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THE Homestake, of Dakota, has paid \$3,018,750 in eighty-seven dividends, and adds \$40,000 a month to these magnificent figures. And yet the ore yields only \$5.80 a ton.

THE Plymouth Consolidated Gold Mining Company, California, has one of the most productive gold mines in America. It has already declared thirty dividends of \$50,000 each, aggregating \$1,500,000, and there is as yet no indication of a stoppage of this golden stream.

THE great Alaskan gold mine, the Treadwell, on Douglas Island, promises to be the greatest of our gold producers. The lode contains an enormous body of low-grade ore, which is crushed in a 120-head stamp-mill, and the tailings concentrated on 48 Frue belts. The concentrates (sulphurets) carry about \$80 a ton, and are to be treated by chlorination.

This mine is expected to produce nearly \$100,000 a month when in full operation. At present, its output is said to exceed a half of this.

THE recent ruling of the Land-Office in the matter of cutting timber on public land in Montana for mining purposes is creating great excitement. It is alleged that it will, if enforced, close up the mines and force the smelters to shut down. Unquestionably, the government has been defrauded out of great quantities of timber stolen from public lands in many of the mining districts, and it is right and proper that a stop should be put to this; but it is to be hoped that the government will find some way of protecting its property, and at the same time allow of the cutting of timber for mining purposes from public lands. This should be a source of large income to the government, and at the same time it is in some cases actually essential to the existence of some Western mining camps.

THE Montana reduction-works have long been taxed enormously by the railroad, which charges \$20 a ton freight on salt from Ogden to Butte, 440 miles; and considering that copper matte is carried from Butte to New York, about 3000 miles, at from \$18 to \$20 a ton, this outrageous charge is all the more objectionable. After many vain protests, the mill-owners have combined and have notified the railroad that, unless the freight on salt is reduced \$5 a ton, they will close their works January 1st. It is to be hoped that the railroad will promptly come to terms. It now sells coal from its Wyoming mines, much farther away than Salt Lake, at from \$8 to \$9 a ton, and in offering \$15 freight for 440 miles' haul, the mill men were extremely liberal. About half that is the figure the railroad must face before very long.

THE North Chicago Rolling-Mill Company is making a magnificent record, under its most efficient management. We have on several occasions recorded its unequalled blast-furnace work, in which the consumption of coke has been reduced to 1947 pounds per ton of iron produced, with a monthly product per furnace of from about 5500 tons to 6488 tons, as shown in the ENGINEERING AND MINING JOURNAL, October 31st, page 303.

We now, through the courtesy of Mr. E. C. POTTER, Superintendent, have the pleasure of recording, we believe, the largest 24-hour record for a steel rail mill.

In Mr. POTTER's words:

"For fear you may think we have nothing but blast-furnaces here, I will give you some of the work of our other departments. During the twenty-four hours ended this morning [November 14th], our rail mill rolled 2597 rails of the Chicago, Burlington & Northern 66-pound pattern, aggregating 756 tons, or about 7½ miles of track. Of these, the day turn made 1354 and the night turn 1243, losing one hour and fifteen minutes changing rolls. During the same time, the steel-works made 90 heats, aggregating 883 tons. This, I believe, is the largest work on record for twenty-four hours."

This work reflects the highest credit on the management of these works, and confirms the high reputation they already enjoyed.

CONCERNING BANQUETS.

A day or two ago, the New York Tribune, in a report of the dinner of the Society of Mechanics and Tradesmen, commented upon the starting "innovation" which that society had introduced, in permitting the presence of ladies at its public banquets. The Tribune's own files contain abundant contradiction of this statement. The innovation in question was introduced as a regular practice on a large scale by the members of the American Institute of Mining Engineers, at Pittsburg, in May, 1879, when a brilliant banquet, numerously attended by ladies, inaugurated the new rooms of the Duquesne Club, of that city. Since that time, dinners of the same character have been held in connection with the Institute meetings, as follows:

- Windsor Hotel, Montreal, September, 1879.
- Hoffman House, New York, February, 1880.
- Douglass House, Houghton, Mich., August, 1880.
- Union League Club, Philadelphia, February, 1881.
- Lochiel House, Harrisburg, Pa., October, 1881.
- Wormley's, Washington, D. C., February, 1882.
- Windsor Hotel, Denver, Colo., August, 1882.
- Hotel Brunswick, Boston, February, 1883.
- Harmony Hall, Troy, N. Y., October, 1883.
- Grand Hotel, Cincinnati, February, 1884.
- Grand Pacific Hotel, Chicago, May, 1884.
- Delmonico's, New York, February, 1885.
- Stanton House, Chattanooga, Tenn., May, 1885.

We submit that this catalogue of precedents is sufficient to prevent the Society of Mechanics and Tradesmen from getting a patent for its invention. That society deserves credit for recognizing and adopting a good thing, after thirteen demonstrations of its excellence. More than

that it can not claim. Perhaps it may take courage now and imitate the Institute in one further particular, namely, by requesting the gentlemen of the press who may be present as guests not to report the speeches made at its dinners. The vision of an after-dinner speech, which is likely to come forth on the following morning from the combined operation of the pencil of the reporter, the scissors of the night editor, the fingers of the weary midnight compositor, and the critical judgment of the 2 A.M. proof-reader, is a fearful and wonderful thing; and the looming vision of it in advance is likely to strike wit with panic and eloquence with paralysis. Let the reporters have the names of speakers and toasts, then put them on their honor as guests, and you will be happy—and so will they. A reporter off duty is a delightful creature; you wouldn't know him!

THE RILEY FURNACE AN OLD DEVICE.

The ENGINEERING AND MINING JOURNAL of October 3d contained the account of a gas cupola given by Mr. JAMES RILEY before the Iron and Steel Institute at Glasgow. No doubt Mr. RILEY considers his invention novel. But our attention has been called to U. S. patent No. 99,415, granted February 1st, 1870, to Mr. A. FABER DU FAUR, of this city, which describes a similar arrangement of a stack and neck, by means of which the escaping products of combustion heat the air to be used for the combustion of the gaseous fuel in the furnace. Mr. DU FAUR is the son of the great pioneer in the use of gaseous fuel, and was formerly himself employed at Wasserralfingen, in Germany, where his father's reputation was won. We find upon inquiry that, although he did not patent this device in the United States until 1870, he erected an experimental gas-furnace of the kind at Wasserralfingen in 1850, shortly before coming to this country, where he has continued to reside. We have seen the drawings of that furnace, and can testify to their substantial identity with the arrangement described in the patent above referred to. The furnace gave very good results, melting with remarkable speed, and consuming as fuel per ton of iron melted about as much weight of charcoal refuse as was required of good charcoal in a hot-blast cupola. The iron was mainly used in the foundry; but refined iron was made also; and in one experiment it was so far decarbonized as to be malleable. Mr. DU FAUR informs us that, so far as he is aware, no records of these experiments were published, and no patent was taken out abroad. But in 1870, recalling the matter, he took out a patent in this country for the invention, and the description and drawings in that patent are conclusive against the essential novelty of the Riley furnace. *

CORRESPONDENCE.

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

Changes in the Arizona Judiciary.

Our recent exchanges from Arizona announce the replacement of the entire bench, appointed under the last administration, by new appointees. We note that the bar of Tucson memorialized the government, but in vain, on the serious inconvenience that must result by removing the judges at the moment when the fall term should commence. The Tombstone papers describe the adjournment from day to day of the courts, till a judge shall appear to preside, and the Clifton *Clarion* describes the same farce in Graham County.

We do not know the reasons of the Department of Justice, and therefore forbear to criticise the action of Secretary Garland; but judging from the comments of the territorial organs of both parties, we fail to see any good reason for the removal of Judge Fitzgerald, who seems to have filled his short tenure of office with marked ability, energy, and honesty. His energy, in fact, perhaps carried him sometimes beyond the bounds of strict propriety. We heard of his warning the attorneys in a civil suit that he would sit continuously till the case was concluded, and that he carried out his threat. The evidence was in at nine in the evening; the arguments of counsel were closed at one A.M.; the charge at half-past one; and the jury was wakened up to consider its verdict. Such a procedure may have a salutary effect on the lawyers, but can hardly insure justice to their clients.

Considering the pittance appropriated to a territorial judge, no Eastern lawyer of any eminence will accept the appointment. As a rule, therefore, these responsible posts are given to political partisans, who dare not aspire to more lucrative berths. They at some time or other have necessarily been lawyers, but occasionally they step from the editorial chair, or some similar secular pursuit, on to the bench.

It is an absurdity to expect such men to adjudicate wisely in intricate mining cases, to control the extravagances of Western lawyers, and overawe the recklessness and license of Western juries.

And yet cases involving many millions not infrequently come up for trial before them. It is true that appeal is open; but it must first be made to the Superior Court of the Territory, in which the ignorant judge, from whose decision the appeal is made, sits with perhaps two fellow judges as incompetent as himself.

Mining cases require for their proper comprehension some technical knowledge on the part of the judge. It should be the special care of the present administration, which has already done many admirable things, to secure a better administration of justice in the mining regions. We do not know the standing of the new appointees, nor the official reasons for removing the old; but from all the information that has come to us,

it appears regrettable that the whole judiciary of the territory should have been removed at once, and that such judges as Judge Fitzgerald should have been removed at all.

Alleged Improvements in Crushing Machinery.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of October 31st, Mr. Theodore A. Blake disputes the statements in my paper read at the Halifax Meeting of Mining Engineers on the subject of improvements in ore-crushing machinery, etc. Please grant me space for a brief answer.

In 1875, I secured my patent for a sectional jaw-crusher, with tie-bolts; but subsequently I reissued my patent, and narrowed my claim to "the combination, with the stationary and moving jaws of the toggle-bars, an actuating link and eccentric, and tie-bolts that connect the stationary jaw with the abutment of the toggles;" and "the combination of the

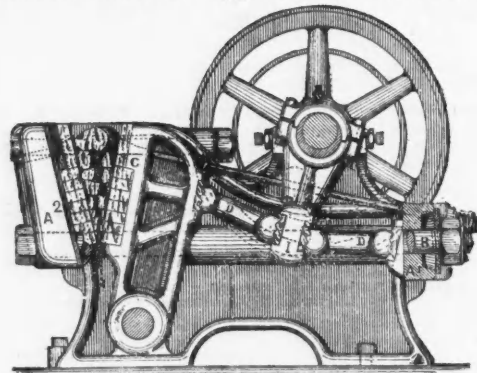


Fig. 1.—Krom's Sectional Ore-Crusher.

sectional framing $A^1 A$, in Fig. 1, and longitudinal tie-bolts B , with the ore-crushing jaw C , toggle D , and link I , the tie-bolt being arranged parallel to and directly in the line of the strain."

Mr. Blake has never brought forward any thing to invalidate this claim, or proof that his "Challenge crusher" is not an infringement on my patent. He refers, however, to the Partz patent, owned by the Blake Crusher Company, which machine shows two sets of tie-bolts. The Partz machine does not anticipate the improvement covered by the description and claim above quoted. In it, the strain is not all taken on the tie-rods. The jaw is carried directly on the eccentric shaft, so that the jaw has "a combined crushing and grinding effect," and when the jaw is acting to crush the ore in its downward movement, the principal strain is upward, and backward on the pillow block.

