being for forge irons; although towards the close of the week a few round orders have been taken for foundry irons and some sales of bright and silvery irons have been consummated. While the Southern furnaces are accepting business as it comes to them, they do not display any special anxiety for trade at present, most of them being comfortably sold ahead for thirty to sixty days. Quotations, for cash basis, f.o.b. cars at Louisville, will be found in our weekly register of prices.

Philadelphia. Dec. 13.

[From our Special Correspondent.]

The steel rail market continues in a most unsettled and unsatisfactory condition. Eastern mills are doing very little business and will not till prices are definitely settled. Prospects for large contracts are by no means promising. Western mills are getting the bulk of the business afloat, as most of it is from Western and Southern roads they find it to their advantage to patronize Western mills. Contracts this week, to present writing, foot up about 10,000 tons. A good many inquiries have been made, including some offers, but rail makers are halting between two opinions. The probabilities seem to be that slightly lower prices will be taken, but makers deny it. The outlook for larger business is very favorable among mills outside of this locality.

The most interesting feature outside of steel rails is the car-iron demand. The Pennsylvania Company has asked bids for the construction of 1500 cars; in addition to these, other roads will shortly be in the market for nearly as many more. Medium and common iron makers will compete very actively for this business, and it will materially help to strengthen prices, which of late have manifested a downward rather than upward tendency. The bar market is in good condition also because supplies in consumers' hands are light, and a good deal of business will be placed during January which will push buyers into the market for merchant bars.

The crude iron market is lacking in interest. Pennsylvania companies are hooking but few orders. Prices are firm for standard and choice brands, but weak for inferior. Large buyers hesitate to purchase beyond sixty days requirements on account of the numbers of furnaces blowing in and the possibility that prices for some reason or other not apparent may work downward. Very choice iron would still bring its own price. Stocks at furnace are light. Another furnace has just blown in at Allentown and two or three more will soon start. Founders expect to be large buyers of iron during the winter. Just at present most of them are refusing to contract, although solicited by concessions on ordinary brands. The probabilities are that there will be some large orders placed by railroad builders early in the year. Negotiations are now going on and prices are the

only cause of the holding back of orders. Railroad builders cannot lower quotations. A large amount of ship-building work has lately been brought to light.

The structural iron makers are taking very little new business. Tariff agitations are having an effect upon buyers who think that that they will probably be able to obtain foreign material in a few months. Prices are firm. A great deal of work is in sight. There is still less doing in merchant steel, but no change in quotations. Large lots of rails are wanted in the interior and small lots are selling at holders' terms.

Nails are weakening and a good many factories are idle. There is nothing whatever encouraging in this branch of trade. Builders are tied up for this winter. Only small lots of tubes and wrought iron pipes are selling. Quotations will be found in our weekly register of prices.

Pittsburg. Dec. 13.

[From our Special Correspondent.]

Raw Iron.—For the past week a fair business was transacted, when the season is taken into consideration. Buying for 1888 delivery is about over. There is, however, a fair inquiry for the first three months in the new year. The amount sold, if added together, would show up well, indicating that requirements for the coming year will be large, while at the same time other buyers are disposed to hold off with the expectation that they can make better terms later on.

There seem to be widely opposite views in regard to this matter. Sellers in most instances show no anxiety to sell. Certain furnaces that make No. 1 Gray Forge have set the figures at \$16@16.25 cash, and will not listen to anything less, and are not doing any traveling in order to obtain trade. On the other hand, there are certain descriptions of iron that can be obtained below \$16 cash. You can take your choice. This condition of affairs may continue during the balance of the year, although there is quite a possibility that at least a number of buyers may decide to place their orders at about present rates. Again, there are others who have allowed their stocks to run down that will require more raw material before the orders on hand can be completed. Taking the price of labor, coke and ore into consideration, on the whole there seems to be an undertone of strength, notwithstanding an apparent dullness.

The general opinion is that there will be plenty of business after the turn of the year. The nail men have reorganized under the style of Western Cut Nail Association. Card rates for nails were fixed at \$1.90, with the customary discounts. The pig iron market in most western cities is reported firm, with many orders being booked, principally for delivery early next year. The next trouble will be caused by the advance in coke, which is expected about the first of the year.

Coal and Coke Smelted Lake Ore.

