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EDISON evidently means business in pushing his system of electrical railroads, if the reports current are to be credited. It is stated that a contract has been entered into by him with the Northern Pacific Railroad for the construction of fifty miles of railroad in Minnesota. The section is to be finished during the course of the next year, and only if the tests to be made to prove its efficiency are satisfactory is full payment to be made.

It is announced from Berlin that a somewhat novel exhibition is to be opened on May 15th, 1882, in that city, to embrace all appliances for the hygiene of cities, buildings, workshops, and mines. There can be no doubt that such an exhibition will do much to favor progress in sanitary science and allied subjects; and as it is stated that much prominence is to be given to mining, the matter deserves some attention in this country also. We may add that the managers expect that Americans, who have of late made such rapid advances, will largely participate.

We print elsewhere some interesting data relating to modern progress in the manufacture of magnesia as a refractory material for furnace lining. The subject is beginning to assume an importance which can not be overestimated. It is not too much to say that the success of improvements in some metallurgical operations largely hinges upon the solution of the question of providing a suitable material for the construc-

tion of those parts of the furnace which are intended to resist high heat and the corrosive action of cinder or slag. The existence of suitable raw materials in this country or in Canada is doubted by some who have investigated the matter. If proved, such deposits of magnesite might serve as the basis of an important industry, and we trust that a careful search will be made, our various geological surveys notably being in a position to do much good.

We have been favored by Mr. J. C. PARKES, General Manager of the North Chicago Rolling-Mill Company, with the following details of the output of those works, which it will be noted are highly creditable. During the first ten months of the current year, the Bessemer plant produced 103,329 gross tons and 350 pounds of steel ingots, making 15,780 blows of 6.54 tons each. The best 24 hours' work during that time was 567 tons, 1540 pounds, while in one week 2696 tons and 2180 pounds were turned out. The best month's work on record was 11,573 tons, 590 pounds. The rail-mill produced during a period of ten months 86,124 tons, 1200 pounds of rails, the average weight being 56 pounds per yard. Of this quantity, only 2919 tons, 1590 pounds were of second quality, making the percentage of that grade 3.93. As the following record of the best work in different periods will prove, the average was not very far from the highest work done, the best day of 24 hours showing an output of 509 tons, 640 pounds; the best week, 2446 tons, 120 pounds; and the best month, 9393 tons, 550 pounds. The first blow of the converters of the North Chicago Rolling-Mill Company was made on April 10th, 1872.

PROFESSOR REULEAUX, of Berlin, has become involved in a quarrel in which indirectly American manufacturers of rock-drills have some interest. Professor REULEAUX will be remembered as the German Commissioner to the Philadelphia Exhibition, who created a great stir in his own country by pronouncing a large part of its exhibits "cheap and bad," and who objected strongly to the tendency of German manufacturers to torture every conceivable material into the forms of the EMPEROR, BISMARCK, or MOLTKE. Professor REULEAUX has finally by this fearless course won the esteem of many classes in Germany, and has since then received the vigorous support of the government, who sent him to Australia as commissioner to the exhibitions there held. He has taken occasion, in writing of the exhibits, to speak highly of American rock-drills and air-compressors, and has thus given much offense to the German representatives of that interest, who accuse him of not knowing the difference between a rock-drill and a drill support. There seems to be some ground for their growling at the way in which the professor managed things at the exhibitions; but those who have compared German and American percussion-drills without prejudice will concede the superiority of the latter in the matter of lightness, and will acknowledge that REULEAUX'S advice to the Germans to study our machines is wise.

RECENT advices from Germany give a good idea of the present status of the oil-wells near Oelheim, in Hanover, about which there has been so much excitement in that country, and which have, it is stated, led to the investment of English capital, and will, in the near future, be examined also by American experts. It appears that twelve different parties are now in the field, the majority of them having done actual work in the way of sinking wells. Out of the fifty-two wells now sunk or in course of sinking, one half have reached the oil-bearing strata at a depth of about two hundred and fifty feet. Of that number, twenty-three are actually producing oil, the quantity, of course, varying largely. The notorious MOHR enterprise has ten producing wells, whose capacity ranges from six to eighty barrels per day, the total probably not exceeding one hundred and fifty barrels. Another concern, controlled by Bremen capitalists, who have been at work for about one year and a half, pumps oil from eleven wells, which, in the aggregate, yield one hundred barrels. As yet, it will be noted, the output is very limited, and it need not give rise to any apprehension that our Pennsylvania producers will lose any considerable portion of their German markets. Future prospecting must prove whether the Oelheim wells are capable of any large or sustained yield, and it would be premature to venture a decisive judgment on the question. But as yet the developments do not justify the sanguine expectations of our German friends.

UNDER the title "Our Prominent Mines," the Times of this city is publishing a series of articles signed H. C. S., the status of which is not clearly defined. They are so placed in its columns that the average reader will look upon them as ordinary matter, the publication of which is editorially sanctioned. In substance, however, they are clever advertisements. We have no information to enable us to say with confidence whether or not they are paid or voluntary contributions, or whether they are admitted as a part of the advertising columns. Their present form

is dangerous, both to the acknowledged high standing of that newspaper and to the best interests of our mining industries. It is not our province to discuss the business or editorial policy of the *Times*, so far as it involves its own interests. Nor are we concerned in solving the question whether it has been led into printing the articles referred to by a some what reckless correspondent, or whether the matter has been printed with a full knowledge of its object. It is, however, our duty to utter an emphatic protest against the effort to induce the public to invest in mines through the public press in such a way, especially when it is made through the medium of the reading columns of an influential daily paper. The *Times* has in this way printed a glowing account of the future of the Hamilton process, which is, to say the least, an untried invention. The mines chosen as examples are undoubtedly "prominent," and so far as we have been able to learn, the statements advanced concerning the ore-bodies and developments of some of them are within the truth; but they are not the whole truth. It is only the most sanguine or the most poorly informed of our investing public who will be attracted by such statements. Though the final issue prove to be all that the investors expected in a number of cases, the great expectations fostered by such accounts and probably largely exaggerated independently of them, must be doomed to partial disappointment. Even with good and regular profits, there will be a lingering sense that injustice has been done them. If, however, they should find their investment unprofitable, their loss will be a serious blow to legitimate mining. The greatest source of danger to it is exaggeration. We do not directly refer to any or all of the mining enterprises brought forward by the *Times* thus far; but it is difficult to state where these communications will end or what schemes may in the future be brought to public notice, apparently backed by the *Times*.

THE usual monthly Board of Trade returns on the shipments of iron and steel from Great Britain are now at hand, covering the month of October. At present, the greatest interest concerning the export movement from that country centers in the shipments of railroad material, which is even now exceeding all the expectations of earlier days. During the ten months ended October 31st there were sent away 713,874 tons of railroad iron and steel, of which 108,606 tons were iron and 512,370 tons were steel rails, a very notable increase when compared with former years. In the corresponding periods of 1871 and 1880, the total shipments were 392,171 and 596,481 tons respectively, the steel rails steadily increasing from 283,989 tons in ten months of 1879 to 408,280 in 1880, and 512,370 tons in 1881; while of iron rails the quantities were 43,781, 116,568, and 108,606 tons respectively. The greater portion of this increase is due to the demand from this country, our supplies from that quarter having been, for the time specified, 28,575 tons in 1879, 191,491 tons in 1880, and 262,097 tons in 1881. When these amounts are deducted, it will be noted that the balance, covering the shipments to regular customers, has not shown any remarkable development, the figures being 364,596 tons in 1879, 404,990 tons in 1880, and 451,777 tons in 1881. Glancing over a list at hand, which has too little general interest, the largest customers are Canada, with 62,220, 82,323, and 104,801 tons respectively; Australia, with 50,447, 70,897, and 79,728 tons; and India, with 70,357, 117,280, and 78,477 tons. There are similar fluctuations in the amounts taken by other countries, but they approximately counterbalance one another. These details may serve to show largely the steel-rail trade is for the present dependent upon orders from this country, as it is well known that the home trade is comparatively limited. The shipments from England to this country are therefore largely due to the exceptional state of affairs in our rail trade, and this refers not alone to our receipts of English railroad iron and steel, but also to a considerable portion of other articles in the following list:

BRITISH EXPORTS OF IRON AND STEEL TO THE UNITED STATES.

ARTICLES.	Month ended Oct. 31.			Ten months ended Oct. 31.		
	1879 Tons.	1880 Tons.	1881 Tons.	1879 Tons.	1880 Tons.	1881 Tons.
Pig-iron	87,491	14,705	38,300	164,134	578,748	447,248
Old iron for re-manufacture.....	33,111	2,404	8,441	92,910	191,558	74,594
Steel unwrought.....	721	2,023	15,914	4,981	35,597	13,359
Tin plates	14,345	14,208	17,022	124,354	138,364	146,611
Hoop and Sheets	89	2,583	1,441	3,931	40,741	30,753
Bar, Angle, Bolt, and Rod	2,242	1,977	2,061	5,532	49,610	11,521

Much, if not the bulk, of the pig is English Bessemer metal, which our steel mills have had to buy to cover their contracts for rails, and nearly nine tenths of the "steel unwrought" are Bessemer steel blooms from which rails are rolled in this country. To this the recent decision of the Treasury Department has put a check. We do not propose to enter into the question whether or not this decision was just. It will not probably do our home industry any good, because probably an equivalent quantity of pig or ore will have to come in. The returns, as they stand, prove fully

that the heavy exports from England to this country are principally brought about by the prevailing "railroad boom," the home trade, notwithstanding its great recent expansion, not being able to cope with it.

THE COMPETITION BETWEEN WATERLINES AND RAILROADS.

There has been much agitation of late to provide better means for the utilization of our water-ways for transportation, and to place existing water-lines in a better condition to compete with railroads. In the West, the regulation and improvement of the Mississippi are urged upon Congress with much force and persistency, and the question of enlarging the Erie is discussed with vigor in the East. The people of the Mississippi States and of New Orleans hope that they may secure the diversion of considerable traffic to those quarters, and those of New York are looking with some uneasiness to the efforts making by the Canadians to obtain a large share of business by the building of the Welland Canal and the improvements connected with it. The hopes of those whose interests are involved in the completion of these projects are apparently great, and the questions concerning the influence of the competition of water-ways upon the rates of railroad companies directly or indirectly influence the prosperity of all, and notably the producers of raw materials. There is, however, quite a general misapprehension concerning the manner and the extent to which water-lines have a regulating influence upon the business and the rates of railroads. Mr. JOSEPH NIMMO has quite recently issued a pamphlet, a part of his annual report on the internal commerce of the United States, in which he lucidly treats the questions at issue. Though referring particularly to competition between Mississippi River navigation and the trunk lines extending to the Atlantic seaboard from St. Louis, his remarks bear largely upon the general question; so that we may follow his argument profitably.

The water-ways of our country are limited in extent and influence compared with our network of railroads. The section west of the Mississippi is almost entirely dependent upon the latter; and east of it, it is only the Ohio, with its tributaries and some less important lines, and the Hudson River with the Erie Canal, that carry large quantities of goods. The great mineral traffic from the north of Michigan is dependent upon the lakes for cheap transportation. The difference between water and rail transportation for copper, for instance, being nearly a cent a pound, copper shipments and iron mining practically cease during the winter. It is this fact that water-lines are available during a part of the year only that largely restricts their utility; ice in winter, and in many cases brought in summer, narrowing down the time within often a very brief period. For lower-class freights, among which ores and coal take a very prominent position, this virtually leads to a practical cessation of operations, with all the disadvantages attending alternate periods of intense activity and idleness. It causes in turn the accumulation of great stocks and a drain of the markets, involving the employment of large capital and large forces of men. Keenly as these disadvantages are felt when reliance must be placed exclusively upon water transportation, it considerably affects business also where this and railroads enter into competition, and counteracts an influence which is so largely beneficial.

Mr. NIMMO, however, justly calls attention to and lays great stress upon one point which has much to do in limiting the influence of available water-ways upon freight rates. He says, "The movements of commerce are directed by the trade forces rather than by the transportation forces of the country;" which he explains by stating that the competition for business between cities, as represented by bodies of intelligent and enterprising merchants, with abundant capital, has more to do in directing merchandise into certain channels than slight differences in charges. The arrangements freely entered into by railroads with one another, but reluctantly with water-lines, to carry merchandise over long distances, have much to do also in limiting the business done by the latter, and therefore also in influencing rates.

After these preliminary general statements of the most striking causes which tend to restrict the sway of water-routes, Mr. NIMMO takes up specially the question as it affects the diversion of traffic from the East and West trunk lines to the Mississippi River. An average of sixteen years shows that that great river is annually closed between Cairo and St. Louis for thirty days on account of ice, and that during a period of nine years, from 1865 to 1873, for an average of one hundred and thirty-six days only out of the year was the water deeper than ten feet at St. Louis. Below Cairo, however, river navigation is seldom if ever obstructed by ice or low water. Still, the competition of the Mississippi River exerts little influence over rates for the transportation of Western goods to the Atlantic seaboard, or to points in the Southern States not situated on the river. The northern tier of Rocky Mountain States and territories has, therefore, little to hope for in that direction. Those of the Southern tier, and notably New Mexico and Arizona, are largely interested, in so far as New Orleans is affected, as it is probable that their commercial connection with it will become in-

timate in the future. Much was hoped for New Orleans as an export center after the completion of the jetties at the mouth of the Mississippi; and while a decided improvement has become noticeable, the ardent wishes of its merchants do not seem likely to be fully realized. It is true, much remains to be done in the improvement of the river, but it is doubtful, even should that be accomplished, whether the diversion of traffic southward would be great. The prospect that the city of the South will be a rival of the cities of the Atlantic coast is not, therefore, very bright. But still, the territories mentioned will be the gainers by every step in advance which is there made.

MINING BUBBLES IN MEXICO.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: We are now having a little cold weather. The Huachuca Mountains, twenty miles from here, are capped with snow. The camp is on its good behavior. Shooting men down has become unpopular, and a better order of things is inaugurated. The Atchison & Topeka Railroad Company has men employed in grading between Contention and this place; and we expect to see the cars running through the town by January 1st. The mines are producing the usual amount of ore, and from present developments will continue to so produce for many years. The suits against the Head Center will, it is expected, be tried at this term of court, which convenes on the 14th proximo. The rush to Sonora, Mexico, is subsiding. The bubble has exploded, and the victims are legion.

The Caborca is now recognized as an enterprise to be avoided. Hoffman and others, original owners, have sold out at a loss, and George D. Roberts, of State Line notoriety, and Charles McDermott, of the Bradshaw *fiasco*, have recently been at Caborca—in the Altar District, Sonora, Mexico—with the expectation that, through their fertile imagination, they can put up a scheme whereby they can induce fools to buy the stock. It is a statement beyond argument that in no part of the Altar District has a paying mine been found up to this time, and there is no prospect that any will be found in the future. There has been a large amount of capital invested and directed by the best mining intelligence; and notwithstanding, the reports come in thick and fast that every thing in mining there is a failure. The Messrs. Sturgis have tried it for three years. McGruder tried it; put up a mill, shut down, and can not make it pay. Several Chicago companies have tried it with like results. The Caborca is the most complete failure of all.

The much-heralded Mulatos mine, of which Ward in his *Mexico* tells such wonderful stories, has come to comparative grief. The ore has run down to four dollars per ton. The conclusion of those who have been referred to Ward's *Mexico*, in regard to the riches of the mines of Mexico, is, that Ward must have been elegantly entertained by the dons when he wrote that book. It is a safe prediction that whoever puts his money up on its statements will lose. This is the experience of the writer, and hundreds now complaining of their losses will indorse all that is here stated.

There are plenty of good mining properties here and in adjoining districts, which, if properly selected, will pay the investor, without going into a new country to be humbugged and swindled, or ruined by excessive taxation or the technicalities of Mexican laws.

TOMBSTONE, ARIZ., Nov. 9.

ALTAR.

THE CANADA CONSOLIDATED GOLD MINING COMPANY.

Special Correspondence of the Engineering and Mining Journal.