In the description of this crusher in the reissued patent, September 16th, 1879, the only allusion made to the bolts is as follows: "The jaw is held in position by cross-bars I , and screw-bolts J . By means of these screw-bolts and cross-bars, the stationary jaw H can be adjusted toward and from the movable jaws according to the fineness to which the ore is to be reduced by the crushing jaw."

During the lifetime of the original Blake patent, I made efforts to

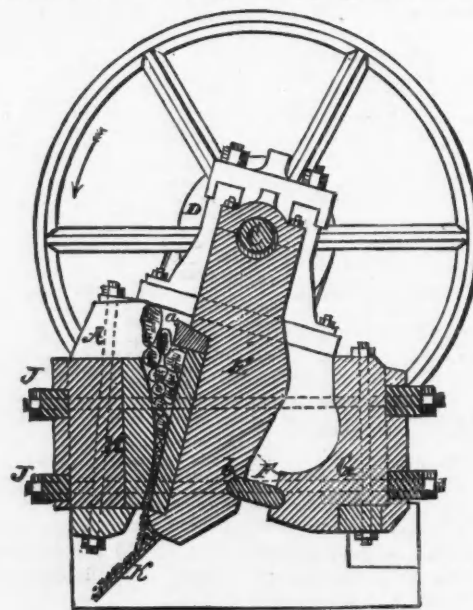


Fig. 2.—A. F. W. Partz Ore-Crusher.

obtain a license to make my sectional crusher, but without success. Through these efforts, Mr. Blake became familiar, if not from other sources of information, with my patent, and my claim for improvements in crushing-machines; but when I made my improvements, I knew nothing of the Partz patent, nor has the patent examiner in any instance made any reference to it.

The change in the length of the tie-bolts in my improved machine in no sense changes the principle of construction. Mr. Blake says that the Challenge crusher has been made without interruption since 1879. This is true; but he has not done so without protest. He also says that in the present use of the tie-bolt I employ the exact mechanical equivalent of the single pair of tension-rods and clamps used in the best form of the

Blake crusher. Mr. Blake has no doubt a right to use the clamp C; but combining it with the tie-bolt does not give him the right to use the latter.

In a patent to T. Varney and A. Rix, of California, No. 61,286, January 15th, 1867, we find this identical clamp C, so that the "Challenge" crusher is simply a combination of the Varney clamp and the Krom tie-bolt.

The specifications of the Varney & Rix patent read: "To hold the upper ends of the jaws in place, and to receive the strain while working, the wrought-iron bands G are placed around the flanges C and joints F."

Mr. Blake's plan of cushioning the crushing blow is as if a blacksmith were to cushion his hammer and anvil with India rubber to lessen the effect of the blow. Mr. Blake says that the use of the steel wearing plates is not new. Perhaps not; but I think the form in which I use steel bars to construct the crushing faces is new; certainly it is an advantage to

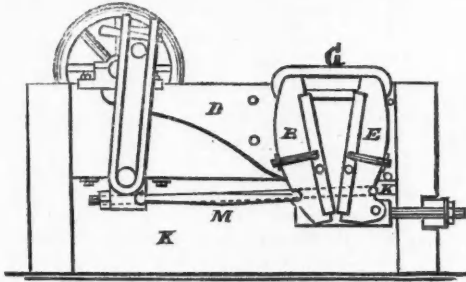


Fig. 3.—Thomas Varney & Alfred Rix Crusher.

have less movement at the bottom than can be obtained in a Blake crusher, so as to crush fine and obtain a more uniform product for the rolls, and the strain is less on the machine with a short movement at the point of discharge.

To compensate for the diminished capacity in a fine crushing-machine, I make my jaw wide, and proportion the parts so as to run the machine at a high speed. There is no more liability to pack with a short movement of the jaw than with the greater movement of the Blake machine.

My fifth improvement—toggles with rolling ends—Mr. Blake says was in times past contemplated by himself, but abandoned. He does not state, however, whether before or after the date of my patent.

So far as I know, or any proof to the contrary brought forward by Mr. Blake, all the five improvements in ore-breakers mentioned in my paper read at the Halifax Meeting of Mining Engineers are new, and none of them has been abandoned. Yours respectfully, S. R. KROM.

FOREIGN COMMERCE OF THE UNITED STATES.

Annual Report of the Chief of the Bureau of Statistics.

Col. W. F. Switzler, Chief of the Bureau of Statistics, has just completed his annual report on foreign commerce. The report says the total value of our foreign commerce in merchandise, including the in transit trade, during the fiscal year of 1885, was \$1,388,588,165, of which the value of the exports was \$742,000,000, of the imports \$577,000,000, and of the in transit and transshipment trade \$68,000,000. The imports and exports of gold and silver, coin and bullion during the same period, amounted to \$85,242,323, of which the value of the exports was \$42,000,000, and of the imports \$43,000,000. The value of our foreign commerce in merchandise, including the in transit trade, during the preceding fiscal year was \$1,481,840,086, showing a falling off in our foreign trade during the last fiscal year of \$93,251,921.

It appears that in the value of foreign commerce the United Kingdom of Great Britain and Ireland stands first, Germany second, France third, and the United States fourth. The total value of the foreign trade in merchandise of these nations during the year 1883 was as follows: Of the United Kingdom, \$3,563,877,370; Germany, \$2,450,428,745; France, 2,083,885,545; the United States, \$1,547,020,316.

The most notable features of our foreign trade during the last fiscal year, as compared with the trade of 1884, was a decrease in the imports of merchandise of \$90,000,000 and a falling off in the exports of gold of \$32,000,000. The decrease occurred mainly in the values of imports of sugar and molasses, silks, wools, and manufactures of silk and wool, and iron and steel, and manufactures of iron and steel. Among the exports of our manufactured products that show the most rapid development since 1866 are agricultural implements, clocks and watches, manufactures of cotton, manufactures of iron and steel, including locomotives, sewing-machines, tools, and hardware. Great Britain not only takes about 60 per cent of our agricultural and unmanufactured products, but also a larger share, amounting to 27 per cent, of our manufactures than do Central America, the West Indies, and South America combined.

Colonel Switzler says there has been since 1860 a marked decline in the percentage of imports of manufactured articles, and a corresponding increase in the percentage of imports of crude or partially manufactured articles. This is a significant fact, showing a steady growth in the demand for crude articles to be used as materials in the various processes of home manufacture. The duty collected on merchandise fell from \$190,000,000 in 1884, to \$178,000,000 in 1885, but the equivalent *ad valorem* rate rose from 41.7 per cent to 46 per cent.

The value of our foreign trade conducted in vessels bearing our national flag shows a steady decline. During the fiscal year 1885, the value of merchandise carried in our foreign trade was \$1,388,000,000, of which only 14.6 per cent was carried in American bottoms, and only 7 per cent in American steam vessels. Of the total tonnage entered at our sea-ports in the foreign trade last year, amounting to 12,000,000 tons, only 2,800,000 was American.

There was also a large falling off in the immigration. The number arrived during the year was 395,346, against 518,592 during the preceding year, and a falling off of 50 per cent since 1882, the year of the largest immigration, when the arrivals were 788,902.

GREAT GUNS!

The committee appointed to investigate the subject of securing a supply of armor plates and heavy guns has had a number of steel and iron makers before it, and the daily papers report the evidence as follows:

The Hon. Abram S. Hewitt presided, and the other members of the committee present were Congressmen Frank Hiscock, Thomas B. Reed, Charles F. Crisp, and William Walter Phelps. Mr. Hewitt explained that the committee desired to ascertain how much patronage from the government was necessary to induce steel manufacturers to go into the business of making heavy guns and armor plates.

"Benjamin Ather, of B. Ather & Co., whose foundry is at Newark, New Jersey, told the committee that the government would probably have to give a contract calling for the supply of from 6000 to 8000 tons of steel a year for five years, in order to make it worth while for an American manufacturer to establish a plant suitable for the production of armor plate. Mr. Ather had not made any close estimates; but he thought that \$500 a ton, or about 25 cents a pound, would be a fair price for the government to pay.

"William Bispham, an iron merchant of this city, said that there was not a steel plant in this country large enough for the production of armor plate of the weight, thickness, and resistance necessary for the construction of modern fortifications and war vessels. The cost of establishing such a plant would be from \$2,500,000 to \$3,000,000. Armor plate could be made more cheaply abroad than here. The present time would be favorable for the United States government to make a low-priced contract with Sheffield manufacturers for a supply of armor plate, because business was dull. Mr. Bispham was in favor of encouraging American manufactures; but it would take a long time to establish first-class armor factories in this country, and he thought that the government ought not to lose an hour in strengthening the navy and seacoast fortifications.

"Charles J. Nourse, a representative of the West Point Foundry, said he thought that a complete plant for the manufacture of good-sized guns could be established in this country if the government would give a five years' contract for \$1,000,000 worth of guns each year. Those figures were for guns not larger than 12-inch bore. For guns of a larger size, the contracts would have to be proportionately greater. Mr. R. W. Davenport, Superintendent of the Midvale Foundry, near Philadelphia, said that his concern was now at work on an 8-inch gun, for which 40 cents a pound was to be paid. He could not tell how much he would charge for making a 10-inch or a 16-inch gun. He remarked that a 16-inch gun was 'so far up in the clouds' that he had never figured on its cost.

"Mr. Davenport said that the Midvale Foundry would require an order from the government for 3000 tons of steel, in order to induce it to attempt to make a 10-inch gun, and an order for 5000 tons of steel to make a 12-inch gun. Mr. Davenport invited the commission to visit the Midvale Foundry, and Chairman Hewitt intimated that the commission would accept the invitation about Friday.

"Joseph Morgan, Jr., of the Cambria Iron-Works, thought that an order from the government for 10,000 tons of steel manufactured into guns and deliverable over a period of five years would be sufficient inducement for the establishment of works for the manufacture of large guns. That would necessitate an outlay by the government of about \$10,000,000, or \$2,000,000 a year for five years. The Cambria Works had three large open-hearth furnaces, capable of casting an ingot large enough to make a 100-ton gun. Mr. Morgan said that his concern would not undertake to contract to furnish large guns completed at present. There were rolling-mills in this country, Mr. Morgan said, capable of rolling armor plate of from 9 to 12 inches in thickness. The speaker believed, however, that the best of armor plates would soon be produced by presses and not by rolling.

"William P. Hunt, President of the South Boston Iron-Works, put forward the claims of cast-iron guns instead of steel guns. He said that, though they were not as durable, perhaps, yet they were not liable to shrink or crack, nor could steel guns maintain such an evenness in their quality. Should the commission consider cast-iron guns suitable, the company would furnish within three years 100 10-inch breech-loading rifle guns at \$15,000 each, and the same number of 8-inch guns at \$7000 each, sending immediately to Washington sample guns to be tested in the severest manner. The company was also ready to furnish in three years 500 12-inch mortar guns at \$5000 each. If the right steel were provided, the company was ready to cast immediately steel guns of 12 inches caliber."