1000 Tons Gray Forge, December	16.00 cash.
1000 Tons Gray Forge, January	16.00 cash.
1000 Tons Bessemer, January and February	17.00 cash.
1000 Tons Bessemer, "	17.00 cash.
1000 Tons Gray Forge	15.85 cash.
500 Tons Gray Forge	16.00 cash.
500 Tons Gray Forge	16.00 cash.
300 Tons Gray Forge	16.00 cash.
300 Tons Gray Forge	16.00 cash.
200 Tons Gray Forge, Storage	15.50 cash.
100 Tons Bessemer No. 1	18.25 cash.
50 Tons Silvery	17.00 4 mo.
50 Tons No. 2 Foundry	17.00 cash.

Coke, Native Ore.

300 Tons Gray Forge, Cold Short	15.50 cash.
75 Tons No. 2 Foundry	17.00 cash.
75 Tons Mottled and White	15.50 cash.
50 Tons White Iron	15.00 cash.
50 Tons Gray Forge	16.00 cash.
25 Tons Silvery, Extra	19.00 cash.
25 Tons No. 2 Foundry	16.75 cash.

Charcoal.

225 Tons Foundry, off lot	19.00 cash.
50 Tons Cold Blast	25.00 cash.
75 Tons No. 2 Foundry	23.00 4 mo.

Steel Slabs and Billets.

500 Tons Billets	28.60 cash.
500 Tons Billets	28.50 cash.
500 Tons Nail Slabs	28.50 cash.
1000 Tons Billets	28.75 cash.

Muck Bar.

500 Tons Neutral	29.25 cash.
1000 Tons Neutral, February	29.70 cash.
1000 Tons Neutral, January	29.25 cash.
250 Tons Neutral, January	29.25 cash.

Old Iron and Steel Rails.

1250 Tons American T's	25.25 cash.
300 Tons American T's	25.10 cash.

Steel Bloom End.

1000 Tons Bloom Ends	19.50 cash.
500 Tons Bloom Ends	19.50 cash.

Ferromanganese.

100 Tons Imported 80 per cent	56.00 cash.
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FINANCIAL.

NEW YORK, Friday Evening, Dec. 14.

The market was more active this week, and quite a large business, as compared with previous weeks, was done in some of the stocks.

Silver King declined from \$1.05@85c., but to-day it advanced again to \$1.20.

Phoenix, of Arkansas, appeared on the list at 25c. Colorado stocks were lifeless. Leadville shows a small business at 10@12c.; Little Chief at from 18@20c.; Breece at 20@22c.; Dunkin at 90c. Plutus was active at 75@76c. Silver Cord was quoted at 75c.; Monitor at 5c.; Lacrosse at 8c.

Alice records a few sales at 97@90c. Brunswick shows one sale at 10c. Quicksilver Preferred was neglected. A sale was made at \$35. Common shows no business.

The business in Bodie stocks continues to be dull. Bodie Consolidated is quoted at \$1.50 and Standard at from \$1.20 to \$1.10.

The Amador stocks continue to show the usual prices.

In another column will be found a circular issued to the stockholders of the Plymouth Consolidated Mining Company. The statement made is that the recent fire did not damage the mine very much. This would appear to show that rumors current at different times, that the fire was used as a lever to bear the stock in order to allow insiders to buy it in at a lower price, may not have been altogether imaginary. The stock recently advanced from \$7 to \$10, and this week declined from \$10 to \$9.

There was a downward movement in United Copper, which went from 55@47c.

El Cristo still continues to be neglected at 77c.

Some 274 shares of Ontario changed hands at from \$33.50 to \$32.75.

Horn-Silver shows one sale at 85c.

Rappahannock shows no change, and remains at 10c.

A large business was done in Colchis, which showed transactions amounting to 2150 shares at declining prices, from \$2.05 to \$1.90.

The only sales in Dakota stocks recorded were one in Caledonia at \$3.50 and a few in Iron Hill at 8 and 10c.

The Consolidated California & Virginia Mining Company has passed the November dividend, after regular payments for two years. The company has cash in bank and unsold bullion valued at \$165,506.72, with further shipments to arrive on November account. Some 1700 shares changed hands at prices which showed a decline from \$11@9.88.

Sierra Nevada advanced from \$3.95@4.20, but later declined to \$3.95. Savage records one sale at \$4.20. Gould & Curry one at \$4.25. Hale & Norcross one at \$6. Ophir went from \$8.50@7.50.

Chollar from \$3.90@3.75, and Eschequer from \$1.80@1.70. Mexican advanced from \$4.75@4.95.