During last week, I visited the mines of this company, and found that the work both on the surface and underground was well advanced. There were 28 miners at work and 18 engineers, firemen, laborers, etc., at work in the mines or on the dumps. In the deep shaft, the first level south was driving, and was opened about 9 feet wide, without exposing the hanging-wall. A sample of ore taken from the face gave 0.65 ounce. The same level north was not driving at the time of my visit. The vein is over 10 feet wide, without exposing either wall. A sample of ore from the face gave 2.42 ounces gold. The lower level north was stoped out twelve feet wide without exposing the whole vein. It was being driven. A sample of ore assayed 0.45 ounce gold. The same level south makes a very good showing. It is about 9 feet wide, and is pushed as rapidly as possible. An assay from the face gave 3.45 ounces gold. The shaft is sinking, and at the bottom assayed 0.40 ounce gold. A small horse has been met, but it is not thought that it will give much trouble. The Tuttle shaft had so much water that no work could be done while the writer was there, although additional pumping facilities were expected to be provided in a few days. The ore at the bottom of the shaft assayed 3.60 ounces gold. In no case do the assays which I have had made go below a point that would not afford a profit in working, while the average of six assays is 1.83 ounces, or much above the estimates of the experts who reported on the prospects of the property over a year ago. In addition to considerable ore being opened up in the mines, there are some thousands of tons upon the surface, ready to be crushed upon the completion of the mill.

The dams, reservoir, canals, etc., for supplying the mill with water as well as power, were about completed and ready for the turbines. Five or six blocks of miners' houses, which would be a credit to any camp in this country, were completed and occupied. A new brick office and the superintendent's house, also of brick, were nearly completed.

The new mill building was about constructed, and practically all of the machinery was on the ground or at the nearest railroad stations. Previous to my visit, the weather had been very unfavorable to outside work, owing to almost continuous rains; but the more favorable weather of the past week has probably permitted considerable advancement.

All that now stands in the way of putting these mines on a productive basis is the putting together of the machinery and the completion of the arsenic chambers, the foundations for which have already been started.

THE CALCULATION OF HOISTING-ENGINES.

Those interested and in charge of our mining operations rarely design their machinery for hoisting themselves. In the great majority of cases, it is far more profitable to order it from firms who make the manufacture of winding-engines a specialty. Still, engineers and managers are frequently placed in a position to calculate, approximately, what plant will be necessary to do given work; and with a view to facilitating this, we present, in the absence of such data in works generally available, the following outline, which may serve as a guide:

Assuming the simplest case for vertical shafts, the points given, as a rule, are the depth of the shaft and the quantity of mineral to be hoisted in a given time. The latter will depend largely upon the nature of the arrangements for attaching and removing the load below and above ground, and upon the dimensions and equipment of the shaft. If the former arrangements are good, little time will be lost during pauses in hoisting, while the latter affect the speed with which the hoisting can be done. When the mine cars are run directly on and off a cage, it takes only from 15 seconds to one minute to load and unload. When the ore is filled in sacks, kept in readiness, or in filled buckets which are directly attached to the rope, one to three minutes are required; and when the bucket must be filled and dumped during a stoppage of the hoisting, from three to six minutes are necessary. The speed of hoisting depends chiefly upon the way in which the load is carried, and upon the manner in which the shaft is equipped. When hoisting is done in buckets, and there is no bratticing in the shaft, the speed should not run higher than two feet a second. In a bratticed shaft it may be increased to 4 feet; and when there are girders besides, 10 feet. The usual speed for cages is 19 to 20 feet, 35 feet per second being considered by many practically the maximum. The time for hoisting one load will therefore be found, in seconds, by the following formula, in which *D*, given in feet, is the depth of the shaft; *v*, the velocity of hoisting given in feet per second; and *t* is the time for loading and unloading:

$$\frac{D}{v} + t$$

The number of times *n* in which the load is hoisted during a given period *T* is therefore:

$$n = \frac{T}{\frac{D}{v} + t}$$

The load *q* may be found in the following way, *M* being the quantity to be raised to the surface in the time *T*:

$$q = \frac{M}{n} = \frac{M}{T} \left(\frac{D}{v} + t \right)$$

As an example, let it be assumed that 120 tons (*M*) are to be hoisted from a depth of 300 feet (*D*) in 10 hours (*T*) at a speed of 3 feet per second (*v*) and allowing 6 minutes (*t*) for loading and dumping. Then the quantity which must be hoisted every time will be found as follows:

$$q = \frac{120 \times 2000}{10 \times 60 \times 60} \left(\frac{300}{3} + 6 \right) = 707 \text{ pounds.}$$

By introducing different values for depth, speed, and time for loading, it will be readily seen how much the speed affects the output of deep shafts, and how little comparatively the time used for loading enters into the calculations for great depths and slow hoisting. It will be noted, on the other hand, that in shallow shafts and with high speed, the time thus lost is very important. As a rule, the weight of the load is given, and the question is to ascertain how much can be hoisted in a certain time. For that purpose, the following formula will be used:

$$M = \frac{q \times T}{\frac{D}{v} + t}$$

Assuming in the above example that the load is 1000 pounds and that otherwise the same conditions as above prevailed, we would have for the capacity per 10 hours:

$$M = \frac{1000 \times 10 \times 60 \times 60}{\frac{300}{3} + 6} = 170 \text{ tons.}$$

By doubling the speed, the output could be made 321 tons per 10 hours, which shows that the loss due to frequency of stoppages is 19 tons.

For a steam hoist in which the drum is driven through the agency of gearing, and the weight of the descending bucket or cage counterbalances that of the one ascending, the calculation of the power requisite to do given work would be done as follows: The engine must do its maximum amount of work in starting, when it must lift the load and bucket or cage, which constitute the dead-weight, and the weight of a length of rope equal to the depth of the shaft, and must overcome some friction and resistance in the engine. The latter may be assumed to be proportional to the total strain on the ropes, and with well-designed engines may be placed at about 4 per cent. If we call *q* the load of ore or mineral, *R* the weight of the rope, and *B* the weight of bucket or cage and car, we shall have for the total resistance *Q* to be overcome in starting:

$$Q = q + R + \frac{4}{100} (q + R + 2B)$$

$$Q = \frac{104}{100} (q + R + 0.077B)$$

This formula well illustrates how little importance the weight of the bucket or cage and car is, so far as moving it is concerned. It has, however, of course considerable influence in determining the size of the rope, and this, in turn, is a very important matter, especially, of course, for greater depths; and we may briefly give the data to show how its weight is arrived at. Let the number of wires in a rope be *n*, the diameter of the iron be *d* in inches, and the weight of iron per cubic inch 0.2812

pounds for iron and 0.2838 pounds for steel, then the weight per running foot is:

$$w = 12 \times 0.2812 \times n \times d^2 \times \frac{3.1416}{4} \times \frac{125}{100}$$

The last fraction of the formula is introduced to allow for the fact that the single wires in a foot of cable are really longer than a foot, and that tar and hemp generally make it heavier. The formula per running foot is therefore:

$$w = 3.31 \times n \times d^2 \text{ for iron.}$$

$$w = 3.34 \times n \times d^2 \text{ for steel.}$$

Rziha gives the following formula for calculating the diameter of a rope D from the diameter of the wire:

$$D = 1.5 d \sqrt{n}$$

Reuleaux calculates the diameter of the wire of the rope from their number and the load by the following formula:

$$d = \frac{1}{100} \sqrt{\frac{P}{P}}$$

Introducing the value found by making P equal to load and weight of cage or bucket, the diameter of the wire is found, and from it that of the rope may be ascertained. Taking again our former example of 1000 pound load with a weight of cage and car of 1500 pounds, we have:

$$d = \frac{1}{100} \sqrt{\frac{2500}{36}}$$

$$= 0.0833 \text{ inch}$$

$$D = 1.5 \times 0.0833 \times \sqrt{36}$$

$$= 0.75 \text{ inch.}$$

The weight of the rope per running foot would be:

$$w = 3.31 \times 36 \times 0.0833 \times 0.0833 = 0.834 \text{ pounds.}$$

The weight of 300 feet of rope would therefore be 250 pounds. Using the formula above given, the total resistance to be overcome in lifting the load would be:

$$Q = \frac{104}{100} (1000 + 250 + 0.077 \times 1500) = 1420 \text{ pounds.}$$

With these data we can calculate the horse-power H required to do the work, v being the speed of hoisting and Q the load:

$$H = \frac{Q \times v}{33,000}$$

Before entering into the details concerning the engine, we may mention, as the case frequently presents itself in our Western mines, that the value of Q is somewhat different when the rock is taken to the surface only in one bucket. Then the load will simply be the weight of rope, bucket, and rock, to which 4 per cent of the whole is added, thus:

$$Q = \frac{104}{100} (q + R + B)$$

In designing a hoisting-engine, the following points must be taken into consideration. High steam pressure is desirable in increasing efficiency and lowering the expenditure of fuel; but on the other hand, enhanced cost of boilers and greater loss of steam limit it. The use of condensers reduces the consumption of steam, but increases the first cost of the machinery, and requires considerable quantities of water. They are profitable when fuel is high and the cost of machinery is low. Cut-off engines are expensive, and the fact that the power required to carry the load to the bank varies makes it desirable to use the automatic cut-off.

The work of the pressure of steam behind the piston is returned by the back pressure, by friction and minor resistance. All these forces may be assumed to be equal to an effective pressure p , in pounds per square inch, acting upon the piston during the whole stroke. Let S , in square inches, be the piston surface; s , in feet, be the average piston speed, and H will be conceded to be equal to the following:

$$H = \frac{S \times p \times s}{33,000}$$

or with D the diameter of the piston in inches, and s given in feet per second,

$$H = \frac{3.1416}{4} \times D^2 \times \frac{60 \times s \times p}{33,000} \text{ or}$$

$$H = \frac{47.124}{33,000} \times D^2 \times s \times p, \text{ or}$$

$$D = \sqrt{\frac{H \times 33,000}{s \times p \times 47.124}}$$

Engines working without any cut-off may be assumed to be running during the entire stroke with 97.5 per cent of full effective pressure, which would be equal to cutting off at nine tenths of the stroke, and that value must be introduced. Allowance must also be made for the fact that the piston-rod takes away some of the effective piston surface, being greater for small engines. It may be placed at about 5 per cent. The effective pressure at the beginning of the stroke is not equal to the boiler pressure, being only about 80 per cent of it. With these modifications, the formula for the diameter of the cylinder will be, p now being the boiler pressure,

$$D = 30 \sqrt{\frac{H}{s \times p}}$$

The boiler pressure is generally given, or at least approximately known, the average being from 40 to 60 pounds. For engines of 8 to 300 horse-power, the piston speed s ranges between 3 and 5 feet a second. If it is made large, the dimensions of the cylinder are naturally decreased, and the loss of steam by imperfect packing of the piston and by condensation is lessened. On the other hand, there is greater danger of breakage, and the back pressure of the exhaust steam is run up. The number of revolutions, too, is increased, whereby the proportion of the gearing may become unfavorable, though the weight of the fly-wheel may be lessened. The length of the stroke, of course, affects the number of revolutions, and it is generally chosen at 1.5 to 3 times the diameter of the cylinder.

Following out our example, which, we may take this occasion to state, is not intended to represent a model case, but is given merely as an illustration in the use of the formula, we may assume the piston speed to be 4 feet a second, and the boiler pressure 50 pounds per square inch.

$$H = \frac{1420 \times 3 \times 60}{33,000} = 7.7 \text{ horse-power.}$$

$$D = 30 \sqrt{\frac{7.7}{4 \times 50}} = 5.9 \text{ inches.}$$

It would take us beyond the limits of the present article to go into a calculation of cut-off engines, nor can we enter into any details concerning the dimensions of the various parts of an engine, or a discussion of various styles. The data given may serve as a guide in shaping an opinion as to the capacity required for given work or to calculate approximately, for instance, to what additional depth a shaft may be sunk without calling for additional machinery to maintain a given output. We need hardly add that, in ordering a hoisting-engine, ordinary prudence and foresight require that its capacity be chosen considerably in excess of immediate necessity. It is an error too often made to practice false economy in this respect. Engines that have grown weak in rough service are crowded beyond their capacity. In the natural course, the increasing depth of a mine causes its hoisting apparatus to be taxed in an increasing measure, while it is steadily becoming more unfit by wear. Unreasonable managers then lay the blame of frequent break-downs and constant costly repairs upon the builders, who are generally held responsible for evils which are the outgrowth of such short-sighted economy.

ANTHRACITE-COAL TONNAGE FOR OCTOBER, 1881.

Mr. John H. Jones, Accountant, makes the following statement of anthracite coal tonnage for the month of October, 1881, as compared with the same period last year:

COMPANIES.	October, 1881.	October 1880.	Difference. Increase.
Philadelphia & Reading Railroad.....	678,051 06	614,852 10	Inc. 63,198 16
Lehigh Valley Railroad.....	549,562 15	442,022 04	Inc. 107,540 11
Central Railroad of New Jersey.....	379,676 16	361,462 00	Inc. 18,214 16
Delaware, Lackawanna & Western RR.....	411,266 02	346,653 03	Inc. 64,612 19
Delaware & Hudson Canal Company.....	290,077 11	236,047 10	Inc. 54,030 01
Pennsylvania Railroad.....	198,407 10	221,929 10	Dec. 23,522 00
Pennsylvania Coal Company.....	144,878 10	116,480 15	Inc. 28,397 15
New York, Lake Erie & Western RR.....	34,133 05	39,362 08	Dec. 5,229 03
Total.....	2,686,053 15	2,378,810 00	Inc. 307,243 15

COMPANIES.	For year 1881.	For year 1880.	Difference. Increase.
Philadelphia & Reading Railroad.....	5,616,402 16	4,879,286 07	737,116 09
Lehigh Valley Railroad.....	4,575,345 13	3,559,433 11	1,015,912 02
Central Railroad of New Jersey.....	3,317,801 17	2,839,145 11	478,656 06
Delaware, Lackawanna & Western RR.....	3,539,593 04	2,877,054 01	662,539 03
Delaware & Hudson Canal Company.....	2,590,132 18	2,151,384 08	438,748 10
Pennsylvania Railroad.....	1,835,692 08	1,930,013 09	305,678 19
Pennsylvania Coal Company.....	1,182,489 10	964,852 05	217,637 05
New York, Lake Erie & Western RR.....	380,949 08	424,550 07	65,399 01
Total.....	23,047,417 14	19,065,719 19	3,981,697 15

The stock of coal on hand at tide-water shipping points, October 31st, 1881, was 474,904 tons; on September 30th, 613,958 tons; decrease, 139,054 tons.

HIGH PRODUCTION OF STEEL-WORKS.

The Bethlehem Iron Company, in October, made 14,646 gross tons of Bessemer steel ingots. Its best week's work was 3857 tons, and best 24 hours' work was 654 tons. The Bethlehem Iron Company has four converters, but it has at present sufficient blowing apparatus for only two of them. One of the two new converters, however, is occasionally used in place of one of the two old ones.

The best work by the Bethlehem Iron Company's blooming-mill and steel-rail mills was as follows: Best 24 hours, 679 gross tons, 220 pounds of blooms and 458 tons, 2016 pounds of rails; best week, 3589 tons of blooms and 2875 tons of rails; best month, 14,663 tons, 1568 pounds of blooms and 11,336 tons of rails. In the same month for which the rail production is here given, the billet-mill rolled 1214 tons of steel billets.

In the week ending October 29th, 1881, the two converters of the Albany & Rensselaer Iron and Steel Company made 2906 tons, 896 pounds of Bessemer steel ingots; the blooming-mill rolled all of these ingots. In this week, the best eight hours' work was 210 tons, 1120 pounds of ingots; the best 24 hours' work was 544 tons, 1568 pounds of ingots. The rail-mill rolled 2230 tons, 1120 pounds of steel rails in the same week.