It is certain that the government can get guns and armor plate of any desired size made in this country; but, naturally, a good price will be asked for the first lot, although, when it comes to making tenders, no doubt the figures mentioned will be heavily shaded. It would be better for the government to divide its orders among several contractors, so as to build up a number of works that could compete on future orders, and put us in a position to bid upon foreign orders also. The country can well afford to pay something for this, and we trust no consideration whatever will be given to propositions advising the purchase of guns and armor plates abroad. The government orders should certainly be given to our own manufacturers.

Large Output of Bessemer Steel.—Mr. W. H. Greenwood, Sheffield Technical School, states that he has received a communication from the United States giving the following record of the putput for the week ended four P.M., Saturday, September 26th, 1885, of a pair of 7-ton Bessemer converters:

| | | |
|-----------|---------------------|-------------|
| Monday | 75 blows, producing | 545 tons. |
| Tuesday | 103 " " | 755 " |
| Wednesday | 96 " " | 591 " |
| Thursday | 102 " " | 743 " |
| Friday | 92 " " | 561 " |
| Saturday | 34 " " | 510 " |
| Total | 551 blows, making | 4,005 tons. |

This is, he believes, the largest make for one week that has yet been recorded, even in America, and is very greatly in excess of the output from any English plant of the same nominal capacity.

THE WORLD'S PRODUCTION OF GOLD AND SILVER.

[COMPILED FROM OFFICIAL STATISTICS FURNISHED BY THE COUNTRIES NAMED, EXCEPT WHEN OTHERWISE STATED.]

| COUNTRIES. | 1882. | | | | 1883. | | | | 1884. | | | |
|--------------------|---------|------------|-----------|-------------|---------|------------|-----------|-------------|---------|------------|-----------|-------------|
| | Gold. | | Silver. | | Gold. | | Silver. | | Gold. | | Silver. | |
| | Kilos. | Dollars. | Kilos. | Dollars. | Kilos. | Dollars. | Kilos. | Dollars. | Kilos. | Dollars. | Kilos. | Dollars. |
| United States | 48,902 | 32,500,000 | 1,126,083 | 46,800,000 | 45,140 | 30,000,000 | 1,111,457 | 46,200,000 | 46,343 | 30,800,000 | 1,174,205 | 48,800,000 |
| Russia | 35,913 | 23,867,935 | 7,781 | 323,427 | *35,913 | 23,867,935 | *7,781 | 323,427 | 32,829 | 21,818,304 | 9,336 | 388,000 |
| Australia | 43,550 | 28,943,217 | 2,475 | 102,878 | †39,873 | 26,500,000 | ‡2,151 | 89,418 | ‡42,960 | 28,551,101 | ‡2,788 | 115,960 |
| Mexico | 1,409 | 936,223 | 703,508 | 29,237,798 | 1,438 | 955,639 | 711,347 | 29,568,576 | 1,780 | 1,183,137 | 655,868 | 27,257,885 |
| Germany | 376 | 249,890 | 214,982 | 8,934,652 | 457 | 303,722 | 230,694 | 9,589,300 | 555 | 368,853 | 248,115 | 10,311,659 |
| Austria-Hungary | 61,580 | 1,050,068 | 647,118 | 1,958,224 | 1,638 | 1,088,615 | 48,708 | 2,024,645 | 1,658 | 1,101,707 | 49,424 | 2,054,070 |
| Sweden | 17 | 11,298 | 1,500 | 62,350 | 37 | 24,590 | 1,583 | 65,800 | 19 | 12,627 | 1,816 | 75,472 |
| Norway | | | 5,893 | 244,954 | | | 5,645 | 234,645 | | | 6,387 | 265,490 |
| Italy | d100 | 72,375 | d432 | 17,949 | d100 | 72,375 | d432 | 17,949 | d100 | 72,375 | d432 | 17,949 |
| Spain | | 6,648 | e74,500 | 3,066,220 | *10 | 6,648 | e74,500 | 3,066,220 | *10 | 6,648 | e74,500 | 3,066,220 |
| Turkey | 10 | 6,648 | 2,164 | 89,918 | *10 | 6,648 | *2,164 | 89,918 | *10 | 6,648 | *2,164 | 89,918 |
| Argentine Republic | f118 | 78,546 | f10,109 | 420,225 | f118 | 78,546 | f10,109 | 420,225 | f118 | 78,546 | f10,109 | 420,225 |
| Colombia | 5,802 | 3,856,000 | 18,283 | 760,000 | *5,802 | 3,856,000 | *18,283 | 760,000 | *5,802 | 3,856,000 | *18,283 | 760,000 |
| Bolivia | g109 | 72,375 | g264,677 | 11,000,000 | g109 | 72,375 | g384,985 | 16,000,000 | g109 | 72,375 | g384,985 | 16,000,000 |
| Chili | 245 | 163,000 | 128,106 | 5,325,000 | *245 | 163,000 | *128,106 | 5,325,000 | *245 | 163,000 | *128,106 | 5,325,000 |
| Brazil | g1,116 | 741,694 | 952 | 632,520 | 952 | 632,520 | 952 | 632,520 | 952 | 632,520 | 952 | 632,520 |
| Japan | 952 | 632,520 | 21,121 | 877,772 | 256 | 170,270 | 21,121 | 877,772 | 256 | 170,270 | 21,121 | 877,772 |
| Africa | a3,000 | 1,993,800 | | | a3,000 | 1,993,800 | | | a3,000 | 1,993,800 | | |
| Venezuela | 3,904 | 2,595,077 | | | c5,022 | 3,338,058 | | | c5,022 | 3,338,058 | | |
| Dominion of Canada | g1,648 | 1,094,926 | g1,641 | 68,205 | 1,435 | 954,000 | g1,641 | 68,205 | 1,435 | 954,000 | g1,641 | 68,205 |
| France | | | 14,291 | 594,053 | | | 6,356 | 264,275 | | | 6,356 | 264,275 |
| Peru | h179 | 119,250 | h45,909 | 1,908,000 | h179 | 119,250 | h45,909 | 1,908,000 | 179 | 119,250 | 45,909 | 1,908,000 |
| Total | 148,939 | 98,984,840 | 2,690,573 | 111,821,623 | 141,733 | 94,107,341 | 2,812,972 | 116,923,373 | 143,381 | 95,292,569 | 2,770,610 | 115,147,878 |

** The bullion product of the world, as given for the census year in Table "CC," volume 13, page 381, of the United States Census of 1880, repeats a clerical error in the Director's report of 1880, but corrected in subsequent reports, namely, in estimating the product of the rest of South America "for 1877, 1878, and 1879, the estimate of Soetbeer of 250,000 kilograms was converted into \$1,039,190, instead of \$10,391,190." The error was corrected in the report of the Director of the Mint for 1881.
 * Estimated same as official statement for 1882.
 † Official for Victoria and New South Wales, with estimated production of the other provinces.
 ‡ Amounts parted from deposits at the Sydney and Melbourne mints.
 § The estimate of 1883, with increased deposits at Melbourne and Sydney mints (99,222 ounces) added.

‡ Estimated same as official for 1883.
 § Same as Consul Dalton's estimate for 1883.
 ¶ Estimated by Dr. A. Soetbeer, 1879.
 * Official for Hungary, with former annual production for Austria added.
 † Report of Consul Dalton, Consular Report for May, 1884, page 394.
 ‡ Estimated same as official statement for 1877.
 § Estimated same as official statement for 1880.
 ¶ Estimated same as official statement for 1879.
 * Estimated same as official statement for 1881.
 † Estimated same as official statement for 1884.

THE REPORT OF THE DIRECTOR OF THE MINT.

Dr. JAMES P. KIMBALL, the Director of the Mint, has been in office but a few months, and his report naturally follows the lines laid down by his predecessor. Indeed, the information it contains was in great part collected by Dr. BURCHARD. It is, therefore, too soon to look for any important changes or improvements; but Dr. KIMBALL's scientific training as a mining engineer, and his experience and high attainments, lead us to look for important improvements in these reports, although they have been creditable and full of valuable information under his predecessors.

We take the following tables from this report. They will be found to contain much information for the guidance of those called upon to discuss the financial questions now attracting attention:

ESTIMATE OF CIRCULATION.

| UNITED STATES COIN. | Gold. | Silver. | Total. |
|--|---------------|---------------|---------------|
| Circulation July 1st, 1884 | \$551,632,442 | \$250,617,357 | \$802,249,799 |
| Deduct probable consumption in arts and manufactures from July 1st, 1873, to June 30th, 1880 | 30,000,000 | | 30,000,000 |
| Corrected circulation July 1st, 1884 | 521,632,442 | 250,617,357 | 772,249,799 |
| Year's coinage | 24,861,123 | 28,848,959 | 53,710,082 |
| Net imports | 1,006,281 | 535,449 | 1,541,730 |
| Total | 547,499,846 | 280,001,765 | 827,501,611 |
| Less deposits for recoinage | 325,210 | 877,564 | 1,202,774 |
| Used in the arts | *5,000,000 | *300,000 | 5,300,000 |
| Total loss | 5,325,210 | 1,177,564 | 6,502,774 |
| Circulation July 1st, 1885 | 542,174,636 | 278,824,201 | 820,998,837 |

* About amount reported to have been used by manufactures in 1883.

FORM AND LOCATION OF TOTAL CIRCULATION JULY 1st, 1885.

| DENOMINATION. | In treasury. | | | In other banks and general circulation. | Total. |
|------------------------|--------------|--------------------|---|---|--------|
| | In treasury. | In national banks. | In other banks and general circulation. | | |
| Gold bullion | \$66,847,095 | \$ | \$ | \$66,847,095 | |
| Silver bullion | *4,654,586 | | | 4,654,586 | |
| Gold coin | 179,952,890 | †90,758,947 | 271,462,799 | 542,174,636 | |
| Silver dollars | 165,413,112 | †7,000,000 | 31,471,269 | 203,884,381 | |
| Fractional silver coin | 31,236,899 | †1,897,554 | 41,805,367 | 74,939,820 | |
| Gold certificates | 13,593,410 | 74,816,920 | 51,491,316 | 139,901,646 | |
| Silver certificates | 38,370,700 | 3,139,070 | 98,813,370 | 140,323,140 | |
| United States notes | \$45,047,378 | 79,701,352 | 221,990,236 | 346,738,966 | |
| National Bank notes | 9,945,710 | 23,465,388 | 285,165,613 | 318,576,711 | |
| Fractional currency | 3,285 | 489,927 | 6,470,963 | 6,964,175 | |
| | 555,065,065 | 281,269,158 | 1,008,670,933 | 1,845,005,156 | |

* Cost value.
 † Includes Gold Clearing-House certificates \$24,189,000.
 ‡ The total "silver coin" only is reported. The division is estimated.
 § Includes \$29,585,000 held as security for currency certificates.

MANIFESTED IMPORTS AND EXPORTS OF GOLD AND SILVER IN CALENDAR YEAR 1884.

| DESCRIPTION. | Imports. | | |
|------------------------|--------------|--------------|--------------|
| | Gold. | Silver. | Total. |
| Bullion | \$8,747,513 | \$3,256,938 | \$12,004,451 |
| Foreign coin | 14,963,011 | 11,522,689 | 26,485,700 |
| Total | \$23,710,524 | \$14,779,627 | \$38,490,151 |
| American coin | 4,247,133 | 725,150 | 4,972,283 |
| Total bullion and coin | \$27,957,657 | \$15,504,777 | \$43,462,434 |
| Exports. | | | |
| Domestic bullion | \$23,066,252 | \$17,914,697 | \$40,980,949 |
| Foreign bullion | 2,400 | 87,370 | 89,770 |
| Foreign coin | 5,696,440 | 11,344,252 | 17,040,692 |
| Total | \$28,765,092 | \$29,346,319 | \$58,111,411 |
| American coin | 11,878,154 | *522,429 | 12,400,583 |
| Total bullion and coin | \$40,643,246 | \$29,868,738 | \$70,511,984 |

* Includes 420,750 trade-dollars.