Julia was firm at from 45@54c. Bullion went from \$2.05@1.85, and later advanced to \$1.95. Best & Belcher was higher, selling at from \$6.88@7.50.

Barcelona was more active. The price was steady at from 69@70c.

The Tuscarora stocks show a small business, excepting in Commonwealth, which was active and advanced from \$3.90 to \$4.10. Besides this sales were made in North Belle Isle at \$3, Belle Isle at 50c., Tornado at 15c.

Eureka Consolidated, in which little interest is shown in this market, shows one sale to-day at \$3.

Sutro Tunnel stock was firm at 8@9c., and Trust Certificates declined from 67c. to 64c.

Considerable attention was again directed to Buffalo Iron Mining, which opened at \$6.25 and later declined to \$6; but later on Wednesday the price again advanced to \$6.88, and to-day sales were made at from \$6.25 to \$6.88.

The Mutual Mining and Smelting Company, the stock of which was recently listed on the Consolidated Stock and Petroleum Exchange, was incorporated under the laws of the State of New York about a year ago, with a capital stock of \$100,000, divided into 100,000 shares. The president and treasurer of the company is Mr. J. S. Moore, otherwise known as "Parsee" Moore. Peter T. Barlow, the son of the well-known jurist, S. M. Barlow, is secretary. Senator Jones, of Nevada, is reported to be interested in the enterprise, and John W. Mackay is also said to have helped the scheme along, although not interested in it himself. A forty-ton smelter has been erected by Messrs. Fraser & Chalmers at a cost of \$30,000. One run has been made, the gross result of which was \$30,000. The company's property is located at Caldwell, Washington Territory, and consists of about 660 acres, of which 160 acres were contributed by the town, and 500 were purchased by the company for the purpose of making their own charcoal. Ore is now being collected from the mines of the district, which are all comparatively small, with the exception of the Old Dominion, and next April another run will be made. The company receives \$25 per ton and 10 per cent of the gross value for smelting, and, according to Mr. Moore, "this gives a very decent profit to the Mutual Mining and Smelting Company." The stock opened at \$1.65, but on Wednesday declined to \$1. Since then sales have been made at \$1.10 to \$1.15.

Meetings.

American Coal Company, of Allegheny County, Md., No. 1 Broadway, Room 152, New York City, December 27th, from twelve o'clock noon to one o'clock P.M.

Dividends.

The following dividends have been declared: Aspen Mining and Smelting Company, dividend No. 2, twenty cents per share, or \$40,000, payable December 19th, at No. 54 Wall street, New York City.

Candelaria Consolidated Mexico Mining Company, of Durango, Mexico, dividend of 25 cents per share, aggregating \$30,000, and payable immediately.

Carlisle Gold Mining Company, Limited, of New Mexico, twelve and one half cents per share, or \$25,000, payable December 10th, in London.

Franklin Mining Company, of New Mexico, dividend No. 21, two dollars per share, or \$80,000, payable January 1st, to stockholders of record December 19th.

Lehigh Valley Railroad Company, quarterly, one and a quarter per cent, payable January 19th, at No. 228 South Third street, Philadelphia, Pa.

Philadelphia (Natural Gas) Company, dividend No. 38, one per cent, or \$75,000, payable December 25th.

Tennessee Coal and Iron Company, semi-annual dividend on preferred stock, payable January 2d,

Assessments.

Table with columns: COMPANY., No., When levied, D't'nt in office, Day of Sale, Am't per share. Lists various mining companies and their assessment details.

FINANCIAL STATEMENTS.

The following are the financial balances of the various mining companies on December 1st:

Table with columns: COMPANY., CASH ON HAND, and other financial metrics. Includes companies like Alpha Con., Alta, Andes, etc.

* Cash in bank and unsold bullion on hand valued at \$165,506.72, with further shipments to arrive before the close of the fiscal month.

† With assessment pending to be collected. ‡ With last assessment levied to be collected. ** Bullion on hand to meet an indebtedness of \$4769.43, with other shipments to arrive.

Table with columns: COMPANY., INDEBTEDNESS, and amounts. Lists companies like Challenge, Grand Prize, Holmes, etc.

Pipe Line Certificates.

Despite the radically "bull" talk which is heard on every side, during the week under review little progress toward a permanent improvement in values has been made...

NEW YORK STOCK EXCHANGE.