In the month of October, 1881, the Albany & Rensselaer Iron and Steel Company, with two converters (and but three cupolas—running only two of them at one time), made 11,629 tons, 1792 pounds of Bessemer steel ingots; the blooming-mill rolled all of these ingots, and the rail-mill rolled 8748 tons, 448 pounds of steel rails. The merchant mill also rolled 3145 tons, 880 pounds of steel billets and bars, which, added to the rail product, makes the total finished product 11,893 tons, 1328 pounds. During the same month, the Albany Iron-Works department of the same company produced 3401 tons of merchant iron, exclusive of railroad spikes, bridge and boiler rivets, bolts and nuts, crow-bars, and car-axes.

The Bessemer steel-works of the Vulcan Steel Company, at St. Louis, were not put in complete running order until September, 1881. Their record for October shows that good work may hereafter be expected of them. The record is as follows: Ingots, 8977 tons, 1650 pounds; blooms, 7778 tons, 1020 pounds; rails, 6403 tons, 620 pounds. They have but two converters.—*Bulletin.*



THE ANALYSIS OF IRON ORES CONTAINING BOTH PHOSPHORIC AND TITANIC ACIDS.*

By Thomas M. Drown, M.D., and P. W. Shimer, M.E., Easton, Pa.

The precipitation of phosphoric with titanic acid by boiling an iron solution which had been reduced to the ferrous condition by sulphurated hydrogen or sulphurous acid was first noticed by E. H. Bogardus in 1874.† Since that time, I am not aware that much has been published on the relation of these two acids to each other and to silicic acid in the ordinary course of analysis of iron ores. The following investigation may perhaps aid in clearing up some of the obscure points in the analysis of titaniferous ores.

THE DETERMINATION OF PHOSPHORUS.

From two to five grams of the finely-powdered ore are weighed into a beaker and treated with about 50 c.c. of hydrochloric acid (sp. gr. 1.12), evaporated to dryness, and heated in an air-bath for an hour to 110° to 120° C. To the dry mass are added 50 c. c. of hydrochloric acid (1.12), and the solution filtered off from the insoluble residue. On washing this residue with water, the filtrate often runs through turbid. This can be avoided by washing with dilute nitric acid or, better, with an acid solution of ammonium nitrate. The filtrate contains the greater part of the phosphoric acid, but the residue may contain a notable amount.

Treatment of the Residue.—Fuse the residue with sodium carbonate and extract with water. Sodium phosphate and silicate go into solution and sodium titanate remains insoluble. Filter, acidify the filtrate with nitric acid, evaporate to dryness, moisten with nitric acid, and dissolve in water. Filter from the silica, concentrate the filtrate, neutralize nearly with ammonia, and precipitate with ammonium molybdate. This is the best method of separating the phosphorus from the insoluble residue. The bulk of the phosphorus may, however, be extracted from the moist residue by washing with ammonia.

Treatment of the Filtrate.—Evaporate to a small bulk, and add enough nitric acid to drive off all the hydrochloric acid on evaporation. If the concentrated solution is clear, add ammonia until a slight permanent precipitate is formed; redissolve this in a few drops of nitric acid, and add 50 to 75 cubic centimeters of ammonium molybdate solution.

In the ores of which we are speaking, a precipitate generally separates on evaporating to a small bulk. The addition of more nitric acid and continued heat often redissolve this. In this case, the evaporation must not be carried too far, or the substance will again precipitate. This precipitate contains phosphoric acid and titanic acid. If it is impossible to get it into solution in nitric acid, it must be filtered off and washed with ammonium nitrate solution. It is then ignited, fused with sodium carbonate, extracted with water, and the filtrate, after acidifying with nitric acid, precipitated with molybdate solution.

After the addition of the ammonium molybdate to the main solution, as mentioned above, it is heated rather hot, say from 50° to 70° C., for half an hour, with frequent vigorous stirring. The precipitate is usually allowed to stand over night, but if filtered within two hours, there will be no appreciable amount of phosphorus unprecipitated. The yellow precipitate is filtered off and washed well with a mixture of 325 cubic centimeters of nitric acid (sp. gr. 1.2), 100 cubic centimeters of ammonium hydrate (sp. gr. .96), and 100 cubic centimeters of water. It is then dissolved upon the filter in dilute ammonia. The solution will probably run through turbid, and a gelatinous residue will remain in the filter. The solution is heated for some time and filtered, and this residue, which contains both phosphoric and titanic acid, is treated, together with the gelatinous residue insoluble in ammonia, with nitric acid, and the resulting solution precipitated with ammonium molybdate. By heating and stirring, the phosphoric acid can be completely precipitated in an hour, so that it will not retard the analysis materially. The solution of this yellow precipitate in ammonia is to be added to the main ammoniacal solution, and magnesia mixture added with the usual precautions. By active stirring after the addition of the magnesia solution, the complete precipitation of the phosphoric acid may be effected in an hour or two.‡ In the analysis of an ore containing 4.74 per cent of phosphoric acid (mostly as apatite) and .65 per cent of titanic acid, the phosphoric acid was found (in duplicate analyses) as follows:

Phosphoric acid in the hydrochloric acid solution	1	2
Phosphoric acid in the residue insoluble in hydrochloric acid	4.370	4.330
Phosphoric acid in the precipitate which separated from the solution of the yellow precipitate in ammonium hydrate	0.016	0.027
Total	4.666	4.747

Determination of the Titanic Acid.§—One to two grams of the finely-powdered ore are weighed into a large platinum crucible. Potassium bisulphate to the amount of 12 to 15 times the weight of the ore is next weighed out in another vessel. Mix the ore in the bottom of the crucible with about one quarter of the bisulphate, and fuse until the excess of sulphuric acid is nearly all driven off. During the progress of the fusion, the lid must be lifted a very little at short intervals, in order to watch the state of the fusion. It should not be allowed to rise above two thirds the height of the crucible. Add now another quarter of the bisulphate, and heat again as before, until nearly all the excess of sulphuric acid is driven off. Then add the remaining half of the bisulphate, and heat until the whole mass is in quiet fusion. Too much sulphuric acid should not be driven off at this stage, or the subsequent solution in water will be retarded. The fused mass may be poured out into a large platinum dish, or it may be removed from the crucible in one lump by inserting a stout

piece of platinum wire while still soft, and allowing the mass to solidify about it. A gentle heat on the outside of the crucible will quickly loosen the mass, which may now be lifted out easily. The former method is preferable, because of the thinness of the mass and its readier solubility.

When the mass has become cold, it is dissolved in plenty of cold water. This usually requires at least twelve hours. When it is evident that all has dissolved but silica and silicates,* filter into a large beaker. This insoluble residue should, after ignition, be again fused with bisulphate and tested as below for titanic acid. To the main solution we add sodium carbonate solution until a slight permanent precipitate is obtained, then 3 to 4 cubic centimeters of sulphuric acid of 1.23 sp. gr. This redissolves the slight precipitate and makes the solution sufficiently acid.

Add now sulphurous acid in excess, and dilute largely with water (1 to 1.5 liters); cover with a watch-glass, and boil about two hours, adding sulphurous acid solution and water as the evaporation goes on.

The titanic acid is precipitated, and with it phosphoric acid and oxide of iron. Filter hot (best done by means of a siphon), and wash with hot water. This precipitate of titanic acid and phosphoric acid is not finely granular like that of pure titanic acid, but is flocculent, and shows no tendency to run through even a very porous filter. It is dried, ignited, and weighed. In spite of the fact that it contains a very notable amount of iron, it is usually white after ignition. It is fused with sodium carbonate and extracted with water. Sodium titanate and oxide of iron remain insoluble, while sodium phosphate goes into solution. The residue is dissolved in sulphuric acid (sp. gr. 1.23), filtered, neutralized with sodium carbonate, 2 to 3 cubic centimeters of sulphuric acid added, and sulphurous acid added as above. The titanic acid precipitated from this solution is free from phosphoric acid and iron.

If, instead of fusing the first precipitate of titanic acid with sodium carbonate, it is re-fused with potassium bisulphate, there will remain on treatment with cold water an insoluble residue containing titanic acid and phosphoric acid.

The following analytical results will illustrate the foregoing description:

First precipitate of titanic acid containing phosphoric acid and iron (in duplicate), No. 1, 3.18 per cent; No. 2, 2.40 per cent.

No. 1 was fused with sodium carbonate and heated with water as above. It consisted of—

Titanic acid	0.65
Phosphoric acid	1.00
Sesquioxide of iron	.84
Loss	.00
	3.18

No. 2 was fused with potassium bisulphate, and gave a

Residue insoluble in cold water	1.83
Precipitate by boiling the solution	.34
Iron by difference	.23
	2.40

The titanic acid precipitate by boiling (.34) contained both phosphoric acid and iron.

The residue insoluble in cold water (1.83) was fused with sodium carbonate as described above; it gave:

Phosphoric acid	.96
Titanic acid	.42
Sesquioxide of iron, by difference	.45
	1.83

The precipitate by boiling (0.34) similarly treated gave:

Phosphoric acid	.05
Titanic acid	.12
Sesquioxide of iron, by difference	.17
	.34

The complete analysis of the original precipitate (2.40) thus shows:

Titanic acid	.54
Phosphoric acid	1.01
Sesquioxide of iron, by difference	.85
	2.40

The titanic acid is here doubtless 10 per cent too low, owing to the many fusions and precipitations to which it was subjected.

Determination of Iron.—If the ore contains less than one per cent of titanic acid, no appreciable error will result from neglecting it. If it contains more than this, the iron must be determined in the filtrate from the titanic acid. The first precipitation of titanic acid contains iron. This is separated by the sodium carbonate fusion, and may be added to the main solution after separation of the titanic acid. The iron is then determined by reduction with zinc and titration with permanganate.

Determination of Silica and Alumina.—When an iron ore containing phosphoric and titanic acids is treated for silica by the usual method (fusion with sodium carbonate, solution in dilute hydrochloric acid, evaporation to dryness, and separation of silica at 110° C., solution in hydrochloric acid and water, and filtration from the insoluble residue), the siliceous residue consists of silica, titanic acid, phosphoric acid, and iron. In the case of an ore containing 3.50 per cent of silica, this residue (which, in spite of the iron in it, is white after ignition) amounted to 6.11 per cent. The presence of phosphoric acid and iron with the silica of course renders worthless the estimation of alumina by difference.

Before speaking of the determination of the silica, we will consider how we may get the phosphoric acid and iron into the main solution where they belong. The insoluble residue (containing silica, titanic acid, phosphoric acid, and iron) is fused with sodium carbonate, and extracted with water. Sodium phosphate and silicate dissolve, and sodium titanate and ferric oxide remain behind. Acidify the filtrate with hydrochloric acid, and evaporate to dryness; take up with hydrochloric acid and water, and filter off the silica; add the filtrate to the solution to be precipitated by sodium acetate. Dissolve the residue insoluble in water (containing the sodium titanate and ferric oxide) in sulphuric acid, and separate the titanic acid from the iron by boiling, as usual. Filter from the titanic acid, and add bromine water to the filtrate, in order to oxidize the iron, boil, and precipitate the iron with ammonia. Filter and weigh

* In ores containing lime, calcium sulphate is often found in this insoluble residue.

* A paper read at the Harrisburg Meeting of the American Institute of Mining Engineers, October, 1881. From the Transactions of the Institute.

† *American Journal of Science*, III. 8, p. 334.
‡ The action of stirring or other agitation in hastening precipitation, although well known, is not, I think, as often made use of in analysis as it might be.

§ In order to make a successful determination of titanic acid, it is necessary to have good potassium bisulphate. This can seldom be bought in a condition fit for use. It usually contains water; sometimes an excess of sulphuric acid; it also usually contains an insoluble siliceous residue. To prepare it for use, it is dissolved in water and filtered, the solution evaporated to dryness, and fused until all the water is driven off and the mass is in quiet fusion. It is sometimes necessary to drive off some sulphuric acid. It is then powdered for use. Bisulphate thus prepared will not mount readily in the crucible, and a quiet fusion at a red heat can be obtained.

it with the precipitate of iron, alumina, and phosphoric acid, separated as basic acetate.

Some titanate acid may go into the filtrate, which is to be precipitated by sodium acetate. In this case, it will contaminate the precipitate of iron, alumina, and phosphoric acid. It is therefore necessary, after this precipitate has been weighed, to grind it in an agate mortar, and weigh out accurately as much of it as possible, fuse with potassium bisulphate, and determine the titanate acid in it by boiling, etc. The titanate acid thus found is to be deducted from the weight of the original precipitate. There will not in all cases be titanate acid in this precipitate, but it is not safe to omit testing for it.

The silica may also be determined by fusing the residue from the second bisulphate fusion for titanate acid with sodium carbonate, and separating the silica, as usual. Or it may be determined by fusing 1 to 1.5 grams of the ore with sodium carbonate, dissolving in hydrochloric acid, and adding an excess (50 cubic centimeters) of sulphuric acid (1.23), and evaporating until all the hydrochloric acid is driven off. This renders the silica insoluble. By now dissolving the ferric sulphate in a large excess of hydrochloric acid by aid of heat, every thing goes into solution but the silica. When this point is reached, it is known by the absence of every thing but transparent gelatinous silica floating in flocks in the clear solution. Calcium sulphate may contaminate the silica, if the ore contains much lime; but it does not look like gelatinous silica, and dissolves on dilution with water.

The following determinations illustrate the foregoing description :

Insoluble in hydrochloric acid.....	No. 1. 6.11 per cent.	No. 2. 5.38 per cent.
Fused with sodium carbonate and extracted with water, solution contained :		
	No. 1.	No. 2.
Silica.....	3.31	3.63
Phosphoric acid.....	1.03	.71
Residue contained :		
Titanic acid.....	.65	.65
Ferric oxide.....	1.33	.58
TOTALS.		
	No. 1.	No. 2.
Silica.....	3.31	3.63
Phosphoric acid.....	1.03	.71
Titanic acid.....	.65	.65
Ferric oxide.....	1.33	.58
	6.32	5.57
	1.	2.
Silica made insoluble by sulphuric acid.....	3.40	3.48
" from residue insoluble in bisulphate.....	3.70	3.74
Residue insoluble in bisulphate.....	4.91	5.03

AMERICAN FERRO-MANGANESE.

By Willard P. Ward, A.M. and M.E.

The amount of spiegeleisen and ferro-manganese annually consumed in the United States in the manufacture of Bessemer and open-hearth steel is about 150,000 tons. Averaging the contents of metallic manganese in this material at 20 per cent (it ranges all the way from 10 per cent to 83 per cent), we should have an annual consumption of 30,000 tons of metallic manganese. A small portion of the total amount is made in the United States, mainly from Spanish ores. The rest is imported as metal from England, France, and Germany.

That we have fuel and labor in abundance to produce this alloy within our borders, requires no demonstration. That we have ores suitable to the purpose, and in sufficient quantity, can be readily seen by an examination of our manganese deposits, particularly those in the Southern States, and from the fact that we are now exporting manganese ore to England and France, where it is manufactured into ferro-manganese or spiegeleisen, and returned to us in that state.

It is confidently believed that no other industry of any thing like equal magnitude is not already established in this country. Nature has furnished us with all the requisites to manufacture successfully here, but we import either the raw or the manufactured article.

I have conducted experiments in a small charcoal furnace and under many technical disadvantages, such as inability to heat the blast high enough, lack of sufficient volume and pressure of blast, and, finally, when the difficulties were in a measure overcome, the cracking of the inner and outer walls of the furnace permitting the escape of the gases which should serve for heating the blast and generating steam. In other words, when a high enough temperature was obtained, the stack itself was not capable of standing it. Before the giving way of the stack, the furnace produced about two tons per day of from 50 to 67 per cent ferro-manganese, at a cost of about \$50 per ton.

The depressed condition of the iron industry in 1875 and 1876, when these experiments were carried on, is too well remembered by the trade to require more than mere mention. At that time, no capitalists or combination of capitalists could be found who were willing to invest in any new enterprise, however promising. At that time, also, the demands for ferro-manganese, and hence the field for operations, were very much smaller than now. It has been remarked by persons familiar with the steel trade, and with my work, that I was several years in advance of the times.