COINAGE OF VARIOUS COUNTRIES—CALENDAR YEARS, EXCEPT FOR INDIA, MEXICO, BRAZIL, AND JAPAN. [Compiled from Official Statistics.]

| COUNTRIES. | 1882. | | 1883. | | 1884. | |
|------------------|--------------|---------------|---------------|---------------|--------------|--------------|
| | Gold. | Silver. | Gold. | Silver. | Gold. | Silver. |
| United States | \$65,887,685 | \$27,072,035 | \$29,241,990 | \$29,245,989 | \$23,991,756 | \$28,534,866 |
| Mexico | 452,590 | 25,146,260 | 407,600 | 24,083,921 | 328,668 | 25,377,378 |
| Bolivia | | 1,684,865 | | *1,600,000 | | |
| Argen. Republic | | 4,530,210 | | 1,715,445 | | |
| Great Britain | | 1,021,381 | | 6,831,169 | | 6,201,517 |
| Australia | 18,701,959 | | 19,903,722 | | 22,196,106 | |
| India | 170,543 | 29,386,322 | 67,044 | 24,927,400 | | 13,847,656 |
| Germany | 3,167,085 | 6,407,157 | 21,002,897 | 594,564 | 13,723,494 | 114,319 |
| Austria-Hungary | 2,829,590 | 3,122,819 | 2,154,390 | 5,552,191 | 1,244,975 | 3,390,163 |
| France | 722,206 | 223,853 | | | | 23,160 |
| Belgium | 2,016,117 | | | | | |
| Italy | | | 785,027 | | 62,165 | 2,121,953 |
| Netherlands | | 608,312 | | 81,095 | | 182,910 |
| Norway | | 69,680 | 192,708 | 37,520 | | |
| Sweden | | 39,876 | 17,707 | 436,619 | 250,468 | 1,022,420 |
| Spain | 1,996,310 | 10,671,842 | 3,327,235 | 10,523,421 | 4,983,004 | 6,738,971 |
| Portugal | 162,000 | | 217,080 | | 186,840 | |
| Japan | 565,645 | 4,367,393 | 544,290 | 3,120,892 | 569,415 | 3,088,724 |
| Brazil | 25,508 | 9,994 | 52,801 | 23,589 | | |
| Russia | | | 12,793,575 | | 18,840,548 | 1,020,786 |
| Turkey | 2,960,056 | | 1,344,640 | 44,000 | | |
| Colombia | | | | 699,114 | | |
| Switzerland | | | 965,000 | | | |
| Honduras | | 76,314 | | | | |
| Persia | | | 47,117 | 605,579 | | |
| Peru | | | | | | 1,400,949 |
| Sandwich Islands | | | | | | 700,000 |
| China | | | | | | 160,000 |
| Total | \$99,697,170 | \$110,785,934 | \$104,845,114 | \$109,306,705 | \$99,459,240 | \$90,039,443 |

* Approximate.

FERRO-MANGANESE MANUFACTURE.*

By M. Pourcel, with Notes by Herr Stoeckmann, of Ruhrort, and the Translator.

(Concluded from page 340.)

To finish the history of our experiments: On February 6th, 1876, after making 20 per cent spiegel, and before beginning to make some 40 per cent ferro-manganese that had been ordered, we tried working for twenty-four hours a charge for 74 per cent ferro-manganese, calculating on a yield of 60 per cent. On February 4th, we cast 73 per cent; on the 5th, 74 per cent, and 71 per cent; in all, nearly 14 tonnes in twenty-four hours. The cinder was calculated as follows:

| | | | |
|------------------------|-------|--------------------------------------|--------|
| SiO ₂ | 18.20 | Al ₂ O ₃ | 4.55 |
| CaO..... | 37.50 | MnO..... | 30.50 |
| BaO..... | 9.25 | Total..... | 100.00 |

The coke used was 2600 k. per tonne. Finally, in April, 1876, we began to make ferro-manganese regularly with furnace No. 3, which had Cowper ovens. After making from 42 to 65 per cent ferro-manganese from April 23d to May 25th, we tried to make 82 per cent, but failed because the ores were too lean, the richest mixture possible containing scarcely 33.60 per cent manganese.

In the mean time, by running thirty-four charges in twenty-four hours, instead of a minimum of fifty-two when making Bessemer iron, with the blast at 12 cm. (2½ pounds) pressure and 750 degrees C. (1382 degrees Fahr.), the furnace made, from June 21st to July 4th, 72, 75, and 77 per cent ferro-manganese with an average make of twelve tonnes per day. The yield of manganese was from 64 to 70 per cent—one day as high as 72 per cent. The fuel consumption averaged 2700 k. per tonne, and was never less than 2400 k. The charge was composed of 1200 k. (2640 pounds) of ore, 250 k. (550 pounds) of which was fine ore (made by regenerating manganese chloride), the greater part of which was carried off by the gas. The average metallic contents were 37 per cent.

The calculated slag contained, omitting the manganese: SiO₂ 117 k., CaO 234 k., Al₂O₃ 30 k., BaO 69 k.; total, 450 k. (990 pounds). The following analysis is of the cinder when making 75 per cent ferro-manganese:

| | | | | | |
|------------------------|-------|--------------------------------------|------|------------|--------|
| SiO ₂ | 26.65 | Al ₂ O ₃ | 7.10 | MnO..... | 14.97 |
| CaO..... | 37.60 | BaO..... | 8.55 | S..... | 1.70 |
| MgO..... | 2.20 | FeO..... | 1.40 | Total..... | 100.17 |

These results are very good, considering the leanness of the charge. It is easy with rich enough ores (containing at least 45 per cent manganese) to make 82 per cent ferro-manganese and over, with a daily output of 10 tonnes and a consumption of coke (with 15 per cent ash) of 2700 k. per tonne of metal.

In June, 1876, the furnace made of high-grade ferro-manganese: 72 tons of 62 per cent; 11 tons of 67 per cent; 85 tons of 72 per cent; 27 tons of from 75 to 77 per cent; besides making considerable that varied between 42 and 57 per cent. The blast ended in the latter part of September.

It is difficult to make from 72 to 77 per cent ferro-manganese with ores that contain less than 40 per cent manganese, because the hearth fills up in a few weeks. This inconvenience is not felt, even when making from 82 to 85 per cent, if the ore is rich enough, that is, if there is not more cinder than metal.

At Terrenoire, we first used rich ores in 1878. In the mean time, we had made (August, 1877) thirty charges of an ore with 44 per cent of manganese, which was expected to make 81 per cent ferro-manganese, but we only obtained one cast of 3800 k. of 81 per cent; the remainder being from 77 to 79 per cent, the ore was evidently not rich enough to make such a high grade. For three days in June, 1878, with a mixture of ores that averaged 50 per cent of manganese, we made several tons of from 83 to 85 per cent, with a yield of 70 per cent of the manganese, and a coke consumption of not quite 3 tonnes to the tonne of metal.

But we were first able to make 82 per cent regularly in December, 1878, thanks to a supply of good ore. We made, without interruption and with the greatest regularity, 353 tonnes in thirty-three days (from December 12th to January 13th inclusive). The average make was, in round numbers, 10,700 k. in twenty-four hours, from thirty-four charges in the same time.

The furnace had two tuyeres 90 m.m. (3.54 inches) in diameter. Blast pressure, 12 c.m. (2½ pounds) at the tuyeres. The temperature varied between 680 and 715 degrees C. (1224 and 1319 degrees Fahr.). The first charge for 82 per cent ferro-manganese was made at 6 P.M., December 9th. On the 12th, at 6 A.M., the metal contained 81 per cent; and on the 13th, 84 per cent; it varied between 81 and 84.50 per cent. The ores used were mostly Spanish, with some iron ore from Taxua. The charge consisted of—

| | | | |
|------------------|-----------------------------|---------|---------------------|
| Coke..... | 850 k. | Fe..... | Mn..... |
| Huelva ore..... | 480 k. | 14..... | 252..... |
| Almeria ore..... | 200 k. | 3..... | 100..... |
| Taxua ore..... | 20 k. | 11..... | |
| Limestone..... | 700 k. | 28..... | 352 × 0.75 = 264 Mn |
| Heavy-spar..... | 220 k. | | 28 Fe |
| | 60 k. | | 23 C and Si |
| | 980 k. gave per charge..... | 315 k. | |

This, with a yield of 75 per cent of the manganese, should have given 315 k. (693 pounds) of 83.50 per cent ferro-manganese per charge. The manganese varied a little, but the average yield was about 315 k. It required 2700 k. of coke per tonne of iron.

A sample of the cinder gave, on analysis:

| | | | | | |
|------------------------|-------|--------------------------------------|-------|------------|-------|
| SiO ₂ | 27.75 | BaO..... | 3.90 | MnO..... | 7.56 |
| CaO..... | 39.50 | Al ₂ O ₃ | 15.25 | S..... | 1.80 |
| MgO..... | 4.00 | FeO..... | trace | Total..... | 99.76 |

Analyses of ferro-manganese:

| | | |
|-----------------|--------------------|----------------|
| Manganese..... | No. 1 [†] | No. 2. |
| Iron..... | 81.242 | 84.573 |
| Carbon..... | 12.120 | 8.550 |
| Silicon..... | 6.600 | 6.650 |
| Phosphorus..... | 0.093 | not determined |
| | not determined | 0.234 |
| Total..... | 100.055 | 100.007 |

* Translated for the ENGINEERING AND MINING JOURNAL, by George C. Stone, M.E., New Jersey Zinc and Iron Company, Newark, N. J.
† Mn=11.60 per cent. ‡ Mn=5.80 per cent.

From the 16th to the 20th of December, the yield of manganese was only 70 per cent. The maximum, 79 per cent, was on the 26th and 27th. From the 5th to the 13th of January, it was 77 per cent.

The gases burned well. We were unable to analyze them. With a coke with less ash, we should have had a greater daily production, and perhaps a higher yield of manganese.

The variations in the richness of the charge affect the results much as they do in making gray iron. The time during which the charge remains in the furnace is one of the most important factors of economical working. It seems to us reasonable to suppose (in view of the high temperature of the escaping gases, from 200 to 250 degrees C. (from 392 to 482 degrees Fahr.), that a furnace 20 m. (65 feet 7 inches) high would have required less fuel than our 15 m. (49 feet) furnace.

Contrary to the opinion that we have frequently heard expressed, a furnace making ferro-manganese is much less liable to interruptions than in any other circumstances. The principal thing to be looked after is the regularity of the mixture, and, above all, the careful analysis of the raw materials. If this is looked after, scaffolds, chills, or slips need not be feared. At Tamaris, the same product was made, and there, as at Terrenoire, the laboratory proved to be the controlling power.