Table with columns: Opening, Highest, Lowest, Closing, Sales. Shows stock market activity for Dec 8-14.

Total sales in barrels..... 4,380,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

Table with columns: Opening, Highest, Lowest, Closing, Sales. Shows consolidated stock and petroleum exchange activity.

Total sales in barrels..... 7,320,000

Auction Sale of Stocks.

At the Real Estate Exchange on the 12th inst., the following securities were sold at auction: Estate of Abraham Downey, deceased, 5 bonds of

IMPORTS AND EXPORTS OF METALS AT NEW YORK DECEMBER 4 TO DECEMBER 10, AND FROM JANUARY 1.

Large table with multiple columns: Week, Year, Tons, Pounds, etc. for various metals like Spelter, Zinc, Lead, Iron, Steel, Tin, Copper, Nickel, etc. Includes sub-sections for imports and exports.

CURRENT PRICES.

Table of current prices for various commodities including chemicals, acids, alkalis, and minerals. Columns list item names and prices per unit.

Table of current prices for building materials and metals. Columns list items like bricks, stone, cement, and various metals with their respective prices.

Table of current prices for iron and steel products. Columns list items such as pig iron, steel blooms, and various types of steel with their prices.

Table of Philadelphia prices for various goods and services. Columns list items like foundry products, steel rails, and other materials with their prices.

Table of stock market quotations for Baltimore and Birmingham. Columns list company names and their stock prices.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

* Gold. * Silver. * Lead. * Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends, and the Terra \$75,000. ¶ Previous to the consolidation in Aug., 1881, the California had paid \$31,320,000 in dividends, and the Con. Virginia, \$28,500,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid \$1,350,000 in dividends. †† 1,300,000.

NEW YORK MINING STOCKS QUOTATIONS.

Table with columns for Dividend-paying Mines and Non-Dividend-paying Mines, listing company names, dates (Dec 8-14), and sales figures.

Ex. dividend. †Dealt in at the New York Stock Ex Unlisted Securities ‡Assessment paid Dividend shares sold, 19,331. Non-dividend shares sold, 55,650. Total New York, 74,981.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, dates (Dec 7-13), and sales figures for various mining companies in Boston.

Boston: Dividend shares sold, 10,897. Non-dividend shares sold, 7,576. Total Boston, 18,473.

COAL STOCKS.

Table with columns for Name of Company, Par val. of sh'rs., dates (Dec 8-14), and Sales figures for coal stocks.

*Bid. †Asked. ‡Ex-dividend. *Of the sales of this stock, 51,861 were in Philadelphia, and 193,119 in New York. Total sales, 438,362.

San Francisco Mining Stock Quotations.

Table with columns for Company, dates (Dec 7-13), and closing quotations for various mining stocks in San Francisco.

the Radical Mining Company, of Colorado, 6 per cent interest in gold, due Oct. 1, 1888, \$100 each, Nos. 30, 31, 32, 33, 34, \$15 each; 5415 shares of the Radical Mining Company, of Colorado, \$5 each, non assessable, \$92.50 lot. Estate of Joshua Jones, deceased, 305 shares Pennsylvania Coal Company, \$50 each, \$300; 300 shares Consolidated Coal Company, of Maryland, \$100 each, \$26.25; 239 shares Mahoning Coal Railroad Company, preferred (guaranteed 5 per cent by Lake Shore & Michigan Southern Railway Company), \$50 each, \$102.50.

Electric Stock Quotations.

The following are the latest quotations, prepared for the ENGINEERING AND MINING JOURNAL by Messrs. Crozman & Quick, brokers, New York city: Edison, \$148@155; Edison Illuminating, \$94@95; Brush, \$35@45; Brush Illuminating, \$80@90; United States, \$20@30; United States Illuminating, \$40@50; Daft, \$40@60; Consolidated, \$50.

Boston Mining Stocks. Dec. 13.
[From our Special Correspondent.]

The market for copper stocks has shown very little activity the past week, and there has been no special features. Prices have been fairly well maintained, and the feeling is generally bullish. Calumet & Hecla opened at \$300, sold down to \$290, and recovered to \$296½. The reports from the mine indicate that the fire is under control, and those parties who were frightened into selling their stock have been quietly buying it back again. There have also been orders in the market to purchase stock which came from the lake, thus indicating the belief that matters were not so serious as at first reported. Quincy has developed a little more activity on the decline, and is now quite steady at \$79 and \$80, with sales at both figures.