A furnace for the most economical production of ferro-manganese should be very much larger than the one in which the original experiments were made, and should be provided with all the modern appliances for working a very refractory ore. The amount of fuel required to reduce and smelt one ton of ferro-manganese, of say 60 per cent, would make nearly or quite three tons of foundry iron. Hence the necessity for the best appliances to work with.

In three months' running of my furnace, fifty-eight and a fraction of a per cent of all the manganese that went into the top of the furnace in the shape of ore came out at the bottom in the shape of metal. At Terre Noire, 60 per cent of the manganese in the ore is said to be utilized and 40 per cent lost in the cinder. This seems to be a large loss; but when the very great affinity of the metal for oxygen is considered, it is not excessive. At any rate, if we can do, at the start, as well as Terre Noire, we may be satisfied. There they employ large furnaces, very hot blast, and coke as

fuel. Adopting the same plan and using the same ore, I am satisfied that I can get as good results. In a small furnace and under the difficulties mentioned, my work did not fall far short of theirs. The ores I employed contain about 45 per cent of metallic manganese, and were smelted with the addition of some iron ore. Nearly three tons of manganese ore would be required to make a ton of 75 per cent ferro-manganese, utilizing 60 per cent of the contents of manganese.

The following is an estimate of the cost of producing a ton of 75 per cent ferro-manganese under favorable conditions, such as I have mentioned. It is a very liberal one, and can probably be improved on in practice. At all events, it is large enough to cover every thing :

3 tons manganese ore, at \$5.....	\$15.00
3 tons coke, at 8 cents per bushel.....	12.00
1½ tons limestone, at \$1.....	1.50
Labor and superintendence.....	6.00
Interest at 6 per cent on investment, and repairs.....	5.00
	\$39.50

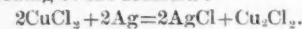
It will be observed that the ore is reckoned to cost \$5 per ton, a price at which it can certainly be delivered at the furnace. At the present time, ore is exported in large quantities from the Georgia mines, to Liverpool and Marseilles, where it commands from \$18 to \$20 per ton; and as they would not pay us more than they could purchase for from other quarters, we may rest assured that an American company can put into its furnace for \$15 what costs from \$55 to \$60 in England or France. With this advantage, and an import duty of \$7 per ton on foreign ferro-manganese, we certainly ought to be able to pay a little more than they for fuel and labor, and still make large profits at present prices. They certainly can not sell much lower, while we would have a large margin. American ferro-manganese can without doubt be made, and sold at a fair profit, at a price per unit of manganese below that of spiegeleisen. When that time comes, it will be to the interest of all steel manufacturers, including those working the Bessemer process, to add manganese to their charge in concentrated form, and to recarbonize with some other material than spiegeleisen; a plan which is universally admitted by steel men to be perfectly feasible.

SAVANNAH, GA., November, 1881.

SOME CHEMICAL REACTIONS AFFECTING THE AMALGAMATION PROCESS.

Though of great practical importance, the chemical reactions which occur in the amalgamation of silver ores have been much less carefully studied than they deserve, and there is a very striking absence of exact figures. Chemically the process is not fully understood, and it is to be hoped that American scientists will take up the subject and make thorough investigations. The latest contribution has been made by Professor C. Rammelsberg, of Berlin, who made a series of tests to fill a gap in Percy's new work, which he has translated into German. The following are the results of his investigations :

Chloride of Copper and Silver.—Chloride of copper and chloride of silver are formed according to the formula :



Chloride of Copper and Sulphide of Silver.—At a boiling heat the decomposition is complete, as the following experiment will show :

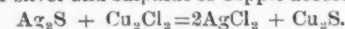
	Found.	Calculated.
Silver.....	83.5	87.0
Copper.....	22.5	25.5
Sulphur.....	13.0	13.0
Chlorine.....	28.4	28.6
	150.4	154.1

The formula being :



When, as Karsten has done, and is always the case on a large scale, chloride of sodium is added to the dichloride of copper, the salt will act as a solvent of chloride of silver, facilitating the decomposition. It hinders the recognition of the simple reaction, however.

Dichloride of Copper and Sulphide of Silver.—The result is the formation of chloride of silver and sulphide of copper according to the formula :



One hundred parts of sulphide of silver yielded first, with solid dichloride, and second, with a solution of zinc, as follows :

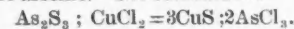
	1.	2.	Calculated.
Silver.....	87.1	87.1	87.1
Copper.....	50.1	48.3	51.1
Sulphur.....	12.4	12.7	12.9
Chlorine.....	28.6	28.6	28.6
Total.....	178.2	176.7	179.7

In Nos. 1 and 2, 7.6 and 8.3 silver respectively remained in the salt solution of copper. By treating the residue with zinc, the substance became 2Ag + Cu₂S. One hundred parts of sulphide of silver yielded :

	Found.	Calculated.
Silver.....	87.1	87.1
Copper.....	56.5	51.1
Sulphur.....	13.0	12.9
Total.....	157.2	151.1

In the amount of copper found are included 5.4 parts reduced by zinc.

Chloride of Copper and Sulphide of Arsenic.—The decomposition proceeds rapidly, the precipitate being sulphide of copper mixed with a little undecomposed sulphide of arsenic. The rest of the arsenic goes into solution as chloride of arsenic. The formula is :



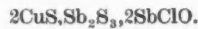
One hundred parts of sulphide of arsenic yielded :

	Found.	Calculated.
Copper.....	65.7	77.2
Sulphur.....	37.6	30.0
Arsenic.....	2.2
Total.....	105.5	110.2

The loss in copper may be due to the formation of dichloride of copper through the agency of arsenious acid.

Chloride of Copper and Sulphide of Antimony.—Besides sulphur, copper, oxygen, and chlorine, the precipitate contains much antimony,

caused by the decomposition of chloride of antimony by water, and the formation of an oxychloride. A considerable amount of antimony remains in the solution, which contains sulphuric acid. As the copper and chlorine are present in the precipitate, approximately in the proportion of a dichloride, it is reasonable to assume that the rest has had the effect of oxidizing sulphur. The product may be assumed to be constituted as follows:

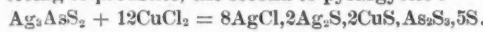


The following was found by analysis, taking 100 parts of sulphide of antimony, or 71.5 of antimony and 28.5 of sulphur, which would indicate that 31 per cent of the antimony and 40 per cent of sulphur entered into solution:

	Calculated.	Found.
Copper.....	13.1	13.1
Antimony.....	49.0	49.1
Sulphur.....	16.4	16.7
Chlorine.....	7.3	11.3
Oxygen.....	3.3	
	90.3	89.1

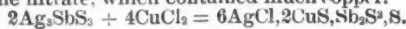
Dichloride of copper and sulphide of antimony act in a similar manner, except that copper appears to be partially or wholly present in the product in a metallic state. It contains also oxychloride of antimony, while the filtrate, which contains much copper, deposits antimonious acid when allowed to stand.

Chloride of Copper and Proustite or Pyrrargyrite.—Both varieties of ore are decomposed by chloride of copper, the total amount of silver being converted into chloride with the latter, while a portion only is so converted with the former. As the arsenic of the proustite is partially and the antimony of the pyrrargyrite wholly present in the residue, it is difficult to decide whether the decomposition of the mineral is complete. Rammelsberg gives the following record of his experiments; the first referring to proustite, the second to pyrrargyrite:



	Found.	Calculated.
Silver.....	65.5	65.5
Copper.....	8.3	6.4
Arsenic.....	7.7	7.6
Sulphur.....	20.4	19.4
Chlorine.....	12.9	14.3
	114.8	113.2

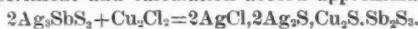
There was a loss of about 3 per cent of the silver, which remained in the filtrate, which contained much copper.



	Found.	Calculated.
Silver.....	59.8	59.8
Copper.....	14.5	11.8
Antimony.....	22.1	22.5
Sulphur.....	17.2	17.7
Chlorine.....	19.0	19.7
	132.6	131.5

The action of a mixture of chloride of copper and chloride of sodium was made the subject of special experiments which showed that the product both with proustite and pyrrargyrite contains silver both as chloride and as sulphide. It is not probable, however, that the latter is present as such in all cases, because it would be converted into chloride by the chloride of copper.

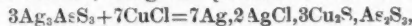
Dichloride of Copper and Pyrrargyrite.—By dissolving dichloride of copper in chloride of sodium, and allowing it to act at a boiling temperature on pyrrargyrite, a black product is obtained, which holds the bulk of the silver (the rest being dissolved as a chloride by the chloride of sodium), the entire antimony and sulphur, and some copper and chlorine. Assuming the reaction to take the course of the following formula, the results of experiment and calculation accord approximately:



	Found.	Calculated.
Silver.....	59.8	59.8
Copper.....	13.1	11.7
Antimony.....	22.5	22.5
Sulphur.....	18.3	17.7
Chlorine.....	9.0	6.6
	122.7	118.3

7.3 per cent of chloride of silver were contained in the solution.

Dichloride of Copper and Proustite.—The gray product of the decomposition contains all the silver and all the sulphur, two thirds of the arsenic, much of the copper, and some chlorine. According to analysis, it consists of silver, chloride of silver, sulphide of copper, and sulphide of arsenic, being the product of the following reaction:



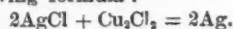
while the solution holds CuCl_2 and AsCl_3 . One hundred parts of proustite yielded:

	Found.	Calculated.
Silver.....	65.2	65.5
Copper.....	23.8	25.6
Arsenic.....	9.2	10.1
Sulphur.....	19.4	19.4
Chlorine.....	6.4	4.8
	124.0	125.4

Of the silver, 4.7 parts were in the filtrate as chloride.

Professor Rammelsberg has also made some experiments to ascertain the action of various substances upon chloride of silver, a matter the importance of which will be fully appreciated.

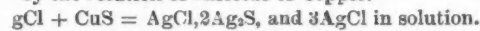
Dichloride of Copper, Chloride of Silver, and Ammonia.—Alone, dichloride of copper and chloride of silver do not act upon one another; but when ammonia is present, silver is deposited in a metallic state, according to the following formula:



Out of the 75.26 parts of silver in 100 parts of chloride, 83.7 parts were deposited.

Chloride of Silver, Sulphide of Copper, and Ammonia.—When heated, a blue solution is obtained, one half of the chloride of silver being converted into sulphide of silver; and the black residue, which contains no copper, consists of sulphide of silver, and one quarter of the chloride of

silver which has remained undecomposed, while the three quarters left are dissolved by the solution of chloride of copper.



One hundred parts of chloride of silver yielded:

	Found.	Calculated.
Silver.....	47.0	47.0
Sulphur.....	5.5	5.6
Chlorine.....	3.1	3.1
	55.6	55.7

Chloride of Silver, Disulphide of Copper, and Ammonia.—If two equivalents of chloride of silver dissolved in ammonia are treated with an equivalent of disulphide of copper, a mixture of silver and disulphide of copper will settle down out of the blue solution. The experiments given below prove that the reaction may be expressed by the following formula:



One hundred parts of chloride of silver yielded:

	Found.	Calculated.
Silver.....	75.2	75.2
Copper.....	21.9	22.0
Sulphur.....	11.2	11.1
	108.3	108.3

About one tenth of the silver remained dissolved in the blue solution of copper as undecomposed chloride.

By dissolving four equivalents of chloride of silver instead of two, as before, and treating with disulphide of copper the residue is almost free from copper, consisting of silver and sulphide of silver.

$4\text{AgCl} + \text{Cu}_2\text{S} = 2\text{Ag}, \text{Ag}_2\text{S}$ and 2CuCl_2 goes into solution. One hundred parts of chloride of silver yielded:

	Found.	Calculated.
Silver.....	47.0	47.0
Sulphur.....	5.5	5.6
Chlorine.....	3.1	3.1
	55.6	55.7

The rest of the silver, 28.2 parts, remained in the solution.

CHICAGO COAL RECEIPTS AND SHIPMENTS—MAY 1 TO NOV. 1, 1881.

	Tons.
Receipts by rail of anthracite coal from May 1st to November 1st, 1881	226,805
Corresponding period, 1880.....	119,456
Increase, 1881.....	106,849
Receipts by rail of bituminous coal from May 1st to November 1st, 1881	970,237
Corresponding period, 1880.....	716,815
Increase, 1881.....	254,422
Receipts by lake of anthracite coal from May 1st to November 1st, 1881	493,967
Corresponding period, 1880.....	329,222
Increase, 1881.....	164,745
Receipts by lake of bituminous coal from May 1st to November 1st, 1881.....	242,530
Corresponding period, 1880.....	210,573
Increase, 1881.....	31,957
Total receipts of all kinds of coal, including coke, from May 1st to November 1st, 1881.....	1,933,039
Corresponding period, 1880.....	1,375,066
Increase, 1881.....	557,973
Total shipments of coal by lake and rail from May 1st to November 1st, 1881.....	292,350
Corresponding period, 1880.....	271,380
Increase, 1881.....	20,970

The receipts of coke are included in the receipts of bituminous coal.

NOTE.—40,456 tons of anthracite (water shipment) were received in April, 1880; none in April, 1881.

NOTE 2.—The above statement shows an increase in receipts of anthracite coal (May 1st to November 1st) over those of the same period last year of 271,694 tons. From this amount, however, should be deducted the above-mentioned receipts for April, 1880, 40,456 tons, leaving the actual increase in receipts 231,238 tons. We have no means of ascertaining exactly the quantity of anthracite coal on hand at opening of navigation, 1880: it is variously estimated at from 100,000 to 200,000 tons. Supposing it to have been 150,000 tons, and that no more has been consumed this year than last, then the present stock exceeds that of one year ago by 81,238 tons.

RECEIPTS BY MONTHS.—May, 201,338 tons bituminous; 67,247 tons anthracite. June, 237,776 tons bituminous; 116,290 tons anthracite. July, 181,755 tons bituminous; 121,459 tons anthracite. August, 241,058 tons bituminous; 147,103 tons anthracite. September, 155,390 tons bituminous; 144,242 tons anthracite. October, 195,450 tons bituminous; 123,931 tons anthracite.

SHIPMENTS BY MONTHS.—May, 28,949 tons. June, 41,832 tons. July, 52,467 tons. August, 66,381 tons. September, 39,205 tons. October, 63,516 tons. Total, 292,350 tons.

H. PRATT, Secretary Chicago Coal Exchange.

The Fauler Cupola.—Herr H. Frey, in the *Zeitschrift des Berg- und Hüttenmännischen Verein für Steiermark und Kärnten*, describes briefly a cupola constructed by Ph. A. Fauler, of Freiburg, in Baden, which has been doing some excellent work. With a pressure of 1.4 inch quicksilver it melted 3 to 3.5 tons of iron with 6.25 pounds of coke per 100 pounds of iron, the metal being used for casting pipe, and the waste in melting being only 4 per cent. It is constructed of a number of annular rings, which, placed one above the other, form that part of the cupola above the tuyeres. The rings consist of sheet-iron; they are lined with fire-brick, which is supported by the flange of T-iron riveted to the lower part of the sheet-iron casing. To the upper part is fastened angle-iron, so that one section can be bolted to the one above it. The sections are lined separately, and are then simply set one above the other. It is claimed that this facilitates repairs, although the handling of such sections seems somewhat unwieldy. The blast is forced in through an annular ring, so that it enters the cupola at all points of the periphery. This is not in itself any thing new, but Herr Fauler's design is quite simple and apparently inexpensive.

PROGRESS IN SCIENCE AND THE ARTS.

Nickel Electrotypes.—Notwithstanding the ease with which nickel is deposited now-a-days, it has required years of careful work to learn how to deposit a sufficiently thick and solid layer of nickel on wax or gutta-percha impressions. The *Revue Industrielle* says that the difficulties have now been successfully overcome, as the nickel electrotypes shown at the recent Paris Electrical Exhibition prove. Although costing double the price of copper electrotypes, those made of nickel have the advantages of allowing a much greater number of impressions to be made, of not being so easily injured by oxidation, and of permitting colored inks which attack copper to be used.