At Tamaris, with a better coke (10 per cent ash), they obtained wonderful results, as the following figures, from their blast-book, will show. In March, 1882, they made 391,800 k. of 82 per cent ferro-manganese, that is, 12,600 k. a day, with a consumption of 2450 k. of coke and 2711 k. of ore to the ton of ferro-manganese. The yield of manganese varied from 73 to 75 per cent.

The use of zinciferous ores is more troublesome in making ferro-manganese than in any other manufacture, as it necessitates the use of scrubbers to free the gas from the injurious fume that it carries with it, which would otherwise stop up the gas-flues in a few days.

The following analysis is of some flue-dust from Carthage ore:

| | | | |
|--------------------------------------|------------------|-------------------------------------|----------------|
| Insoluble..... | 1.80 | CaO..... | 3.58 |
| Mn ₂ O ₃ | 4.50 = 3.34 Mn | BaO..... | 1.31 |
| Fe ₂ O ₃ | 2.23 = 1.56 Fe | B ₂ O ₃ | not determined |
| ZnO..... | 79.25 = 63.40 Zn | Total..... | 92.47 |
| Al ₂ O ₃ | 0.30 | | |

Below is an analysis of dried flue-dust from ordinary ores:

| | | | |
|------------------------|-------|--------------------------------------|------------------|
| Insoluble portion..... | 27.50 | Insoluble..... | 27.50 |
| SiO ₂ | 62.00 | Mn ₂ O ₃ | 31.90 = 23.00 Mn |
| BaO..... | 33.39 | Fe ₂ O ₃ | 8.56 = 5.98 Fe |
| CaO..... | 2.60 | ZnO..... | 1.70 = 1.36 Zn |
| Metallic oxides..... | 1.90 | Al ₂ O ₃ | 3.31 |
| | 99.29 | CaO..... | 12.20 |
| Loss on ignition..... | 12.75 | BaO..... | 1.57 |
| Total..... | 99.49 | | |

The loss on ignition was principally combustible matter. The analysis of the insoluble portion is interesting, as it proves that the barium sulphate is decomposed before it reaches the tuyeres.

NOTE BY HERR STOECKMANN, OF RUHRORT.

The principal condition for the successful manufacture of ferro-manganese is a highly basic cinder. It is not necessary to have a blast temperature of any thing like 720 degrees C. (1328 degrees Fahr.). I have made large quantities of ferro-manganese continuously (and that with a yield of over 80 per cent of the manganese) with blast of only 420 degrees C. (788 degrees Fahr.), heated by ordinary pistol pipe ovens, with coal fires. I used a slag in which the oxygen of the bases (CaO, Al₂O₃, and MgO) was equal to, or greater than, the oxygen of the silica. A cinder as basic as this is necessary: otherwise, there is either too great a loss of manganese, or, by using a higher temperature to prevent this, the ferro-manganese is made siliceous. As to M. Pourcel's graphite hearth, the necessity for it shows that, at Terrenoire, the cinder contains too little lime, and therefore too much manganese, and consequently is of a kind that cuts the ordinary acid hearth.

In making ferro-silicon-manganese, it is necessary to calculate a cinder that, if it contained all the silica, lime, magnesia, and alumina of the charge, would be acid, and to have a very high temperature in the hearth. As a matter of fact, the cinder as flushed is basic, as a large part of the silica is reduced.

The addition of barium sulphate, in M. Pourcel's process, is singular. If it occurs naturally in the ore, as, for instance, in the ores from Stromberg, which contain as much as 17 per cent, it must be used; but to add it is useless and injurious, as it is likely to make the cinder less fusible. I have also found that if present it does not give up sulphur to the ferro-manganese.

NOTE BY THE TRANSLATOR.

In making high-grade (from 20 to 25 per cent) spiegel from franklinite residuum, I have found that the most suitable cinder is one in which the oxygen in all the bases (MnO included) equals the oxygen in the silica. If either more or less limestone* is added than is necessary to produce this, the cinder will contain an excessive quantity of manganese. From the material we have to treat, we can not extract more than about 50 per cent of the manganese, because, if we attempt it, we have to use such a large proportion of coal that it does not pay, and the high heat makes the spiegel too siliceous to be salable. A high temperature of the blast may not be necessary, but is very advantageous, as, contrary to the experience with gray iron, adding heat by the blast is less likely to make the spiegel high in silicon than adding it by using a larger proportion of fuel.

I can confirm what Herr Stoeckmann says about a cinder with too much manganese cutting the hearth. A few years ago, when making spiegel with from 12 to 16 per cent of manganese, our furnaces were continually breaking out in the hearth. Now, while making from 20 to 25 per cent spiegel from the same material, we are more apt to be troubled by the hearth filling up with graphite. I have had but one break-out in the last two years.

It is difficult to see M. Pourcel's reason for adding barium sulphate. There is no trouble in making a fusible cinder even more basic than a singulo-silicate with silica, alumina, lime, magnesia, and manganese. If he considered another base necessary, it would have been better to add magnesium carbonate, as 100 parts of it would have satisfied as much

* We use a nearly pure dolomite.

silica as 277 parts of barium sulphate, and would have required only one third of the carbon to decompose it.

The best arrangement I have seen for preventing the inconveniences of zinc fume is at the furnace of the Passaic Zinc Company, where there is a double set of condensers, the gas passing through one set while the other is cleaned. By opening and shutting two valves, the gas is transferred to the clean set without stopping the furnace. Wet scrubbers have been tried at Bethlehem and at the Passaic Company's furnace, but have not proved a success.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

This society held its annual meeting in Boston on the 10th inst., and elected the following officers:

President.—Coleman Sellers, Philadelphia.
Vice-Presidents.—Olin Landreth, Nashville, Tenn.; Horace See, Philadelphia, Pa.; Charles H. Loring, U.S.N., Washington, D. C.; Allen Stirling, New York City.

Managers.—Hamilton A. Hill, Boston, Mass.; William Kent, New York City; Samuel T. Wellman, Cleveland, Ohio.

Treasurer.—William H. Wiley, New York.

A number of valuable professional papers were read, among which was one by Prof. J. E. Sweet on "The Unexpected which often Happens," in which he and other engineers, who discussed the subject, gave many instances in their practice where the unexpected occurred. A valuable paper on "The Frictional Resistance of Shafting" was read by Mr. Samuel Webber, of Lawrence, Mass. Mr. Webber criticised the usual manner of measuring the frictional resistance of shafting by throwing the machine belts on to loose pulleys, and claimed that the machine belts should be thrown off. The amount of power consumed by the machine belts running on the loose pulleys will average, in a cotton mill, according to Mr. Webber, fully 10 per cent, varying from 5 to 6 per cent in the spinning-rooms to 18 to 20 per cent in the weaving-room. Aside from this, the power absorbed by the frictional resistance of the shafting amounts to some 16 per cent in a properly shafted mill. This is divided as follows: Engine, 6 per cent; shafting and belting, 10 per cent, which, in some instances cited, went down to 8.3 per cent.

Mr. George A. Barrus read a paper on a new form of steam calorimeter.

The following papers were also presented at the meeting:

Thomas Egleston: "The Basic Bessemer Process."
Francis E. Galloupe: "Rapid Transit and Elevated Railroad, with Description of the Meigs Elevated Railroad."

William A. Rogers: "The Microscope in the Workshop."
W. P. Trowbridge and C. B. Richards: "The Commercial Rating of Boilers by Horse-Power."

William Hill: "The Crystallization of Wrought-Iron."
William Cowles: "Improvements in Ferry-Boats."

Wilfred Lewis: "Experiments on the Efficiency of Worm, Spiral, and Spur Gearing."

William H. Thorne: "Twist Drills."
George M. Bond: "Standards for Pipe Threads."

C. H. Peabody: "Steam-Engine Tests."
G. Lanza: "The Course in Mechanical Engineering at the Massachusetts Institute of Technology."

Australasian Taxation.—The annual rate of taxation per head in Australasia is: South Australia, £1 16s. 7d.; New South Wales, £2 8s.; Victoria, £2 9s.; Tasmania, £2 13s. 7d.; New Zealand, £3 7s. 7d.; Queensland, £3 13s.; Western Australia, £3 18s. 9d.

War Ships with Electric Light in the Suez Canal.—It has been resolved, from the first of January, to allow war ships and postal steamers fitted with electric lights to navigate the Suez Canal, between Port Said and Suez, at a rate of speed not exceeding fifty-four kilometers per night.

South African Diamond Trade.—Returns recently published in Kimberley give the production of Cape diamonds from the four chief mines during the three years ended August 31st last, as follows:

| | Carats. | Value. |
|---------------|-----------|------------|
| Kimberley | 2,280,123 | £2,211,239 |
| De Beer's | 1,447,335 | 1,516,353 |
| Du Toit's Pan | 1,483,184 | 2,099,686 |
| Bultfontein | 1,615,878 | 1,658,071 |
| Total | 6,827,520 | £7,485,328 |

Dividing the three years into two periods of eighteen months each, it appears that the production of the Kimberley mine fell off one half during the second period, while the other three mines increased their output one sixth. The exports in each year are as follows:

| | Carats. | Declared value. |
|-----------------------------------|-----------|-----------------|
| Four months ended Dec. 31st, 1882 | 796,546 | £1,156,273 |
| In 1883, 12 months | 2,413,954 | 2,742,521 |
| In 1884, 12 months | 2,263,686 | 2,807,288 |
| In 1885, 8 months ended Aug. 31st | 1,537,196 | 1,586,796 |
| Total, 36 months | 7,011,382 | £8,292,878 |

It thus appears the exports of diamonds from the colony (making allowance for exports not included in the returns) can not have been worth less than £9,000,000 for the three years, or an average of £3,000,000 a year. Were this sum struck out from the total export trade, the balance against the colony would obviously be very serious. The importance of suppressing the trade in diamonds stolen from the mines, to which the Cape government has latterly given increased attention, is thus apparent.

Advices state that the new system of underground mining has proved a decided success; the weekly output of blue ground is steadily increasing, the quantity raised and deposited on the company's floors for the week ended the 24th ult. being 4600 loads, and it is confidently expected that they will shortly be hauling at the rate of 1000 loads a day. The company has at present a stock of about 20,000 loads on the floors. The new system of working will obviate all the difficulties with which the company has had to contend in past years from slips of reef.

MODERN AMERICAN METHODS OF COPPER SMELTING.*

By Edward D. Peters, Jr., M.E., M.D.

CHAPTER X.

BLAST-FURNACES CONSTRUCTED OF BRICK.

The small type of brick cupolas, though not yet entirely abandoned in the United States, in the treatment of copper ores and mattes, has been described in almost every former work on this subject, and it possesses no peculiar or distinctive features that demand particular attention.

As the whole tendency of the art looks toward an increase in the size and capacity of most of our metallurgical structures, particular attention is here given to such details as are not to be found elsewhere in metallurgical literature.

The largest type of brick cupola as yet found unmistakably practicable and advantageous will, therefore, be selected for detailed description, the accumulated experience of several years, and covering almost every grade and variety of copper-bearing material, having emphatically demonstrated its economy and general superiority.