Boston & Montana has been very steady at \$70. All the stock offered at \$70 has been taken quite readily, and higher prices are quite probable. Franklin took an upward start on the announcement of a \$2 dividend, payable next month, and advanced to \$18. There is no improvement in the production of the mine, but rather a falling off, and were it not for the high price received for copper, thanks to the syndicate, the stock would sell much lower.

Atlantic is firm at \$177@18. Osceola has developed a weakness, and considerable stock coming on the market caused a decline to \$19. Tamarack has shown considerable activity for this stock, the market being strong at \$174@175. Kearsarge declined at the close of last week to \$10½, but has been in better demand, and advanced to \$12, with a reaction to \$11½.

Butte & Boston sold at \$27@28, with small lots at \$28½@29.

Allouez has been very strong and in good demand, advancing to \$4½. The outlook for this stock is very promising.

National declined from \$8 to \$7½ on sales of 800 shares.

Fewabic sold at \$6. Bonanza holds its own at \$1½@1¾. We hear that it will sell much higher in the near future.

In silver stocks there is but little doing. Dunkin sold at 90c. The latest report from the mine is that they are increasing the output of iron ore, and that it carries more silver to the ton than formerly. A remittance of \$5000 is looked for in a few days, which will enable the treasurer to pay the regular quarterly dividend of 5c. per share next month without disturbing the surplus now on hand, which is about \$40,000.

Napa Quicksilver sold at \$2¼ to \$2, about 1000 shares.

Catalpa dull, at 17@18c. Crescent, 8@10c. Cusi at 5c.

LATE PRICES.

(By Telegraph)—December 14th, 1 P. M.—Calumet & Hecla, 295; Tamarack, 173½; Burlington & Quincy, 8; Boston & Montana, 69½; Franklin, 18; Atlantic, 18; National, 7½; Kearsarge, 11; bid, Huron, 6; Allouez, 4½.

St. Louis Mining Stocks. Dec. 14.
[From our Special Correspondent.]

A dull, narrow, featureless market is all that can be said of St. Louis mining stocks during the past week. An advance in West Granite was looked for anxiously, and a drop in Frisco would not have been surprising, but neither moved one way or another, and the week closes with the prices of nearly all stocks little changed. Some gossip about a property recently placed here—the Major Budd—has occasioned a deal of curiosity. The mine is situated in Montana, and from all that can be learned regarding it, is most promising. There seems to be but little doubt but that present developments show a large body of ore, and as far as the mine itself goes, there's every reason to believe the deal is a square one. The company operating the property is incorporated under the laws of Montana, with its office and directors located at Helena. A transfer office has, however, been opened here with the broker who placed the property in charge. Now comes a gentleman from Montana well known in St. Louis mining circles who pronounces the whole thing a fraud, and makes the startling and sensational statement that there is no deed, lease nor contract by which the title or even control of the mine is vested in the company. A different story, however, is told by the representative of the company here. The title to the property I am assured is absolutely in the company, and this may be accepted as a settled fact, as the character and reputation of the gentlemen in charge of the mine is a

guarantee of absolute fairness. Further inquiry elicited the fact that the aforesaid prominent gentleman is indulging in a little game of bluff, with a view of materially benefiting himself, and that so far as attacking the title nothing has been done by any one; on the contrary, this gentleman has made a claim in the shape of a demand made by a third party for interest on 150,000 shares of stock which would certainly be valueless if the aforesaid very prominent gentleman's assertions and statements were true. Stockholders in the Major Budd may rest assured that their property is all right, and all this talk is nothing more than a little game to get a slice of a valuable block of stock. The market closes quiet and dull. The closing bid and asked prices of the active stocks dealt in on the Mining Exchange was as follows:

	Bid.	Asked.	For the week.	
			H.	L.
Adams, Colorado.....	30	40	.45	....
Bi-Metallic, Montana.....	34.00	36.00	....	....
Black Oak, California.....	35	37½	38¾	35
Concepcion, Mexico.....	12½	15	17½	13¾
Granite, Montana.....	47.00	48.00	48.00	47.00
Hope, Montana.....	5.40	5.60	5.50	4.75
I. X. L., Colorado.....	.07	.08	.12½	.07½
Jumbo, Colorado.....	.22½	.25	.30	.22½
Major Budd, Montana.....	.50	.55	.55	.50
Mary Foster, Colorado.....	.08	.09	.09½	.05
Pat Murphy, Colorado.....	.17½	.20	.18¾	.15
Pedro, Arizona.....	....	.06	....	....
San Francisco, Montana.....	.25	.27½	.35	.25
Silver Age, Colorado.....	.87½	.95	.90	.80
Small Hopes, Colorado.....	.70	.75	....	....
St. Louis M. & I. Mexico.....	.10	.12½	.15	.10
West Granite, Montana.....	.60	.62½	.65	.55
Wire Patch, Colorado.....	.37½	.40	....	....