The Humid Assay for Silver.—Dr. A. P. Whittell, of San Francisco, has written the following letter to the *Scientific American*, which contains some interesting suggestions on improvements in the Gay Lussac assay of silver bullion: "In making the humid assay for silver, a great deal of time is necessarily spent in waiting for the suspended chloride to settle and leave the liquid clear to observe the action of the next drop of the precipitant; this, even when the solution has been previously heated. I have reduced the loss of time and insured greater facility in making an assay by dividing the solution (containing the silver) into several, say five equal parts, in separate vessels. I place them in a row, and add, say 3 c.c. of the solution of salt to the first, 4 c.c. to the next, 5 c.c. to the next, and so on. After the precipitate has subsided, I add say one half c.c. of the same solution to each of the several parts of the silver solution, successively. Numbers one, two, and three will perhaps show traces of silver still in solution, but numbers four and five none. The total amount precipitated from number three multiplied by five (as it represents only one fifth of the original solution of silver) will be the amount of silver contained in the ore or alloy being assayed. A simple means of settling the precipitated chloride almost instantaneously is to agitate the solution with a few drops of chloroform. Its action seems to be entirely mechanical. The agitation disperses the chloroform in minute globules throughout the silver solution, which in settling to the bottom carries with it every particle of the chloride.

Magnesia as a Refractory Material—We have had occasion repeatedly to call attention to the efforts made abroad to render magnesia available as a refractory material for furnace lining, and notably for those purposes where high heats and at the same time the corrosive action of acid cinders must be contended with. The subject in itself is not a new one, but it has never until now given such promise of an extended practical application, the high price having stood in the way of its adoption. The late Tessié du Motay used magnesite from the island of Eubœa, in the Mediterranean, the raw material containing, according to an analysis published in *Stahl und Eisen*:

Silica	3.92
Oxide of iron and alumina	0.98
Carbonate of lime	6.84
Carbonate of magnesia	88.10
Total	99.84

This material is found in the island of Eubœa in abundance, but its quality and purity vary considerably. The main trouble with Tessié du Motay's magnesia brick was, that it contained too much silica, notwithstanding all precautions. An analysis of his brick at Hoerde yielded:

Silica	6.87
Oxide of iron and alumina	1.86
Lime	3.18
Magnesia	87.80
Total	99.71

Similar brick, made from deposits of magnesite worked at Frankenstein, Silesia, by Haup & Lange, of Brieg, who sell it to Silesian works for use in reverberatory furnaces, was found at Hoerde to possess the following composition:

Silica	9.65
Oxide of iron and alumina	0.52
Lime	0.78
Magnesia	89.78
Total	100.73

At the Witkowitz works, in Austria, brick is made from raw material obtained in Styria.

Recent efforts have been directed to obtaining pure magnesia by chemical means. We have already spoken of Closson's method of utilizing the mother-liquors of Stassfurt potash brines, and will only add now that at Hoerde Closson brick was found to contain:

Silica, oxide of iron, and alumina	1.65
Lime	1.94
Magnesia	96.60
Total	99.59

A later process for obtaining pure magnesia is claiming attention in Germany, that of C. Scheibler, of Berlin. It consists of calcining dolomite and treating and agitating it with a refuse solution containing 10 to 15 per cent of sugar. The dolomite is decomposed in a few minutes, the lime it contains being dissolved, while magnesia remains behind. From the decanted sugar solution of lime, the latter is precipitated by carbonic acid, and the clear solution is then again available for new lots of calcined dolomite. Both the Closson and the Scheibler method yield magnesia at a low cost. The product of the latter has been found at Hoerde to be composed of:

Silica, oxide of iron, and alumina	1.48
Lime	2.18
Magnesia	95.99
Total	99.65

Unutilized Coal-Tar Products.—In an inaugural address by Professor Roscoe, before the new Society of Chemical Industry, that scientist speaks as follows on some of the problems which still remain to be

solved in the utilization of coal-tar. Among the coal-tar products which are yet drugs in the market must be mentioned naphthalene, this beautiful white crystalline substance being still used as a fuel or sent out of the works in solution in creosote oils. Naphthalene is, however, by degrees finding useful employment, owing to the advance made by chemists in the production of naphthalene colors, which are chiefly characterized by their fine yellow and red tints. New members of this series have been lately discovered. The latest arrival is one having a golden hue, and to which the poetical name of sun-gold is given. This color, discovered by Messrs. Weit and Merz, of Zurich, is said to be so intense as to promise to throw all the other yellows into the shade of forgotten things. An isomeride of anthracene, phenanthracene, is also found existing in most coal-tars in fully as large a proportion as anthracene. Here, again, we have a body which has as yet been turned to no useful account. Again, cresol, the methyl derivative of phenol, though occurring in considerable but varying proportions in different coal-tars, has received comparatively little attention from manufacturing chemists. Other higher homologues of cresol exist, but of these nothing has as yet been made. Finally, a field lies open for investigation in the examination of the 30 to 40 per cent of higher products of distillation of coal-tar about which nothing beyond the mere fact of their existence is known. These are the mother-liquors of the anthracene. They are repeatedly distilled to recover fresh quantities of this hydrocarbon, but the residual oils themselves find but very limited use. Looking to the future of this great industry of coal-tar products, it appears not unlikely that hereafter every gas company will distill its own gas-tar and ammonia liquor, and thus secure considerable profit. Indeed, some companies do this already; for it should be remembered that the tar and the ammonia-liquor products, when worked up, are said to cover half the cost of the coal used in the gas-making.

GENERAL MINING NEWS.

ARIZONA.

TOMBSTONE DISTRICT.

GRAND CENTRAL.—The Tombstone *Epitaph* has, in the second of a series of articles, which promise to be of exceptional value, given a history of this mine. We take from it the following: Up to November 1st, the east ledge, which was 160 feet deep in May, 1880, had been extended to a point 600 feet below the surface, and cross-cuts and levels run at 100, 200, 300, 400, and 500 feet. During the work of developing, down to and upon the 300-foot level, there was extracted and piled upon the dump ore variously estimated at 6000 to 8000 tons, 7000 being, probably, the safest estimate. This accumulation was from the legitimate development of the mine—sinking the shaft and running the levels, without any stopping whatever. On the 200-foot level, the east ledge was followed continuously 1100 feet south, and north to the line of the Contention, another 100 feet, making a continuous vein 1200 feet long at 200 feet deep. The west ledge was not so thoroughly developed until after the completion of the mill, in March, 1881. After that event, work was pushed upon the west ledge, which, upon the 300 level, proved itself a veritable giant, having a continuous body of ore several hundred feet long, that gradually widened from 10 to 40 feet, all good milling ore. After having satisfied themselves of the permanence and great value of their mine, some time about the 1st of May last, the owners started a new three-compartment shaft on the ridge south of the old works, and distant about 400 feet. This shaft is now down about 500 feet and is pushed ahead at the rate of 100 feet per month. This mill has thirty stamps, which are crushing at the present time an average of 2½ tons per stamp every twenty-four hours, making 2250 tons per month. The mill was started upon its permanent work on the 10th of March last, and, with the exception of about twenty days' lost time, occasioned by the floods of July and August, and the stopping of one battery of five stamps, which was disabled by breakage of a shaft last month, it has run continuously; thus making six months' work up to the 1st day of November. Up to November 1st, there had been mined 20,000 tons of ore, 18,000 tons of which had been milled, yielding \$848,176.40. This gives an average yield of \$47.12½ per ton. There is remaining at the mine and mill a surplus of 2000 tons which, at the same valuation, gives \$94,258. The comparatively low grade of the ore is due to the fact that every thing in the shape of ore that would pay fifteen dollars and upward, where stopping is done, has been taken out and sent to the mill along with the richer parts of the vein. This has run the returns down to \$47.12½ per ton; but this system of working will more than compensate in the future workings of the mine. From the above output the original cost of development of the mine with the two sets of hoisting-works and the mill, roads, etc., has been repaid, amounting to not less than \$300,000, and four dividends declared of \$50,000 each, aggregating \$200,000.

INGERSOLL.—A dispatch to the *Tribune* gives the following information: San Francisco parties have offered \$450,000 for the Ingersoll mine, and the offer has been refused. It is estimated that there is more than \$200,000 worth of ore on the dump and \$500,000 worth in sight in the mines.

WESTERN.—The San Francisco *Daily Report* says that at the annual meeting of the Western Mining Company, held on Monday, the old board of directors was re-elected. A resolution was adopted forming a new company, to be known as the Contention Consolidated Mining Company, with a capital of \$12,500,000 divided into 250,000 shares. The formation of this new corporation involves the consolidation of the Western, Flora Morrison, and Sulphuret. The apportionment is as follows: Western to receive for its mine 200,000 shares; Flora Morrison to receive for its mine 32,000 shares; Sulphuret to receive for 600 feet of the southerly end of its mine 18,000 shares. The Western declared a dividend of \$1 per share, payable on the 10th inst., and there will be another final dividend in the settlement. The gross product of the Western mine is given at \$1,592,742.39. It paid \$900,000 in dividends during the last year, and the dividend declared Monday will bring the amount disbursed up to a round million.

SILVER KING.—A considerable improvement in the 700-foot level is reported. The Windsor mill, which made a trial run on Silver King tailings, has stopped, the experiment test not having proved successful.

VIZINA.—The *Nugget*, under date of the 12th, says: Less than one year ago, the Vizina was a non-producer, and now it is a dividend-payer, the first having been declared on the 1st of November. The amount was ten cents per share, equivalent to \$20,000; and after paying that sum, a cash balance of \$75,000 was carried over. This mine has paid its expenses from the grass-roots, having produced in the last quarter \$211,216, and since its first shipment of bullion, \$425,000 from 4595 tons of ore, an average of \$92.50 per ton. For the last three months, the yield has been:

August	\$81,216.00
September	70,000.00
October	60,000.00
Total	\$211,216.00

The October returns of \$60,000 being the product of 302 tons of ore.

CALIFORNIA.

THE REPORT OF THE DEBRIS COMMITTEE.

The full text of the report of the Débris Committee of the Board of Trade of San Francisco, is now at hand—a document, the body of which differs but little in

character from the writings of men who have prepared themselves to decide a difficult question by an excursion. The committee report what they have seen and what they have gathered from the reports of Colonel Mendell and State Engineer Hall; and as the result of their observations, offer the following conclusions:

First. That all property and property rights ought to be respected and protected.

Second. That the true interests of the State require the promotion of both the agricultural and mining interests.

Third. That the discharge of *débris* from the hydraulic and other mines into the river channels has been very destructive in its effect upon the agricultural lands and to the rivers and streams; and, if continued as at present conducted and operated, will be disastrous to the agricultural lands, and like a lava stream will last and render sterile and barren that entire section of the country, blotting out its towns and cities, and rendering it a perfect "Sahara."

Fourth. That the hydraulic mining interest, in which so much capital is invested, and which supports a very large, thrifty, and intelligent class of our citizens, are of great importance and magnitude; and its encouragement is not alone desirable, but a duty, for its wants would tend to benefit and develop the very land which it will now destroy for want of concerted, scientific, and judicious action being taken in the impounding of its *débris*.

Fifth. That dams be immediately constructed on the Yuba River, below the junction of Deer Creek, and at Degare Point; also, that the break in the brush dam on the Yuba River be at once repaired.

Sixth. That the entire cost of the construction, maintenance, and repair of proper dams for the retention and storage of *débris* should be borne by the mining interest.

Seventh. That the federal government should be urged to appropriate sufficient means to dredge and otherwise improve the navigation of the Sacramento and Feather rivers in the interest of commerce.

Eighth. That all litigation be suspended between the parties interested, as a further prosecution of vexatious and expensive proceedings can not afford a remedy, but rather tend to exhaust the means and antagonize those whose best interests should cause them to co-operate intelligently and dispassionately to obtain a remedy to protect the interests involved.

Ninth. That security against further damage is imperative; but whether that shall involve the stoppage of the mines during the construction of the dams is not our province, but that of the convention to decide.

Tenth. That in order to bring about a co-operation of the heretofore conflicting interests; to secure a fair, honorable, and equitable adjustment of this matter; to adopt and carry out a speedy plan and remedy; to enlist the sympathy and support of the people of the State and its representatives, a convention be called in San Francisco, to convene on Thursday, the 17th day of November, 1881.

CANADA.

NOVA SCOTIA.

It is announced that Messrs. Adams & Decamp, of this city, have just completed the sale of Hall & Anderson's gold mine, at Fifteen Mile Stream, to a New York corporation known as Hall-Anderson Gold Mining Co. The price paid was \$150,000.

COLORADO.

It is reported that the Pueblo Smelting Company, a concern which has six blast-furnaces, and is treating from 100 to 150 tons of ore per day, proposes soon to commence refining base bullion and making sheet-lead pipe and shot for the Rocky Mountain trade.

GILPIN COUNTY.

WILLIAMS.—According to the *Register-Call*, development of the mine is made in the east 500-foot level, which has attained a distance of 220 feet. The first 15 feet east of the shaft was in tight ground, but for the last 200 feet a good body of ore has been passed through. Both the east and west 400-foot levels are driven, and overhead and underhand stopes are made at this point. Twelve men are employed, eight of whom are engaged in drilling. The main shaft will be sunk again next month, the water in the bottom having nearly all disappeared since the late cold weather set in. The shaft is now 365 feet in depth, and from the 500-foot level it has been sunk through as good a body of ore as has been found in any other portion of the mine. Ten stamps of the Cashier mill are employed on Williams ore for the company, the last runs averaging 10 ounce-gold per cord. Last month, 18 tons of smelting ore were produced, averaging \$60 per ton net, or \$1080 for the month.

GUNNISON COUNTY.

MAPLE LEAF.—The *Tribune* says: A run of ore from the Maple Leaf mine, at Cochita, Pennsylvania District, Gunnison County, shows unexpected richness, and has revived a dead camp. The Maple Leaf is owned by Philadelphia parties.

LAKE COUNTY.

DUNKIN.—The *Herald* says: We are authorized by Mr. Ford, manager of the property, to state that the principal product of the mine is a low-grade iron and sand ore, which, after deducting the expenses of extraction, and paying the \$2500 royalty to the company, leaves but a small margin for the lessees. The company still retains control of the south portion of the property, and is engaged in sinking the Robinson shaft with a view of ascertaining whether mineral does not lie below the deposit at present worked. This shaft, after passing through forty feet of low-grade mineral, has entered a solid body of porphyry similar to that found on Carbonate Hill almost at grass roots, and it is hoped that, when this is passed through, a second contact containing mineral will be reached. Prospecting-work is going on on the body of low-grade ore above mentioned, which was at first struck at a depth of two hundred feet, with the hope that a higher grade of ore may be found. At a depth of seventy-six feet another drift is running south in the iron body, and spots of galena are met with. The Robinson shaft is now about 265 feet deep. It has a fine shaft-house over it, and is supplied with a good Cornish pump.

IRON SILVER.—According to the *Herald*, a large amount of development-work is doing in the mine, and shipments continue at the rate of two hundred tons a day. The iron mine furnishes about 125 tons, while the Rock and Dome furnish the rest. Besides the large ore-reserves left in blocks, laid out in the mine, and the continuance of the ore-faces in the drifts beyond, there is an immense amount in the line below the contact, which has been run over in former workings.

NEVADA DISTRICT.

KENT COUNTY MINE.—The *Register-Call* reports, under date of the 13th inst., that the sale of the Kent County lode, Nevada District, which has been pending for some time, has been consummated, the consideration paid being \$95,000. The purchasers are English capitalists, possession of the property having been given them to-day. Work will commence to-morrow morning, and the working-shaft will be relieved of the water which has accumulated since closing down mining operations some months ago.

SUMMIT COUNTY.