That the bounds of economy have not been overstepped in this matter of size, is evident from careful comparative experiments, which show conclusively that the cost per ton of ore increases, the repairs become proportionately greater, and the ease of management is sacrificed with every inch that is taken from the size already referred to. What the limits may be in the other direction, is yet an open question; but experience has shown that any further considerable augmentation of capacity involves the solution of various new problems pertaining to the blast and to the handling of such large quantities of ore and slag, and certain other matters that will be noticed in their proper place. It would be unjust to attempt the history or description of the successful introduction of this form of large rectangular brick furnaces without mentioning the names of certain persons whose perseverance and skill have overcome the difficulties inseparable from such an undertaking, and who have made to American metallurgy one of its most valuable additions.†

The distinctive peculiarities of the "Orford" furnace, as this altered and improved form of Raschette furnace is usually designated, aside from its unusual size, are the large number and diameter of its tuyere openings—14 of 6 inches diameter; the absence of any interior crucible or space for the collection of the fused products; the substitution therefore of an exterior fore-hearth or basin, and the construction of the latter in such a manner that two continuous streams—of slag and metal respectively—flow therefrom into ordinary slag-pots, without any blowing through of the blast, or delay for tapping and other related manipulations. The latter arrangement may be applied to any furnace of sufficient size, it being absolutely essential, for the prevention of chilling, that a large quantity of molten material should constantly traverse it. If the product is a matte of high grade, 60 per cent and over, a much larger quantity is necessary to prevent chilling than if the metal is of poorer quality. The rapid chilling of the former is due not to its possessing a higher fusion-point, but because its capacity as a conductor of heat increases with its percentage of copper.

When the smelting mixture is exceedingly rich, so that a very large amount of the copper-bearing product results, it is even possible, by rapid smelting, to maintain a constant stream of metallic copper—a practice that may be regarded as a curiosity rather than as ordinarily feasible.

A detailed description of the construction and subsequent management of this form of furnace will bring forward the points already referred to, and illustrate the practice that up to the present time has been found most advantageous, and which has cheapened the smelting of copper ores to a remarkable extent.

The outside measurement of the furnace being 8 feet 5 inches by 16 feet 8 inches, an excavation should be made at the intended site some three feet larger in every direction than the figures just given, and of sufficient depth to reach solid ground and insure a proper foundation. A depth of four or five feet will usually suffice, the pit being immediately filled with concrete; or, where possible, the pit should be filled to nearly the surface with molten slag.

The walls of the furnace should be begun a foot below the ground level, and should consist entirely of fire-brick up to the tuyere level, where the panels, shown in the cut on page 292, are begun. Up to this point, the walls are 30 inches thick, of solid fire-brick, while the panels are only 18 inches thick, thus being more accessible for repairs, and containing the tuyere openings. The rear wall is divided into three panels, equally spaced, and supported on each side by the full thickness of the wall, forming columns at each corner, and between the weaker portions, that are chiefly relied upon to carry the weight of the superincumbent structure. The panels are 30 inches wide and 33 inches high, and are strongly arched over with three rows of fire-brick, above which the full thickness of the wall (30 inches) is maintained to the top of the structure. Each panel is pierced by two 6-inch square tuyere-holes, equally spaced, excepting the central front panel, which contains only a small orifice for the slag-run, at a point some 10 inches below the tuyere level. The panel referred to forms the breast of the furnace, and is not closed in until the last moment.

The total number of tuyere openings is 14—6 behind, 4 in front, and 2 at each end. The interior rectangle is 3 feet 5 inches wide and 11 feet 8 inches long, although any exact adherence to these measurements is

* Copy-right 1885, by the Scientific Publishing Company.

† The gentlemen referred to, Messrs. W. E. C. Eustis, R. M. Thompson, H. M. Howe, J. L. Thomson, are, or have been, all officers of the present Orford Copper and Sulphur Company, of Bergenport, New Jersey; and while the furnace referred to closely resembles the Raschette type of furnace so extensively introduced into Germany and Russia during the past thirty years, its management and all manipulations connected therewith are sufficiently different to convert into a brilliant success what has in Europe, at least, been practically a failure. The application of the exterior crucible, continuous matte-tap, and peculiar method of feeding and manipulation by which campaigns of a year are made with an excessively basic slag, and in the entire absence of any water-cooled tuyeres, aside from the trebling of its former capacity, are sufficient to constitute a valid claim to originality.

The writer is pleased to have this opportunity to acknowledge the benefits derived from long and intimate intercourse with these gentlemen, and to state that it was while occupying the position of superintendent of this company that he first learned the full extent to which the cost of smelting could be reduced by increase in the capacity of furnaces.

unnecessary, the interior of the furnace being soon burnt out into an irregular shape and usually much larger than the size just given.

Strong tie-rods, provided at their extremities with loops, and buried deeply in the foundation, are placed in position as indicated in the cut. Unless the transverse rods can be placed at a depth of two or three feet below the surface, they should merely be fastened into the wall by hooks, as they would certainly be smelted away in time.

The brick should be laid with the closest possible joints, and in a very thin mortar made of half each of raw and burned fire-clay, ground exceedingly fine.

Heavy railroad iron may be used for binders, and should be used rather more than less liberally than shown in the illustration, as the expansive force is enormous when the furnace is in full heat, and any serious cracking tends greatly to shorten its existence.

If fire-brick are expensive, the outside lining, above the panels, and to a depth of 12 inches, may be constructed of red brick, although this is not recommended.

The usual height from the tuyeres to the threshold of the charging-door is 8 feet; but this, of course, may be varied to suit the character of the ore to be smelted. The charging-doors are three in number, and of large size, and all further details of construction are plainly shown in the cut.

The chimney should never be made smaller than here shown, and if a vertical down-take is used, connected with flues for the saving of the flue-dust, its dimensions should be increased one third. The latter construction is much preferable to the simple vertical chimney, and is absolutely essential where any thing but the poorest material is smelted, as the loss in flue-dust, owing to the enormous volume of blast peculiar to this practice, is very great—especially as a large proportion of the charge often consists of fine ore, it having been found that these large rectangular furnaces are peculiarly adapted to the treatment of that material.

The tuyeres consist of rather heavy galvanized sheet-iron—No. 18—and are connected with the vertical branches of the main blast-pipe surrounding the furnace with thick duck tuyere-bags, soaked in a strong solution of alum, to render them less inflammable and to fill the pores of the cloth. Their diameter may vary with the character of the ore under treatment, but is usually from 5 to 6 inches, the pipes being merely thrust a short distance into the square orifices left in the brick-work, and made tight with plastic clay.

There remains nothing in the construction of this furnace that can not be plainly seen from the illustration, and the discussion of its management from the time when taken in hand by the smelter will now be proceeded with.

It is frequently customary to form the bottom of a solid mass of fire-brick, placed on end, and brought up to within 10 inches of the tuyere openings, sloping slightly toward the slag-run in the center of the front wall.*

The author has found the following method, practiced originally by the Orford Company, far superior to any other, especially where low-grade matte is to be produced, the most difficult of all copper-bearing materials to confine within brick walls.

After filling in the foundation with béton to a foot below the ground level, the furnace bottom is begun by laying two courses of fire-brick on end, and with the closest possible joints. This still leaves a space of from 24 inches to 30 inches to bring the bottom to the proper height, which is filled in as follows:

The furnace and foundation being thoroughly dried by at least four days' brisk firing with brands and similar material, enough coke is dumped into the red-hot shaft to fill it to a point some three feet above certain temporary openings that should be left in the brick-work while building. These openings correspond in size, number, and position with the permanent tuyere openings, except that they are some 8 inches lower and directly beneath the regular orifices, which, for the present, are plugged with clay.

Some six or eight tons of calcined quartz crushed to the size of chest-nuts and mixed with about five per cent of fusible slag, are spread upon the coke; and as soon as the latter is properly on fire above the temporary tuyere openings, the blast-pipes are put in place, and a light blast is continued until the coke is burned away and the sticky, half-melted charge threatens to flow into the tuyere openings. The unconsumed coke and excess of quartz are removed through the breast panel—which was built up temporarily of 4-inch brick-work; and the furnace being tightly closed, is allowed to cool very gradually for twenty-four hours or more.

If the operation is successful, the bottom will be as solid and infusible as can be made, nor will any attempt at the substitution of basic material for quartz, in consideration of the probable highly ferruginous character of the slag to be produced, result in any improvement on the plan recommended.

It is probably as good a bottom as can be made, although, as will be later seen, it offers but little resistance to a hot low-grade matte, when produced at the rate of from 30 to 50 tons daily.

The furnace being thoroughly dried and heated, blowing in may follow at once, it being only necessary to plug the temporary tuyere orifices, fill the shaft with coke to a point some three feet above the permanent tuyeres, and allow the fire to ascend to these openings before filling the shaft with alternate layers of charge and fuel, and putting on a light blast (one ounce).

All this may be done the night before starting, and at the same time, if not before, the fore-hearth and siphon-tap† must be arranged. This consists of a rectangular box, some 4 feet by 3 feet 6 inches, formed of cast-iron plates strongly bolted together at the corners, and lined with a brick wall $4\frac{1}{2}$ inches or 9 inches thick, according to the quality of the product. It is fastened firmly to the front of the furnace, just at the slag-run in the center panel, the lower middle portion of the anterior front wall of that structure forming its posterior boundary. It is divided longitudinally by a 9-inch wall of fire-brick into a greater and lesser portion, the area of the two compartments being

about as 5 to 2, and the direction of the division wall being parallel to the short axis of the furnace.

The entire molten contents of the furnace discharge through a 2 by 4-inch opening (the slag-run) in the middle panel (the breast) into the larger of these two compartments, which is provided with a slag-spout, bolted to the upper edge of the front plate, while it communicates with the smaller compartment by means of a 3-inch by 8-inch vertical slot through the 9-inch division wall, about midway of its length and on a level with the floor of the fore-hearth. This smaller compartment also has a spout about 2 inches below the level of the spout belonging to the larger division, and on the outer side—instead of the end wall, for the sake of convenience.

A thorough understanding of this very simple and inexpensive contrivance will render it very easy to appreciate its management.

When the breast-hole is opened, and slag and metal first begin to flow, the larger compartment is soon filled, as the only means of communication between the two divisions of the fore-hearth is the closed slot in the lower part of the 9-inch division wall.

The molten products separate according to the law of gravity, and slag is allowed to flow through the spout of the large compartment until the drops of metal appearing show that it is filled with the more valuable product. The channel of communication is now opened by means of a crooked tapping-bar, and the metal flows rapidly through the same into the smaller compartment, until an equilibrium is established, and both divisions of the fore-hearth are partially filled with the matte, the communicating channel being far below the surface of the same, and consequently so situated that slag can never reach it unless it should sink below the metal, which is obviously impossible.

As the furnace constantly discharges its stream into the larger compartment, the fore-hearth is soon filled again, the metal sinking to the bottom and standing at the same level in both divisions, while the slag simply flows over the surface of the matte in the larger compartment.

As soon as the matte reaches the level of the spout attached to the small compartment, it begins to flow into a pot placed to receive it, and by judicious manipulation, and if a sufficient proportion of matte is produced from the charge, a constant stream of each product may be kept running without difficulty.

The management of this "siphon-tap" requires considerable experience, as the matte stops occasionally without apparent cause, and requires a certain amount of manipulation and coaxing to keep running freely. This is accomplished by slightly damming up the slag-spout, which soon forces an excess of matte into the smaller compartment, or by clearing out the communicating orifice by means of a heated bar bent to the required curve.