London Stock Market.

After the public craze in England for investments in breweries and music halls it is natural that cigars should meet with their due meed of recognition. Already a large company has been formed to purchase the Havana factory in which is manufactured the once famous Partaga cigar, and a dispatch this week from Havana announces the purchase by an English syndicate of the Heary Clay factory for a sum of \$1,650,000, an advance over actual value that would be incredible anywhere else than in London. The British investor in beer and cigar shares has the satisfaction of knowing that he is imbibing and smoking toward dividends.

The Ridgeway mines of Trinity County, California, have been sold to an English company with a capital of £15,000. The gentlemen forming the syndicate have been interested for some time past in the New River District, and have managed their mining interests with economy and judgment. Their new venture is not overburdened in capitalization and it looks well to see that the parties actually in interest have subscribed their names to the Articles of Association.

The Wilson mine, situated about 6 miles from Silver City, Idaho, and owned by Delamar and others, is to be offered upon the London market. Mr. Delamar was in London some six months ago with the intention of bringing it out, but the "Alien Act" interfered with his negotiation. At that time he had at his back a strong and conservative firm. Whether Mr. Delamar will be more successful, aided by his fellow-countryman, Mr. Kemp Van E., remains to be seen. Mr. Kemp Van E., who has the reputation of having aided in floating more wildcat mines than any other one American, sailed for London a week ago, and Mr. Delamar follows next week.

It is stated in a Nevada paper, presumably upon the authority of Mr. Wenban, that the Cortez mine, Eureka County, has not been sold to London capitalists, as heretofore announced. Out of 300,000 shares of capital stock, 10,000 were floated in London at £1 per share. This may be so, but a company was formed in London which purchased the property. Its board of directors and office is located there, and Mr. Wenban, we opine, as a shareholder of that company, may for the nonce be classed as an English capitalist. Whether it is a good business move upon the part of the owner of a mine like the Cortez to organize a company in London and practically pay out of his own pocket the expenses of a cumbersome form of management located at the other end of the earth from the seat of operations, is another question. We are inclined to doubt its wisdom, and think it would have been better had Mr. Wenban declined to go to allotment upon so small a public support. Nick Coleman had the property in London and Paris some two or three years ago endeavoring to make a trade, but he was not willing to accept such terms.

It looks very much as if La Luz, of Mexico, was being gradually snuffed out. The stock has only been on the market a month or so, and it has steadily declined until it is now only nominally quoted at 7s. @ 8s. However, the public has not taken in a very large quantity of it.

One our London contemporaries complains of the long and senseless reports furnished by the mining companies for publication, and suggests that irrelevant matter be left out, and simply the result of the working given. We are much afraid, if this course were

adopted, some companies would have very little to say.

Mr. Justice Kay, by a recent decision in the case of the Faure Electric Accumulator Company, has caused great consternation in the ranks of bankers, brokers, and company promoters. He holds that the payment by the directors of a joint stock company of a commission to a broker for the sale of the company's stock is *ultra vires* and illegal. This decision can hardly be upheld in its strict literal sense; but every one is familiar with the many ways of getting around any such law, otherwise brokers might as well retire from business. That brokers are entitled to a reasonable commission for placing the stock of a company has never yet been questioned, and it is just as reasonable to ask Mr. Justice Kay to sit on the bench and render decisions for a salary of nothing a year as to expect a broker to work for nothing. Mr. Justice Kay has evidently never had to hustle for a living.

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Dividend No. 2 of TWENTY CENTS PER SHARE has this day been declared on the stock of this company (200,000 shares), payable at the office of the company on and after the 15th day of December, to stockholders of record. The transfer-books will be closed on Thursday, December 13th, at 12 o'clock noon, and reopened on Monday, December 17th, at 10 o'clock A.M.
J. L. TILTON, Secretary.

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By **RICHARD E. CHISM, Mining Engineer.**

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