ROBINSON CONSOLIDATED.—A correspondent of the *Tribune* sends that journal the following, under date of the 10th inst.: A personal examination of the Robinson Consolidated mine proves that the official reports have not been exaggerated, and that the mine never showed to better advantage than at present. It is shipping from 95 to 140 tons of ore daily. The eighth level is now in the ore-body, showing it to be as fine as at any level above. The new shaft is down over 200

feet, with improved machinery. At the old workings, a large body of ore was recently uncovered. At the sixth and seventh levels, great breasts of ore, from ten to twenty-five feet high and one hundred feet in length, are disclosed. The mine is undoubtedly still in its infancy, and is ably managed. The ore which has been taken out is not missed.

RARA AVIS.—The *Register-Call* gives an elaborate account of the projected concentration mill and the mine of the Rara Avis. The main mill building is to be 60 x 40 feet, with an L on the south side 40 x 20. It is to be a three-terraced mill. The L will extend up to the mouth of the tunnel. The ore from the mine will be trimmed and dumped into inclined ore-bins built above the first floor, where will be placed the rock-breaker. The ore, after passing through the crusher, will be run through the pulverizer on the second floor, and from there placed on dryers. After drying, it will be run through the concentrators, of which three will be erected. The mill will have a capacity for concentrating 75 tons of crude ore every 24 hours, and will be run by a 70 horse-power engine and boiler. The building will be sufficiently large to admit of increased crushing and concentrating capacity, should the output of the Whitney vein require it. The cross-cut tunnel to the Whitney vein is now in 150 feet, and is driven at the rate of 8 feet every 24 hours. The north wall of the lode has been cut at an acute angle. When the south wall is reached, a slight curve will be made in the course of the tunnel, the tunnel continued on west until the air-shaft is reached, when an uprise of 12 feet will be made to the bottom of the air-shaft. Owing to the large amount of water coming in on the miners working in this shaft, the work of sinking was suspended some days ago. It is not improbable that, as the tunnel progresses westward, the water in the air-shaft will be drained through the former. Should this prove to be the case, miners will be put at work sinking the remaining 12 feet, and the tunnel driven east from the shaft for connection. The 300-foot east level, from No. 1 shaft on the Whitney vein, is driving night and day, and has advanced 180 feet from the shaft. Sinking in the main shaft progresses, two shifts of miners being employed. Present depth, 355 feet, with a good crevice of pay material. On the several dumps in and around the shaft buildings, are not less than 600 tons of concentrating ore awaiting the completion of the mill. The tunnel, when finished, will be 900 feet in length. It is carried at present writing 6 x 7 feet in the clear.

DAKOTA.

From the accounts of the local journals, there appears to be considerable activity in the Black Hills. It is reported that the new Grand Junction mill will start up at an early date, that the Hill City smelter will be ready by the beginning of the year, and that a smelter has been contracted for by the Deadwood Smelting Company. From the Rochford District comes the news that Charter Oak ore is going to the Stand-by mill, and that the erection of a large mill for that mine is contemplated. The Gold Star mill, at Custer, has been closed down for the winter. The discovery of native copper is reported near Deer Creek, north of Pactola. The semi-monthly partial clean-up of the plates from the Homestake and five other mines was sent to this city on the 19th inst. It aggregates \$125,000. The batteries are cleaned only on the first of each month. Among the mines represented are the Deadwood-Terra and the Father de Smet.

FATHER DE SMET.—The superintendent of the Father de Smet mine writes, under date of November 5th, as follows: I send herewith express company's receipt for 1800 ounces gold bullion, the result of last 15 days' run in October, making 3751.38 ounces for the month, this being the largest amount of bullion produced by the mine in any one month. The mill is running steadily, and we are now receiving the benefit of the extensive repairs made during the summer. At the mine every thing is running with its accustomed regularity and smoothness. We have started a drift south on second level, Golden Gate vein, which shows very well. We are also putting in sill sets on third level, preparatory to working the large body of ore lying between second and third levels. If the winter is open, this body of ore will not be required for use until one year from now. The north-end tunnel is progressing about 2 feet each 24 hours, and on 1st inst. was in 257 feet. For the week ending November 8th, the superintendent reports that 1200 tons of ore were extracted from first level, 1000 tons from second level, and 105 tons from third level. This week, 2305 tons of ore were milled. The north-end tunnel is in 267 feet. A tunnel is driving in a southerly direction on the second level, beginning at the rise at the end of the east cross cut, Golden Gate vein, to be known as South Header, Golden Gate.

GEORGIA.

The Dahlonega Mountain Signal reports that a great many very rich mines have been profitably started in that section of the gold belt of North Georgia within the last few months, the principal ones being located in the counties of Lumpkin, White, Union, and Dawson. In the latter county some new discoveries have lately been made on the Taylor's Creek gold mines, some veins of which are pronounced to contain rich ore.

MAINE.

From Ellsworth, our correspondent "DOUGLASS" writes as follows under date of November 14th:

During the fall, our mines have been doing but little; still, by looking back six months, some change is noticeable. When we take into consideration what people have the management of the affairs of our mines, it is not strange that so little mining has been done; the only wonder is, that anything at all has been accomplished. Yet the outlook is brighter than ever before; and at the present state of progress, returns may be looked for, from a few of the mines, in about three years.

The Deer Isle mine is taking out some very fine ore, and the shafts and drifts show considerable pay-ore in sight; and with a good mart in England for their ore, there seems to be nothing to hinder their having some income.

The Sullivan silver mine also has a large quantity of ore in sight. There is a good, well-mineralized vein the whole width of the shaft on the 300-foot level; and as two assessments of 25 cents each have already been levied, there ought to be money enough in the treasury to effect the improvement of the stamp-mills, and go to work in earnest. The ore contains native and brittle silver, and its grade is such that it should pay well for working.

The Milton is working in three drifts, and there is a rumor that a vein has been encountered in each drift; but the quality of ore found is unknown to outsiders.

The Douglass continues surface-work. The cupola-furnaces work fair, as do the reverberatories. The kiln-furnace is approaching completion. The refinery-furnace turns out first-class work. Although a large quantity of ore has been taken out, the vein has not been penetrated over 150 feet. At the last meeting of the stockholders in Bangor, October 31st, it was voted to change the name of the company, and make the new stock assessable; and a dollar assessment is to be levied, in order to free the mine from debt and take up the mortgages given. On the new basis, it is to be hoped the property will begin to pay. There is a large quantity of fine ingot copper already on hand.

The Mammoth, on the opposite side of the Douglass Pond, is attracting considerable attention, the body of ore being large, and the quality first-class. A shaft has been sunk about thirty feet on the vein, with a very fine showing.

The Blue Hill is working along slowly with a slight improvement in the quality of ore. The new pump enables work to be done to better advantage. One cupola-furnace is in operation.

The Twin Lead has encountered a vein after drifting a considerable distance from the incline-shaft. At present, a winze is sinking upon this vein, which is producing good smelting ore. The ore previously taken from the mine will need concentrating before it can be worked.

A great many of our mines have been closed this fall for want of funds, owing to their having to depend upon the sale of stock for money. For this reason, most

of our companies are reorganizing, so as to have the stock assessable, which will enable them to work until they have some chance to determine whether their properties are valuable or not.

PORTLAND SULLIVAN.—In reply to an inquiry of a correspondent, concerning this property, the editor of the *Sullivan Bulletin* writes as follows, under date of November 19th: About two years ago, a sort of a hole was sunk, west of the location known as the Faneuil Hall and Sullivan, by some parties residing in Portland, and which was called by them the Portland-Sullivan mine. There has been no work done on the so-called Portland-Sullivan for a year or so.

MONTANA.

The reports of strikes in Montana mines are coming in pretty fast by mail and telegraph, among the mines thus favored being the Alice, Moulton, Legal Tender, and Alta Montana. The local press has the following details concerning current work:

BUTTE DISTRICT.

ALICE.—An important strike has been made on the 400-foot level, after cross-cutting the horse east, in the extreme south vein. The cross-cut has run into some four feet of ore, two feet of which is first-class, assaying over \$50.

BELLE OF BUTTE.—Sinking has been going on for some time past, and consequently no ore is taken out. The shaft is now down about 150 feet. Some weeks ago, before sinking was begun, a large quantity of ore was stoped out.

GAGNON.—Stopping is going steadily forward between the 225 and 325-foot levels. The average percentage of copper in the Gagnon ore is from 15 to 20 per cent, the average of silver about 60 ounces.

LEXINGTON.—The *Miner* says: The main shaft at the Lexington is down now about 260 feet. From the 200-foot level, a cross-cut to the north has been run some 110 feet. On this cross-cut, about 40 feet north of the shaft, an important lead has been struck. At this point, drifts have been run 20 feet to the east and 50 feet to the west, which develop a showing of from four to six feet of good ore. Water has ceased to be troublesome in the Lexington. In the mean time work is progressing actively on the new mill and office buildings.

MOULTON.—The Moulton is said never to have looked so well as it does to-day. There is good ore in sight in every level and stope, according to the *Butte Miner*. On the 200-foot level, the east and west drifts both show first-class ore in the breasts. Rising is going on in these drifts preparatory to stoping. On the 300-foot level, the east drift is within forty feet of the Alice line, and shows a fine body of first-class ore. The west drift is in about 150 feet, developing high-grade ore, which has improved wonderfully in the last few days, and is marked with a good deal of native silver. There have been no regular stopes on the 300-foot level as yet, but all the rises show fine ore. On the 400-foot level, drifting to the west has just been commenced, uncovering a body of average milling ore about ten feet wide, and a very rich streak about two feet in width, which shows native and wire silver, and averages 157 ounces. The new pump will probably not be ready for use for three weeks, a full crew of men working, however, night and day to get it into place. On the south cross-cut on the 300-foot level, some forty-five feet of ledge matter have been cut through, with streaks of ore running from 31 to 48 ounces. Pumping is going on from the 400-foot level. The average daily tonnage at present is from 17 to 20 tons, and has been about 17 tons the past month. When the rises are all opened up, it can easily be run up to 30 tons.

MORNING STAR.—The shaft of this mine is now down about 220 feet, and on this level the cross-cut to the south has been run 50 feet. On the 220-foot level, a drift to the west has been extended some 40 feet, there being no east drift on this level. From the 100-foot to the 220-foot level, a winze has been sinking for some time, and all the ore taken out recently has been from this winze, running from 78 to 200 ounces. There is a good deal of water on the 220-foot level, all that two Knowles pumps can manage.

PHILIPSBURG DISTRICT.

The *Helena Independent* has the following general statements concerning the mines of this district:

ALGONQUIN.—The 20-stamp mill belonging to this company is equipped with boilers rated at 200 horse-power, and an engine of 125 horse-power. The mill is equipped with a 60-inch Howell furnace, 6 pans with wooden bottoms and mullers, and 3 settlers. Between 20 and 25 tons of ore are crushed dry per day, and their chlorination averages a trifle over 90 per cent. The mine is 400 feet deep, and has been opened by shafts and levels that aggregate in extent 2500 feet. It is equipped with a steam-hoist capable of operating to a depth of 800 feet; two steam-pumps, for throwing the water from the mine, besides a sinking-pump, which is used only in the shafts when sinking between the levels. The ore averages about 80 ounces of silver per ton, and their lowest pay-streak, which is considered of most excellent promise of permanency, is about 18 inches thick and very regular. This company also owns the Salmon mine, which is now 300 feet deep, and shows a pay-streak from 18 to 24 inches wide, that carries an average of 60 ounces of silver per ton. Since February of last year, the company has produced for the market 288,000 ounces of fine silver.

GRANITE MOUNTAIN.—This mine is outside the limestone formation, on a high granite peak, in such a position as to render its development by tunnels a matter of ease and economy. The ores produced seem to be much like the free or surface ores found in Butte, and it is claimed that the pay-ore will average five feet in width, and repeated averages made by careful assays of it from all parts of the mine opened show that it carries 56 ounces of silver and \$10 gold per ton. The upper tunnel is in on the mine for a distance of 186 feet, and another tunnel 124 feet below is now in 541 feet, 341 feet of which is on the vein; and in its face, at the lowest point in the mine, the vein is 11 feet wide.

HOPE.—The mill has ten stamps, with ample power, and appliances requisite for the economical handling of the ores, and four Frue vanners for concentrating the tailings. The ore from the Hope mine is said to carry nearly 50 ounces of silver per ton.

TROUT.—Though of higher grade, the ore is base. The ore extracted and milled recently has averaged in large lots over 80 ounces per ton, and one 128-ton lot carried over 95 ounces per ton. The mill formerly operating at this mine is now dismantled, and the old company hopelessly in debt; and yet the mine has been able to add to the world's treasure during the last year about \$30,000, and that without any adequate appliances for mining with proper economy. It is understood that a steam-hoisting apparatus is to be placed on this mine as soon as practicable.

NEVADA.

COMSTOCK LODGE.

The following statement of the cash on hand on November 1st may be of interest:

Alta	\$28,759.52	Gould & Curry	\$9,103.24
Alpha	4,441.00	Imperial	10,938.23
Benton	487.82	Julia Consolidated	9,261.62
Chollar	811.48	Justice	25,207.44
Challenge	599.75	Lady Washington	2,380.49
Caledonia	512.00	New York	2,500.00
Crown Point	31,991.00	Silver Hill	17,658.93
Consolidated Virginia	24,337.00		

The following companies had an indebtedness November 1st:

Best & Belcher	\$1,381.00	Potosi	\$12,347.41
Bullion	50,000.00	Sierra Nevada	29,583.00
California	23,652.00	Union Consolidated	19,149.31
Hale & Norcross	4,500.00	Utah	7,398.00
Overman	5,246.40		

The Bullion Mining Company had \$85,787.17 resources to meet the above indebtedness and the October expenses at the mine. California had \$9141 in unsold bullion.

HALE & NORCROSS.—Under date of November 16th, the *News* says: The repairs to the shaft and incline of the Hale & Norcross were completed yesterday. The bulkhead in the drift connecting the mine with the Chollar-Norcross-Savage shaft, on the 2400 level, was removed last night. The removal of the bulkhead will allow of a circulation of air from one shaft to the other, and in passing through the various drifts and winzes materially cool off the Chollar and Potosi mines, which are extremely hot. The Savage mine will also be benefited by the increased circulation of air. For a time, until the other mines are relieved of their hot air, the temperature in the Hale & Norcross will be greatly increased. The management has, therefore, concluded to cease work in the lower levels for a short time.

SAVAGE.—The following is the estimate of the superintendent, under date of Nov. 12th: Extracted 315 tons of ore last week. Cross-cut No. 1, at eighth station, was advanced 32 feet; total length, 56 feet. Cross-cut No. 2 was extended 28 feet; total length, 63 feet. The faces of both are in favorable vein material. The drift from the Combination shaft, 2400 level, was extended 63 feet during the past week.

KINGSTON DISTRICT.

VICTORINE.—From this mine, 30 miles south of Austin, the *Eureka Sentinel* reports as follows:

The Victorine Mill and Mining Company is carrying on extensive operations at that place. A 30-stamp mill and two O'Hara furnaces are in course of construction. The mine is rich in gold. Seventy-five miners have been employed, and all of the stopes are filled with ore. The ore accumulated so fast that 50 of the 75 miners had to be dropped last week. The O'Hara furnace is something new in this State. S. B. Mowery, formerly superintendent of the Lemon mill at this place, has the contract for building the furnace.

NEW MEXICO.

We have the following letter from Santa Fé, dated November 7th:

Generally speaking, mining enterprise is reviving; for it can not be denied that the summer boom that was so confidently anticipated did not come. It is true many capitalists and men fully capable of judging of the value of mines have been among us, but have returned in very many cases with their money untouched in their pockets. Under existing circumstances, this is a sign to be hailed with satisfaction by all well-wishers to legitimate mining enterprise, showing an unmistakable proof of a great advance in the education of that class, at one time so easily gulled.

New Mexico is a new country, and we must not expect to find large bullion-producing mines just yet, although a beginning has been made, especially around Silver City. The metals and minerals already known to exist in considerable quantities are notably gold, silver, copper, lead, coal, and mica. Gold is found in greater or less quantities in many parts of the territory, in quartz and placers, on barren plains and in fertile valleys, the richest usually in the least desirable places, as, for example, the old and new placers some thirty or forty miles from here, where there are acres and acres of rich pay-dirt, but which, without the aid of a large amount of capital, can not be extensively worked, owing to the scarcity of water.