With matte of 50 per cent or over, the principal difficulty is found in the gradual filling up of the fore-hearth by chilling, while a matte containing 20 per cent or less of copper, and produced in large quantities, has directly the opposite effects, thinning the fire-lining until the plates are endangered, and cutting away the division wall until the two compartments are virtually thrown into one.

But even under these circumstances, and as long as a vestige of the center wall remains, the separation of the matte and slag continues to be perfect, and by judicious repairing and nursing, a fore-hearth apparently in the last stage of ruin may yet do good service for many days.

An opening through the division wall 18 inches high by 24 inches wide, and actually involving two thirds of the separating brick-work, is not incompatible with a perfect separation.

The larger compartment is provided with a tap-hole at its lowest boundary, and on the side opposite the matte division, and a large quantity of sand should always be at hand ready to make up into rough molds in case of any sudden necessity for tapping the furnace.

This is especially the case when producing very low-grade metal; for, owing to its corrosive action, and to the fact that the anterior wall of the furnace forms the posterior boundary of the fire-hearth, the entire contents of the former may escape into the latter in case of a break through the plates. It is at first somewhat startling to have such an outbreak when the entire bottom of the enlarged and burned-out furnace has been excavated to the floor level, forming a crucible some three feet deep and perhaps 4 by 18 feet in size. Under such circumstances, the emptying of the fore-hearth by tapping—or oftener by breaking through the plates or brick-work at some point—may result in the irruption of some 12 to 15 tons of matte upon the floor of the cupola-house. The workmen soon become expert at controlling such outbreaks by means of dry sand in unlimited quantities—the approach of any thing wet is like touching a match to a keg of gunpowder—and no serious results need be apprehended when the buildings are fire-proof, as should invariably be the case where large brick furnaces are employed.

Such an outbreak is treated as are most other accidents to which this type of furnace is liable, by entirely shutting off the blast and allowing every thing to stand quiet for a few hours. The orifice is tightly plugged from the outside, and the molten products that trickle into it from the interior are allowed to cool by standing still, until it is as tight as ever.

The full burden may be reached after feeding two quarter charges, four half charges, and eight three quarter charges, slag being substituted for ore to a considerable extent, until the condition of the furnace warrants the employment of the normal mixture.

This is shown by the gradual change of the color of the slag from a dull red to a yellowish white; the entire ceasing or great diminution of smoke arising from the slag; a certain peculiar viscosity (except in very basic slags) when it falls into the pot; a general brightening of the tuyeres, succeeded by the formation of short noses, perforated abundantly with bright holes; and a steady and rapid sinking of the charge.

Although the charging of the blast-furnace is always one of the most important manipulations belonging to this apparatus, it is doubly the case with the furnaces now under discussion.

While the walls of the water-jacket are thoroughly protected and entirely unassailable, the mason-work of the brick furnace is completely exposed, and any error in the proportion of fuel to ore or in the manner of charging is sure to be followed by serious results.

This is, strange as it may seem, peculiarly the case with a siliceous charge, and nothing can more clearly illustrate the proper method of working than a brief description of an irregularity that is constantly

* The practice of basing the bottom upon an arch built over an open space below must be strongly condemned, as it will simply result in the cutting through of the arch, and the total disappearance of all metal until the cavity is filled, making eventually a solid but somewhat expensive bottom.

† This is an entire misnomer, as the apparatus here referred to, as used for the continuous discharge of the metallic product, has nothing about it pertaining to the principles of the siphon.

liable to occur, and that will be quickly recognized by all practical cupola smelters.

An imaginary case will be assumed where a newly blown-in furnace, in good condition, but with a slightly too siliceous charge, begins to become too hot in one end, through some slight irregularity of feeding, or through an improper proportion of ore to fuel—either too much or too little of the same producing very similar effects.

The attention of the foreman will be called to the fact that one of the end panels is becoming very hot, which, as it consists of 18 inches of fire-brick, shows either that the inner temperature is much too high, or that the bricks have already been thinned by burning.

A glance into the tuyere opening shows that a heavy black nose has already formed, resulting from the fusion of the fire-brick above, which form a crust almost impervious to a steel bar, and exceedingly infusible.

A consultation with the man who feeds that end of the furnace will elicit the information that that portion of the charge is sinking very slowly, and that the heat is rising to the surface.

At the same time, the blast-gauge will show an increased tension, owing to the blocking up of the tuyeres that supply that portion of the apparatus, and the agglomeration of the charge above, owing to the rapidly ascending temperature.

The already too siliceous slag is rendered still more infusible by the admixture of silicate of alumina from the melting fire-brick; and the high temperature and powerful reducing atmosphere, resulting from the almost stationary condition of this portion of the charge, soon begin to reduce metallic iron out of the slag, and even from the matte, the sulphur being driven away to a considerable extent by the powerful blast, high temperature, and slow removal of the molten products.

The slimy, half-fused metallic iron is soon recognized by the bar which is constantly thrust into the choked tuyeres, and the inexperienced metallurgist, following the teaching of all our best text-books, reasons that the reduction of iron comes from too highly ferruginous a charge, and destroys all hope of improvement by cutting off a portion of the iron from the charge fed into that end of the furnace.

(TO BE CONTINUED.)

PROJECTED SOUTH AMERICAN RAILROADS.

Señor Don Vincente Quesada, the new Minister from the Argentine Republic at Washington, has just received official information that the government has made a contract with Lucius Gonzales to complete all the railroads now in progress, and to construct a harbor. Señor Gonzales, who represents a syndicate of English capitalists, agrees to complete the construction of all improvements now in progress at their original estimated cost of \$59,000,000, of which \$10,000,000 are to be expended on the harbor. The government agrees to issue 6 per cent fifty year bonds to the amount of \$59,000,000, which are to be deposited in London in trust for the syndicate Gonzales represents, until the completion of the entire system of improvements, the time being limited to five years.

In addition to the construction of a harbor, the Andean Railroad, which is to connect Buenos Ayres with Santiago, Chili, is to be completed at an estimated cost of \$2,393,000 for construction, \$1,000,000 for rolling stock, \$600,000 for shops and machinery, \$1,000,000 for the expenses of the engineering department; total, \$4,993,000. The Central Railroad is to be completed to the coal mines in the southern part of Chili, at a cost of \$6,305,000, with \$2,000,000 for rolling stock, and \$1,000,000 for shops; total, \$9,305,000. The Northern road is to be extended to the Bolivian boundary at a cost of \$8,000,000, with \$1,000,000 for shops; total, \$9,000,000. Branches of this line are to be extended from Chumbica to Catamarca, costing \$1,293,000, and from Dean Fuenes to Chilecito, costing \$5,000,000. The aggregate expenditure for the Bolivian line is \$15,293,000. Another line is to be constructed from Tamatiné to connect with the above, costing \$2,500,000. The Richahué enterprise is to be completed at a cost of \$13,931,000, and various other small works at an aggregate cost of \$4,500,000, which makes a grand total of \$59,000,000.

The coal mines of Southern Chili, where the only steaming fuel to be had in South America is found, will be brought within three days of Buenos Ayres, and the Argentine people will no longer be compelled to import coal from Europe. Bolivia is full of metal; but the mines have been worthless because of the impossibility of getting machinery into the country, all of the interior transportation being done on the backs of llamas, which can not carry more than 125 pounds.

COST OF COAL MINING IN BELGIUM.

The following table has been published in the *Moniteur Belge*, from which the *Colliery Guardian* translates it. It will be seen from this that the cost of coal in Belgium is considerably greater than in Maryland or Pennsylvania, where \$1 or 5 francs a ton would be a very satisfactory figure to obtain at the colliery. Even our anthracite coal, with all its breaking, screening, and washing or picking, sells at less than the following figures of cost of soft coal at Belgian collieries:

| Provinces. | Collieries. | Men. | Average wages. | Ordinary expenses. | Extraordinary expenses. | Cost per ton. |
|--------------|-------------|------|----------------|--------------------|-------------------------|---------------|
| | | | Francs. | Francs. | Francs. | Francs. |
| Hainaut..... | 1884 | 192 | 78,789 | 3.02 | 113,469,743 | 9,425,705 |
| | 1883 | 211 | 79,129 | 3.24 | 123,806,375 | 10,827,300 |
| Namur..... | 1884 | 19 | 2,752 | 2.03 | 3,185,662 | 623,471 |
| | 1883 | 24 | 2,814 | 3.16 | 3,419,658 | 643,273 |
| Liège..... | 1884 | 78 | 23,641 | 2.10 | 38,171,750 | 3,866,900 |
| | 1883 | 79 | 24,309 | 3.39 | 35,892,550 | 5,630,500 |
| Kingdom..... | 1884 | 280 | 105,182 | 3.07 | 151,857,155 | 13,946,076 |
| | 1883 | 314 | 106,252 | 3.35 | 163,118,583 | 17,101,073 |

The general profit realized by the Belgian collieries was 6,550,110 francs, or 1,701,416 francs more than in 1883. There are in Belgium 266 concessions of coal mines, of which 150 have furnished the quantities above mentioned. The others may be considered as without actual value. Among the 150 mines in activity, 70 sustained a deficit of 4,030,193 francs; the other 80 mines realized in 1884 a profit of 10,289,303 francs. Those that realized the largest profits are as follows: In the province of Hainaut, the colliery of Bascoup-Mariamont, 782,300 francs, with a production of 572,718 tons, or a profit of 1.37 francs a ton;

in the province of Namur, the Hazard mine, 18,109 francs, with a production of 84,605 tons, or a profit of 21 centimes a ton; in the province of Liège, the Marihay mine, 459,100 francs, with a production of 360,970 tons, or a profit of 1.27 francs a ton. The miners at these three collieries obtained respectively 5.04 francs, 5.20 francs, and 4.42 francs per ton of coal extracted. For the whole of the collieries of the country, the average annual wages of workers of all categories, including women and children, was 917 francs, or 5.34 francs per ton of coal extracted. The average profit realized was only 37 centimes a ton.

A German Commission on British Coal Mines.—A commission sent by the German government, and including Baron Pizzo and a number of mining engineers, has been sent to inspect and report on British coal mines.

The Scientific Study of Coal Mining.—The colliery proprietors of Durham and Northumberland have been organizing classes for the encouragement of the scientific study of coal mining. Both masters and men are stated to be heartily contributing to the success of these classes. At the Spen Colliery, science classes in sound, light and heat, and mathematics have been formed, Mr. R. Pearce, principal of Chester House, Newcastle, delivering the opening address.

A Paper Chimney.—*L'Illustration* states that a manufacturer at Breslau has built a chimney 16 meters high (51 feet 6 inches) entirely of paper. The blocks used in its construction, instead of being of brick or stone, were made of layers of compressed paper, jointed with some siliceous cement. The chimney is very elastic, and at the same time is fire-proof, and is less liable than ordinary chimneys to be struck by lightning.

The Arizona Copper Prince Company.—During October, the company smelted 2,490,571 pounds of ore with 403,825 pounds of San Pedro coke, in 7844 charges, 688 hours, and produced 404,133 pounds of black copper, about 96 per cent copper. The copper in the ore varied from 16 to 23 per cent, and in the slag averages 1½ per cent. We are informed that the Prince will be closed, the low price of copper making it more desirable to keep it in the mine than to send it to market.