Silver is found also very widely distributed in its own ores, such as chlorides, or with those of other metals—lead, copper, etc. The chlorides are chiefly confined to the southern portion of the territory, beginning at about Socorro, extending down into old Mexico; such camps as Silver City, Shakespear, and Gillespie being the most prominent. Every one who has had to do with chloride mines knows the changeable nature of the veins—rich to day, poor to-morrow—setting at naught all calculations as to quantity in sight and conjectures as to the probable future. There are a few of these mines already at work in earnest, with money to back them: for instance, the Torrence and the Ivanhoe.

Silver, in association with other ores, is to be found in many places; the only question is, how low a grade will pay to work in every individual locality. The argentiferous galena mines of the Cerillos and Taos districts have been attracting a good share of attention among local men. The Cerillos mines are, on the whole, decidedly low-grade, the assays showing all the way from \$10 to \$20; but, taking all through, perhaps \$15 might be a fair estimate of the silver value for about 35 or 40 per cent of lead. In some cases, the presence of blende in considerable quantities lowers the value of the ore; but this could be remedied by proper concentration. Several influential Denver men have taken in hand a smelter that had been lying idle for some time, and are setting about bringing it into blast before long. The railroad runs close to the works, giving them every facility for shipping. Coal of good quality is found in large quantities in the vicinity, so that every thing conducive to successful treatment of ores on the spot is at hand. It will thus be seen why I mention the low-grade Cerillos ores as an important item in the mineral list. The only remaining question is to prove a sufficient body of ore, which task is now being undertaken.

The other camp I mentioned—Taos—presents a more attractive appearance, the galena there running higher in silver and lead. It contains, furthermore, no blende and but little pyrites; in fact, nothing but the pure galena, in a good, clean quartz. Thus, concentration and reduction charges would be reduced to a minimum. The mines are situated about twelve miles from the Denver & Rio Grande Railroad, and coal has been discovered in the neighborhood. I believe it will eventually turn out a paying and desirable district for investment. The trouble so far has been lack of funds to push exploration-work.

At the commencement of this letter, I alluded to a revival of mining business. The previous depression was partly brought about by the prospectors standing out for too high prices for undeveloped properties; but now winter is coming on, and possibly because more work has been done, numerous investments are made quietly without any outward show.

Another, and probably a much more potent cause of the stagnation has been the much vexed grant question. Every one shrinks back in horror at the name, and sees nothing but regular nightmares of lawsuits and litigation staring them in the face. At first, both miner and grant-holders were immovable; neither willing to give way an inch, each telling the other they had no business to be where they were. But now, after giving the matter a little calm reflection, it is discovered that there are rights that have to be respected on both sides; so that at the present time it is no uncommon thing to hear of leases being granted by those whose rights are beyond dispute, and conditional leases where the rights have to be confirmed or doubts as to the tenability of their claims cleared up in the law courts. This, then, I believe to be the second impediment to successful mining thus far, but which, I think, is on a fair way to a speedy settlement satisfactory to all concerned.

UTAH.

The Southern Utah *Times* states that the Frisco Company proposes to start its smelting-works about the 1st of December.

HORN-SILVER.—The *Times* is our authority for the following: Regular work is vigorously pushed at the Horn-Silver mine. No dead-work is going on. The working-shaft is now at a depth of 483 feet, and it is probable that one more week will take them to the 500 level, where the fifth station will be put in. A vast amount of ore is taken out of 1 and 2 and railroaded to the company's smelters. The working force has been increased to more than 100.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Nov 25.

Although Thanksgiving-Day reduced the transactions to five days for this review, yet the aggregate of sales is 731,265 shares, a very good showing.

The Tuscarora stocks have been quiet and have developed no increase in market value.

The Comstock shares have had a liberal business, but have been very much demoralized. California only records sales of 5620 shares, at a decline from 67 @35c.

In the Bodie stocks, Bodie Consolidated declined to \$4 1/2 under a small business.

Barcelona declined from 71 @43c. under moderate sales. Bradshaw touched 48c. to-day, with only moderate transactions for the week.

The Vizina Consolidated Mining Company, of Tombstone, Arizona, has declared a dividend of ten cents (10c.) per share, or \$20,000, payable December 1st.

Receipts: Base bullion product, 363 tons 1860 lbs. \$115,992.19

Charges: Mine account, \$43,128.01; Smelting, \$1,184.69; Freight and refining, \$24,747.24

Approximate net earnings October, 1881, \$12,176.92

The disbursements on the new shaft, \$46,419.27, are not included in the above. The resources at the end of the month include 124 tons, 1665 pounds of bullion, valued at \$32,456.45, and \$124,368.91 cash on hand.

UNLISTED QUOTATIONS. Mr. L. V. Deforest, No. 70 Broadway, under date of

DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, SHARES, ASSESSMENTS, DIVIDENDS, HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. Rows include Alice Mon., Amie Con., Argentia, etc.

* Non assess able. † The Deadwood mine paid in dividends, previous to the consolidation, \$275,000, and the Golden Terra paid \$75,000.

SALES.—Alice, 500; Amie Consolidated, 3700; Bassick, 100; Belle Isle, 100; Bodie Consolidated, 950; California, 5620; Chrysolite, 5880; Climax, 2300; Consolidated Virginia, 2495; Copper Knob, 12,000; Dunkin, 10; Eureka Consolidated, 100; Father de Smet, 30; Gold Stripe, 200; Grand Prize, 300; Great Eastern, 3000; Green Mountain, 1300; Hibernia, 700; Homestake, 200; Horn-Silver, 610; Hukill, 1300; Independence, 1100; Iron Silver, 9530; La Plata, 100; Leadville Consolidated, 10,750; Little Chief, 2105; Little Pittsburg, 300; Moose, 5400; Northern Belle, 1175; North Belle Isle, 280; Ontario, 40; Ophir, 900; Quicksilver, Preferred, 1100; Common, 800; Rising Sun, 2600; Robinson Consolidated, 4,600; Sierra Nevada, 960; Spring Valley, 400; Standard, 830; Stormont, 500; St. Joseph, 500; Tip-Top, 50; Yellow Jacket, 200 Dividend shares sold, 167,890.

November 25th, 3 P.M., reports the current quotations of unlisted stocks as follows:

Table with columns: Bid. Off'd., Bid. Off'd.. Rows include Colum. & Beaver \$0.95, Highland Chief 2.00, etc.

DIVIDENDS.

The Black Bear Quartz Company has declared a dividend of 20 cents per share.

The Charleston (S. C.) Mining and Manufacturing Company has declared the usual quarterly dividend of \$1.50 per share, and an extra dividend of \$1 per share on the capital stock of the company, payable on and after December 1st, 1881, at the Philadelphia office, No. 132 Walnut street.

The Chrysolite Silver Mining Company has declared a dividend of 50 cents per share, payable on the 10th prox. Transfer-books close November 30th.

The Delaware & Hudson Canal Company has declared a quarterly dividend of one and a half per cent on the capital stock of the company, payable at the National Bank of Commerce, in this city, on and after Saturday, 10th December next. Transfer-books close November 26th.

The Evening Star Mining Company has declared a dividend (No. 22) of 5 per cent on the capital stock,

payable November 28th. Transfer-books closed on the 25th inst.

The Jocustita Mining Company has declared dividend No. 2 of \$1 per share, payable on the 30th inst

Transfer-books closed on the 25th.

The La Plata Mining and Smelting Company has declared a dividend of 7 1/2 c. per share, payable December 1st. Transfer-books closed November 25th.

The Lehigh Coal and Navigation Company has declared a dividend of 2 per cent on the capital stock of the company, clear of all taxes, payable in cash on and after December 3d, 1881, to stockholders as registered on the books at three P.M., November 22d.

The Pennsylvania Railroad Company has declared a semi-annual dividend of four per cent on the capital stock of the company, clear of all taxes, payable in cash on and after November 30th to stockholders as registered on the books at three P.M., October 31st.

The Vizina Consolidated Mining Company has declared a dividend of 10 cents per share, payable December 1st. Transfer-books close November 26th.

REVIEW OF THE SAN FRANCISCO MARKET.

Comstock prices are still declining, and the San Francisco market continues in the same depressed condition noted for some time past. Thus far this year,

more than \$9,000,000 have been called in in assessments by the mines of the Comstock lode, for carrying forward development and prospecting work; and during that period not a dollar has been returned to the stockholders in dividends, while the production of the whole lode, according to the latest official quarterly returns, was only \$173,000 for such period, at which rate of output this would be barely sufficient to pay the running expenses of one single prominent mine alone.

SAN FRANCISCO MINING STOCK QUOTATIONS. Daily Range of Prices for the Week.

Table with columns: NAME OF COMPANY, CLOSING QUOTATIONS (Nov. 18, 19, 21, 22, 23, 24, 25), Opening Nov. 24, Opening Nov. 25. Lists various mining companies like Alpha, Alta, Bechtel, etc.

Gas Stocks.

The following list of companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 17 Wall Street, New York. Quotations are based on the equivalent of \$100.

Table with columns: COMPANIES IN NEW YORK AND VICINITY, Capital Stock, Par., Dividends (Rate per ann., Ann. of last., Date of last.), Quotations (Bid., As'd.). Lists companies like Mutual N. Y., N. York, Metrop., etc.

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, Nov. 23.

The market for the past week has felt the influence of depression caused by the bank troubles, and does not show the advance which, under more favorable financial circumstances, would doubtless have been the result of the increased demand for ingots of copper and the advance in price of same. There is, however, a better feeling among stockholders of the producing mines and a manifest disposition to buy rather than sell at present prices. At present, there is no disposition to operate in the speculative shares, but they will doubtless feel the influence in due time. In (Cumberland & Hecla, there is a good buying demand at \$24 1/2 @ \$25, with but little stock changing hands. Quincy has been active, and under the pressure to sell, in the early part of the week, declined from \$44 @ \$41, but has recovered the decline and sold again at \$44 to-day. Franklin advanced from \$12 @ \$12 1/4. Pewabic also advanced from \$12 1/4 @ \$13 1/4. This stock is very firmly held and small orders advance the stock considerably. Osoosa is steady at \$29. In silver stocks, the market has been a generally declining one, with Silver Islet as the principal feature of interest, this being one of the stocks operated in by the broker whose failure has caused so much comment the past week, naturally declined heavily when pressed for sale, dropping in one session from \$38 @ \$28, and still further to \$22 to-day.

NON-DIVIDEND PAYING MINES.

Large table with columns: NAME AND LOCATION OF COMPANY, NUMBER OF SHARES, Par, ASSESSMENTS (Total levied to date, Date and amount of last), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (Nov. 19, 21, 22, 23, 24, 25). Lists numerous mining companies like Albion, Alta, Aita-Montana, etc.

SALES.—Albion, 900; Alta Montana, 675; American Flag, 2000; Barcelona, 700; Bechtel Consolidated, 200; Best & Belcher, 100; Big Pittsburg, 900; Black Jack, 30; Boston Consolidated, 14200; Boulder Consolidated, 2400; Bradshaw, 5720; Buckley, 3500; Bull-Domingo, 1400; Bullion, 100; Bulwer, 645; Bye and Bye, 3200; Calaveras, 1100; Calaveras W. & M. Co., 300; Carbonate Hill, 4700; Central Arizona, 3900; Chapparral, 12100; Cherokee, 200; Consolidated Imperial, 800; Consolidated Pacific, 200; Crowell, 1000; Dahlonega, 1000; Dunderberg, 50; Enterprise, 330; Gold Placer, 100; Goodshaw, 900; Granville, 1100; Hortense, 200; Lacrosse, 1000; Legal Tender, 3100; Maiposa Preferred, 50; Common 400; Mexican, 655; Mineral Creek, 14,300; North State, 13,400; Noonday, 200; Oriental & Miller, 4700; Rappahannock, 5200; Red Elephant, 300; Silver Cliff, 3250; Silver Nugget (new), 4300; Sonora Con. Consolidated, 500; South Bulwer, 1900; South Hecla, 700; South Pacific, 28,120; State Line No. 4, 100; Nos. 1 and 4, 41,300; Nos. 2 and 3, 22,000; Sutro Tunnel, 14,000; Taylor Phurnas, 17,800; Unadilla, 9100; Vandewater, 10,100. Non-dividend shares sold, 363,375. Total shares sold at all the exchanges, 731,000.

Coal Stocks.

NEW YORK, Friday Evening, Nov. 25.

A fair business has been done in these stocks for a week which has included but five days. In the early part of the week, prices were weak and irregular, and almost without exception declined. To-day, however, there has been a good demand, and stocks have more than recovered the losses sustained in the early part of the week. The sales include 124,400 shares of Delaware, Lackawanna & Western at \$126 1/4 @ \$124 1/2 @ \$126 1/4; 7565 shares of Delaware & Hudson at \$108 1/4 @ \$108 1/4.

At the Boston Mining and Stock Exchange, Milton continues to be the leading stock, and has steadily advanced from \$1.18 to \$1.30 regular and \$1.35 @ \$1.56 buyer 60 days. The advance the past few days has been quite rapid and said to be on account of the favorable outlook at the mine. Deer Isle has been further depressed, and sales were made to-day at the lowest point ever touched, namely, 45c. Edgemountain grows in favor, and steadily advances under good buying orders. Twin Lea is dull but steady at 45 @ 47c; other specialties require no comment. P. M.—The market this afternoon was fully as strong as in the morning, but rather dull, as it general is just before a holiday. Franklin \$123 1/4 bid; Quincy \$44 bid; Osceola, \$29 bid; Pewabic, \$13 bid; Silver Islet sold at \$22; Calumet & Hecla, \$25. Deer Isle advanced to 52c., and Milton sold \$1.20.

COAL STOCKS.

Table listing coal stocks with columns for Name of Company, Capital Stock, Shares, Last Dividend, and Quotations of New York stocks. Includes companies like Am. Coal Co., Cameron Cl., and others.

Total Sales... 287,088. Of the sales of this stock, 23,018 shares were in Philadelphia and 18,300 in New York.

PHILADELPHIA MINING STOCKS.

Table listing Philadelphia Mining Stocks with columns for Name of Company, Shares, and Quotations for various dates from Nov. 17 to Nov. 23. Includes companies like Etna, Alonzo, and others.

@\$109; 56,600 shares of New Jersey Central at \$95 1/2; @\$92 1/2 to @\$94 1/2; and 18,300 shares of Reading at \$64 1/2 to \$65 1/2.

BULLION MARKET.

Friday Evening, Nov. 25.

Table showing bullion market data with columns for Date, London Pence, N. Y. Cents, and Date, London Pence, N. Y. Cents for various dates.

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ended November 25th, as compiled from various sources, amounted to \$160,950.59, as against \$307,476.00

reported for the previous week. The receipts from January 1st to date are \$15,100,580.89.

Exports of Gold and Silver from New York. Week ending November 10th. Corresponding week last year... Since January 1st... Corresponding period last year...

BULLION PRODUCTION FOR 1881.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to that date, from the first of January, 1881.

value, the following figures, where they relate to silver bullion, should be diminished by about 13 1/2 per cent to arrive at actual value

Table listing mines with columns for Mine Name, State, For the week, Month of November, and Year from Jan. 1st, 1881. Includes mines like Alice, Barbée & Walker, Belle Isle, etc.

Total amount of shipments to date... \$22,492,357

* Official. † Net. G. Gold. S. Silver. L. Lead. ‡ Assay value.

Table listing smelters and mills with columns for Name, State, Month of October, and Year from Jan. 1st, 1881. Includes American Smelter, August R. Meyer & Co, etc.

* Including value of lead, which is figured at 5 cents. † The figures of the Grant Smelting Company are estimated, as usual, as the company declines to furnish them for publication.

METALS. NEW YORK, Friday Evening, Nov. 25. During the week, the features noted in our previous reviews have become more marked, the general situation remaining the same, while prices have stiffened. The consumptive demand, which has proved a surprise to so many, continues unabated. Consumers

STATISTICS OF FOREIGN TIN—LONDON AND HOLLAND.

Table with columns for Imports, Deliveries, Stocks, and Approximate quantities. Rows include Australian and Straits, Banca (ex sale), Billiton, and various dates from Oct 1 to Oct 31.

The following gives the import and export of tin for Great Britain during the period ending October 31st, according to the returns of the Board of Trade:

Table showing import and export statistics for tin. Columns include Jan 1 to Oct 31 (1881, 1880, 1879) and October (1881, 1880). Rows include Imports foreign, Exports, and Total.

Tin Plates.—There has been some activity in cokes, and in sympathy with the English market prices are hardening. We quote per box as follows: Charcoal tins, Melyn grade, 1/2 cross, \$6 1/4; Allaway grade, \$5 1/2 @ \$6. Charcoal Roofing, Dean grade, \$5 3/4 @ \$5 1/2 for 14 x 20, and \$11 1/2 for 20 x 28; Allaway grade, \$5 1/2 @ \$5.30 for 14 x 20, and \$11 @ \$11 1/4 for 20 x 28. Coke tins, B. V. grade, IC, \$5.45 @ \$5.50.

Messrs. Robert Crooks & Co., of Liverpool, under date of November 10th, say that tin and terne plates are cheaper all round, the greatest reduction being in charcoal tin, which is now procurable at within 6d. of the lowest prices ever touched, a fact which is worth observing in view of the continued firmness of all material at an advance of from 15 to 25 per cent. There is considerable inquiry for coke tin forward, but the cheapest sales are making solely for prompt or, at the latest, December delivery, and an advance of at least 6d. is asked for any shipments further ahead. The great unprofitableness of present prices will probably before long lead to enforced curtailment of production.

Lead.—During the week, the market has been quite active and very firm, from 300 to 400 tons of common selling at 5c., and some parcels of Newark lead, which is scarce, at 5 1/2 @ 5 15/16. Toward the close, it is announced that the Richmond Company, which has chiefly furnished supplies for immediate wants, has advanced its prices to 5 1/2 c. As there is very little stock in the hands of other parties, it is likely that it will carry its point. As yet, however, buyers are holding off. In the West, there has been quite an active business, sales footing up to 200 to 300 tons on the basis of 4 7/8, for Common, and 4 1/2 @ 4.90c. for Refined. We learn from good authority that the stocks there, too, are low. There has been little doing in Refined here, which we quote nominally 5 1/2 @ 5 1/2 c.

The receipts of lead at St. Louis via the St. Louis & San Francisco Railroad for the week ended November 14th were 300 tons.

Spelter and Zinc.—The scarcity in spelter continues, and 6c. is now asked for Western. During the week, there have been sales of 50 tons of W. H. and 300 tons of S. S. spelter, both foreign brands, which are now held at 6 @ 5 1/2 c. respectively.

Antimony.—With a fair trade, Cookson's is quoted at 14 @ 14 1/4 c.; Hallett's at 13 1/4 @ 13 1/2 c. and American at 13c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 25. The iron market affords but little change upon which to comment. There is a very large amount of business doing, but it is of that character which attracts but little attention. Prices are very strong, with no inclination to weakness, but rather inclined to advance on all articles. Many of our quotations represent the market only for limited quantities; a large order would probably absorb all cheap lots and cause an advance in prices.

American Pig.—We do not learn of any business worthy of note. There are rumors of sales of good brands at prices \$1 @ \$2 above our quotations, while we learn of an order for 2000 tons of a leading brand of No. 2 Foundry at \$24; being refused by the furnace company, owing to its inability to deliver the iron. Deliveries are made with great difficulty. Nearly all of the companies are behind with their orders. We quote No. 1 Foundry at \$25 1/2 @ \$27; No. 2 Foundry, \$23; and Forge, \$20 1/2 @ \$21. We must state, however, that it is impossible to buy any considerable quantity of iron at these prices. It looks as though most makers, being well sold ahead and unable to take advantage of a boom, are doing all they can to delay one, with the hopes of being able to participate in it.

Scotch Pig.—This article is not doing as well as it was. The arrivals are liberal and sales but moderate. As a result of this, some lots are going into store, and importers are offering concessions from dock. The Glasgow market is steady, and freights are fully as strong and scarce as they have been. We quote Gartsherrie at \$25 from ship and \$26 from yard; Coltness, \$26 @ \$26 1/2; Eglinton, \$23 @ \$23 1/2; Summerlee, \$25 1/2 @ \$26; and Glengarnock, \$24 1/2.

Rails.—There has been a very liberal business. The sales reported to us aggregate over 20,000 tons of steel rails and 6000 tons of iron. The steel rails are for delivery from January to October, and the iron rails from December to April. For immediate delivery, \$61 is asked for domestic rails, and \$59 @ \$61 for delivery next year. There are no foreign rails here. It would cost \$62 @ \$63 to import them, and the earliest delivery would be from two to four months hence. Iron rails at mills are quoted at \$48 @ \$48 1/2 East, and \$50 @ \$51 West. Foreign iron rails are in very light stock and quoted at \$48 @ \$50.

Old Rails.—These are very quiet. They are quoted at \$29, and D. Hs. at \$31 1/2 @ \$32.

Wrought Scrap.—This article is scarce and in moderate demand. From yard, \$32 is asked.

We publish the following letters from our regular correspondents:

Baltimore, Nov. 22.

[Specially reported by R. C. HOFFMAN & Co.] The iron market presents no new features; prices remain firm. We quote:

Table with columns for Baltimore prices: Balt. Char., Va., Anth. No. 1., Anth. No. 2., Anth. No. 3., Anth. No. 4., Anth. No. 5., Anth. No. 6., Anth. No. 7., Anth. No. 8., Anth. No. 9., Anth. No. 10.

Louisville, Nov. 21.

[Specially reported by GEORGE H. HULL & Co.] Pig-iron is very firm at ruling rates. Nearly every thing offered at the market price is accepted. Some producers are holding their metal out of the market, or sales would be much larger, as buyers are plenty. We quote for cash as below:

FOUNDRY IRONS.

Table with columns for Foundry Irons: Hanging Rock Charcoal, Southern Charcoal, Hanging Rock, Steel & Coke, Southern Stonecoal & Coke, Amer. Scotch, Scotch Iron.

MILL IRONS.

Table with columns for Mill Irons: No. 1 Charcoal, cold-short and neutral, No. 1 Steel & Coke, cold-short and neutral, No. 2 Steel & Coke, cold-short and neutral, No. 1 Missouri and Indiana, red-short, White & Mottled, cold-short and neutral.

CAR-WHEEL AND MALLEABLE IRONS.

Table with columns for Car-wheel and Malleable Irons: Hanging Rock, cold blast, Alabama and Georgia, cold blast, Kentucky, cold blast, Hanging Rock W. B.

Richmond, Nov. 22.

[Specially reported by ASA SNYDER.] A steady, firm market at full prices characterizes the iron trade at this writing. Quotations as follows:

Table with columns for Richmond prices: Scotch Pig-Iron, Anthracite Pig-Iron, Virginia Coke Pig-Iron, Old Rails, Va. Charcoal C. B. Wheel Iron, Wrought Scrap, Richmond Refined Bar-Iron, Horse-Shoes (Tredegar), Mule.

St. Louis, Nov. 22.

[Specially reported by HOFFER, PLUMB & Co.] There is no change to report in this market; quietness and strength are the ruling features. Prices are:

HOT BLAST CHARCOAL.

Table with columns for Hot Blast Charcoal: Missouri, Southern, Ohio.

COKE AND COAL.

Table with columns for Coke and Coal: Missouri, Southern, Ohio.

MILL IRONS.

Table with columns for Mill Irons: Red short, Neutral.

CAR-WHEEL AND MALLEABLE IRONS.

Table with columns for Car-wheel and Malleable Irons: Missouri, Southern, Ohio.

Philadelphia, Nov. 25.

The following are to-day's ruling quotations for iron and steel:

No. 1 Foundry, \$25 @ \$26; No. 2 do., \$23 @ \$23.50; G. F., \$22.50 @ \$23.50; English, \$20.50 @ \$21; Scotch, \$24 @ \$26; Muck iron, \$45; Charcoal blooms at forge, \$70; Bar iron, 2'8c; Bar iron, store, 3c. Shaped iron, 3 @ 3 1/2 c. for Angles; Beams, 3 1/4 @ 4c.; Channels, 4 @ 4 1/2 c. Plate and Tank iron, 3 1/2 c. for Tank; Refined, 4 @ 4 1/2 c.; Shell, 4 1/2 c.; Flange, 5 @ 5 1/2 c.; Fire-box, 6 @ 6 1/2 c.; Sheet iron, 5 1/2 @ 5c.; Gauge, 2 @ 16c. Wrought Pipes, 55 per cent off; Tubes, 40 per cent off. Railroad material: Steel rails, \$60 @ \$62; foreign, \$62.50 @ \$65. Lighter section iron, \$65 @ \$70; iron, heavy, \$48; iron, light, \$52. Bessemer pig, \$26; Steel Blooms, \$46; Tees, \$30; Doubles, \$32; Nails, \$3.30; Spikes, \$3.10; Scrap, best, \$32; Scrap, second, \$30. The slight falling off in demand is due to wants being covered, and to the season. The smaller establishments report a rush of work for delivery during the winter months, and it is apparent that an active demand will spring up after the holidays. The tendency is upward in pig-iron. Finished iron is stationary, orders being placed more readily; but prices are firm. No further advance is probable. Spring requirements are under consideration at some establishments. Because of the risk involved, very little concession is extended in these transactions. By January 1st, a full winter's work in shapes, plate and tank and pipe iron will be in hand. Some blast-furnace companies are sold up to May, and inquiries are in hand for further business. Rails are sought for, but sales are infrequent. Shipments from abroad are uncertain and freights high. Domestic makers report but few additional contracts.

John H. Austin & Co.'s Special Market Report.

LONDON, E. C., Nov. 9.

STEEL RAILS.—\$6 @ \$6 7s. 6d. per ton for sections 35 lbs. per yard and upward. The Alabama Railroad Company has placed its requirements for 27,000 tons, spread over 1882, on terms apparently to our makers' satisfaction. The tone of the market is very firm, continental buyers coming forward to supply wants which can not be filled at home.

IRON RAILS.—\$5 10s. @ \$5 15s. per ton for sections 35 lbs. per yard and upward. We have had to pay full prices in each case to fix orders on hand.

BAR IRON.—\$5 7s. 6d. @ \$5 10s. per ton; firm and good business doing.

OLD RAILS.—The demand for these now extends to Flanges, business in which we have done directly with strong houses here at 82s. 6d. per ton and upward, c. i. f. New York. Sellers decline to quote to probably ice-bound ports. O. D. Hs. continue firmly held for f. o. b. prices, putting c. i. f. business at present out of court.

HEAVY WROUGHT SCRAP-IRON.—Has been sold as high as 68s. per ton, f. o. b. London; or equal, at current freights; to 87s. 6d. per ton c. i. f., ex seller's profit.

OLD RAILROAD LEAF SPRING STEEL.—Quiet; very little offering; \$6 5s. per ton asked.

STEEL BLOOMS 7" x 7" and UPWARD.—\$5 12s. 6d. @ \$5 15s. per ton, January forward; no pressure to sell, but a decline in outward freights would enable us and others to fix good lines c. i. f. on the above f. o. b. basis.

BESSEMER PIG-IRON, Nos. 1, 2, and 3.—Quieter at 58s. @ 60s. per ton, freights again killing c. i. f. orders.

Scotch Pig-Iron.—50s. 6d. per ton, speculation governing daily quotations.

Middlebrook Pig-Iron, No. 7.—41s. 9d. per ton, but much steeper than Scotch.

Freights.—We have no charters for America to report during the past week. It is said 23s. or 24s. has been paid from Middlesbrough to Galveston Bay, and 21s. from Glasgow to New Orleans; but we can not find that such business was really concluded.

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to Nov. 25th 1881.

Table with columns for Ports, From Philadelphia, From Baltimore, and From Elizabethport, Port Johnson, Hoboken, and Weehawken. Lists various ports and their freight rates.

* And discharging. † And discharging and towing. ‡ 3c. per bridge extra. § Alongside. ¶ And towing up and down. ** Below bridge.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 25.

Anthracite.

The coal trade reports have become monotonous, owing to good condition of the trade and the steadiness of prices. The demand appears to be but little if any less than it has been for weeks, and will continue so until it is too late to ship to many markets.

as an accompaniment there would probably be obstacles to transportation which would not permit of a very large tonnage being moved.

Beginning with the middle of December, therefore, it will be impossible to dispose of and transport nearly as much coal as is now done, and for the benefit of next year's business it will be well for the companies to make provision for a smaller production until the opening of navigation next year.

The Western Association, at its meeting this week, resolved to leave prices as they were. There was a strong feeling in favor of an advance of 25c. per ton on chestnut coal, but the advance was not made.

Although our reports are incomplete for last week, the production reported aggregates over 650,000 tons. At the prices which are being secured, the business must be very profitable to the companies engaged in it.

Our Philadelphia correspondent, under date of November 24th, says:

The local trade holds unusually well for this season of the year when signs of preparation for winter quarters are generally much more evident than at present. For shipping, the number of unfilled orders is very large, owing to the scarcity of vessels for many weeks past; and the rates of freight to the East from this port are so much out of proportion compared to other shipping points that orders are gradually being countermanded.

Bituminous.

The situation in this trade is but little changed. Scarcity of cars is the complaint from all sides, while at the shipping ports there is a scarcity of vessels with high freights. The production is a little greater than it was. Prices are irregular and dependent on the necessities of the buyer.

Wholesale Prices of Anthracite Coal Delivery f. o. b. at Tide-Water Shipping Ports, per ton of 2240 lbs.

Table listing prices for various coal types (Wyoming, Lehigh, Schuylkill) across different shipping methods (Lump, Steamer, Grate, Egg, Stove, Chestnut).

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended Nov. 19th, and years from January 1st:

Table showing coal production statistics for 1881 and 1880, broken down by region (Wyoming, Lehigh, Schuylkill, Sullivan) and year (Week, Year).

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.

* This report was not received this week. † This report is not full.

Small table comparing production at the same time in 1876, 1877, 1878, and 1879.

The decrease in shipments of Cumberland Coal, over the Cumberland Branch and Cumberland & Pennsylvania railroads, amounts to 169,314 tons, as compared with the corresponding period in 1880.

The shipments of Cumberland Coal, over the George's Creek & Cumberland RR., by the Maryland and the American Coal companies, for the week ended Nov. 19th, amounted to 8453 tons, making a total of 173,411 tons since the beginning of transportation.

The Production of Bituminous Coal for the week ended Oct. 29th was as follows:

Table showing bituminous coal production by region (Cumberland, Barclay, Broad Top, Huntingdon & Broad Top, Clearfield, Snow Shoe, Tyrone and Clearfield, Alleghany, West Penn, South Penn, Penn & Westmoreland) for week and year.

The Transportation of Coke over the Pennsylvania Railroad for the week ending Oct. 29th, and year from Jan. 1st:

Table showing coke transportation statistics for Penn. RR., West Penn. RR., and Pittsburgh, Penn. RR. for week and year.

Horsford's Acid Phosphate In Lassitude.

I have used Horsford's Acid Phosphate with good success in lassitude and innervation. VENICE, Ill. C. S. YOURREE, M.D.

CHEMIST. THOROUGHLY CONVERSANT and long practiced in all the details of accurate Analysis and Assaying, desires an engagement in a metallurgical mining, or other similar works; no choice of locality. Address, W. W. T., this office.

WANTED.—A SUPERINTENDENT FOR Lead Smelting-Works. Must be practical and experienced with calcining and stack furnaces. Apply, giving reference, leading experience and salary expected, DESLOGE LEAD CO., Bonne Terre, St. Francois County, Mo.

BLASTING POWDER! SPORTING POWDER! Oriental Powder Mills, No. 13 Broad Street, Boston, Mass. Agencies in the principal cities throughout the U. S.