Gilding a Dome.—To many, the coating of a dome or roof with thin gold-leaf would seem to be a waste of material; the first snow or hail-storm would pierce or tear it to shreds. The fact that the gold defies the wear of the weather induces the belief that it is much thicker than the leaf used by sign-painters, bookbinders, and makers of fancy ornamental articles; but the fact is, that the gold-leaf is precisely the same, airy, fleecy, and capable of floating in the air like a gossamer fiber. The gilder of the dome of the capitol at Hartford, Conn., Capt. Thomas F. Burke, said that his principal trouble in doing the work was from currents of air, the altitude being more than 200 feet from the ground and the site of the building itself being one of the highest in the city. To do the work properly, he constructed a movable canvas shield made to fit the curvature of the dome and its twelve radial ribs, not so much to shield the workmen, as to prevent the leaf from being blown away. To cover this dome—an area of 4100 square feet—there were used 87,500 leaves of gold, each 3½ inches square, weighing in the whole three pounds avoirdupois. The total cost of the gold and the labor was \$1600.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price.]

Twenty Years with the Indicator. By Thomas Pray, Jr., C.E., M.E. [etc.] Vol. II. Published by the Author, New York: John Wiley & Sons, 1885. 8vo, pages xiii+168, and 177 figures. (A full Table of Contents, miscalled an Index; no Index; no List of Plates.) \$2.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

GRANTED NOVEMBER 10TH, 1885.

- 329,902. Natural Gas Supply System. William C. Henry and Alfred Smedley, Bradford, Pa.
- 329,928. Gas-Pressure Regulator. Edwin C. Merrill, Pittsburg, Pa.
- 329,937. Junction or Separator Lining for Open-Hearth Furnaces. Oscar Murisier, Alexandrowsky, near St. Petersburg, Russia, and Percy C. Gilchrist, Palace Chambers, Westminster, England, said Murisier Assignor to said Gilchrist.
- 329,964. Separator. Delos Car-Skaden, Chicago, Ill.
- 329,967. Process of Manufacturing Gas. John L. Stewart, Philadelphia, Pa.
- 329,968. Apparatus for Sinking Wells. Michael Hopper, Cincinnati, Ohio.
- 329,985. Apparatus for Burning Hydrocarbons. Louis B. White, New York City, Assignor to Wilson L. Potter and E. Hamilton Hills, both of Hartford, Conn.
- 329,986. Ratchet-Drill. Fardon A. Whitney, Chagrin Falls, Ohio.
- 330,000. Composition Fuel. Leon Cline, Chicago, Ill., Assignor of one fourth to Samuel W. line, same place.
- 330,115. Machine for Disintegrating Ores. Aaron Higley, Cleveland, Ohio.
- 330,121. Limekiln. Joshua Hunt, Catasaqua, Assignor to the Baker Lime Company, Limited, Avondale, Pa.
- 330,122. Apparatus for Making Illuminating Gas. Charles W. Isbell, New York City.
- 330,134. Pipe-Coupling. Lucien Lerède, Paris, France.
- 330,142. Process of Manufacturing Gas. William F. C. M. McCarthy, Philadelphia, Pa., Assignor to Adolph Ohl, James McC. Creighton, and Bernard C. Lauth, all of Philadelphia, Pa., and Jane Logan, Hager-town, Md.
- 330,155. Process of Making Ammonium Chloride. Theodore Schmidtborn, Jersey City, New Jersey, Assignor to himself and Hugo H. Harnish, New York City.
- 330,165. Gas Apparatus. Roland H. Smith, Pittsburg, Pa.
- 330,171. Treating Asbestos to Form Crucibles, etc. Mark S. Thompson, New York City, Assignor to Robert H. Martin, same place.
- 330,179. Means for Detecting and Carrying off Leakage from Gas Mains. George Westinghouse, Jr., Pittsburg, Pa.
- 330,190. Apparatus for Making and Burning Gaseous Fuel. Russell P. Ambler, Medford, Mass., and Henry Deitz, Albany, New York.
- 330,199. Means for Detecting Leakage in Gas Mains. Harvey Bartley, Pittsburg, Pa.
- 330,228. Testing and Firing Apparatus for Submarine Mines. Joseph P. Gibbons, No. 4 Osborne Terrace, Coombe Farm Lane, Westcombe Park, County of Kent, Assignor to Latimer Clark Muirhead & Company, Limited, No. 23 Regency street, Westminster, England.
- 330,227. Case for Submarine Mines. Joseph P. Gibbons, No. 4 Osborne Terrace, Coombe Farm Lane, Westcombe Park, County of Kent, Assignor to Latimer Clark Muirhead & Company, Limited, No. 23 Regency street, Westminster, England.
- 330,262. Radial Forging-Machine. Julius C. Richardson, Iilon, New York.
- 330,263. Gas-Regulator. James Robertson, Brooklyn, New York.
- 330,267. Means for Gas Distribution. Roland H. Smith, Pittsburg, Pa.
- 330,280. Apparatus for Making and Burning Gaseous Fuels. Russell P. Ambler, Medford, Mass., Assignor of one half to Henry Deitz, Albany, New York.
- 330,281. Ingot-Mold. Benjamin Atha, Newark, New Jersey.
- 330,294. Main for Conveying Gas under Pressure. Thomas A. Connolly and Anthony A. Connolly, Washington, D. C.

FURNAOE, MILL, AND FACTORY.

The Warwick Iron Company, Pennsylvania, blew in December 15th, 1880, and blew out September 1st, 1885, making in that time 101,335½ tons of iron, which has probably not been excelled by any anthracite furnace of its size—55 feet high, 15½ feet bosh. During 1883-84-85, one fourth the fuel used was coke. The efficient manager of the Warwick furnace is Mr. Edgar S. Cook.

Proposals will be received until November 24th at the Watervliet Arsenal, West Troy, New York, for furnishing army cutlery, iron and steel, hardware, plumbers' supplies, etc.

The Wheaton Sub-Electric Conduit Company has been incorporated in this city, with a capital of \$1,500,000, for the purpose of laying wires under ground. The corporators are John A. Belvin, Samuel Conover, Charles A. Post, John J. Kiernan, John A. Todd, Stephen T. Willett, and Henry A. Heiser.

The owners of a number of blast-furnaces in the Hocking Valley, Ohio, have decided to continue work for the present, notwithstanding the strike of the coal miners, and have made arrangements to run their furnaces with coke as fuel, at least until the present supply of ore has been made into iron.

Proposals will be received until November 30th by the Secretary of the Water-Works at Columbus, Ohio, for a duplex compound condensing pumping-engine, either vertical or horizontal, of 15,000,000 gallons capacity.

The New York & Perry Coal and Iron Company, Hocking District, Ohio, having reorganized without any bonded indebtedness, it is stated, on the property of the old New York & Straitsville Company, is now in the hands of capitalists, who propose to overhaul the plant and put it in repair. It will be in blast, turning out pig-iron, about the middle of this month.

Lucy Blast-Furnace No. 1, at Pittsburg, Pa., which has been in blast less than a year, is soon to be blown out, for relining.

The trustees of the Huntingdon Car and Car-Wheel Works, Huntingdon, Pa., have executed a deed of conveyance for the plant to Purcival Roberts, of Philadelphia. The consideration is \$20,000, and an agreement to operate the works here. It is probable that the works will be run in the interest of the East Broad Top Railroad, of which the purchaser is one of the largest stockholders.

The Western Steel Company is getting its works at Carondelet, Mo., in good running order. When the works are in full blast, it is expected the output will be between 200 and 250 tons a day.

The old crucible steel-works at Cleveland, Ohio, have been leased by the Cuyahoga Rolling-Mill Company, and will be put into operation at once.

All the mills and furnaces in Chattanooga, Tenn., are now in full operation.

The Saucon Iron Company's furnace, at Hellertown, Pa., which has been idle for two years, has started up. Arrangements are making to start another furnace.

The blowing of mineral wool has been discontinued at the Isabella furnace, the only place where it is made in Western Pennsylvania. There is said to be a large stock on hand.

Preparations are making to blow in another of the Copley Iron Company's furnaces, at Easton, Pa., on the 23d inst.

The Western Iron-Works Company, recently incorporated with a paid-up capital of \$25,000, succeeds to the business and interests of the Pope Iron and Metal Company, St. Louis. The business had in view at the works at the start was the production of general castings for rolling-mills, particularly rolls; under the old management, over \$40,000 were expended in the building of a thirty-ton air-furnace and the making of other preparations. Under the new incorporation, this business will be fully revived; and in addition the rebuilding of heavy machinery of all kinds and the handling of rolling-mill supplies will become special features.

The American Association of Barbed Wire Manufacturers met at Chicago, Ill., on the 17th inst. Representatives were present from all parts of the country. A compact was formed by which the output is to be regulated by a central committee appointed by the pool.

The National Association of Wrought-Iron Pipe Manufacturers, in session at Pittsburg, Pa., on the 18th inst., advanced the rate on brass boiler tubes 2½ per cent.

Messrs. A. Garrison & Co., of Pittsburg, Pa., have cast for Park, Brother & Co., proprietors of the Black Diamond Steel-Works, a chilled-iron roll weighing 16 tons. This is the fourth roll of this kind that Garrison & Co. have cast for Park, Brother & Co. The four are the largest rolls in the world, the last being a spare one to replace any of the others that may get out of order. They are used for rolling steel plates, and measure 32 inches in diameter and 9 feet 7 inches in length.

LABOR AND WAGES.

An effort is making to settle the long strike of the coal miners in the Monongahela Valley, Pa. The operators recently proposed to guarantee the strikers steady work at two and a half cents a bushel, the rate ruling before the demand was made for three cents. Secretary Flannery has issued a circular favoring the acceptance of the proposition and advising a meeting to ratify it, in order that an answer may be returned to the employers before December 1st.

At a conference of coal operators and the officials of the Miners' Association, held in Pittsburg, Pa., on the 18th inst., a compromise was effected on the basis of 2½ cents per bushel, the operators guaranteeing a year's steady work, and operations will probably be renewed next Monday, after five months' suspension.

W. P. Rend & Co., of Chicago, owners and operators of coal mines in the Hocking Valley, Ohio, on the 16th inst. telegraphed their superintendents to grant the demands of the striking miners by increasing their wages from 50 to 60 cents. The miners of this district, at a meeting in Straitsville on the 17th inst., adopted a resolution instructing the President of the State Miners' Association to order a general suspension throughout the State, all the men who can get a 60 cent rate being allowed to work in the mean while, and stipulating that on the day of the suspension all the mines in the State must stop.

Two hundred miners employed by the Soddy Coal Company, near Chattanooga, Tenn., have struck for higher wages.

Arbitration will be resorted to in Brazil, Ind., in the case of the coal miners' controversy, and a large strike of miners probably averted.

A special meeting of the Executive Board of the Miners and Laborers' Amalgamated Association was held in Pottsville, Pa., on the 18th inst., to discuss the labor difficulties. The majority of the delegates have been instructed to demand the restoration of three per cent, the enforcement of the timber law, and other measures. There is a strong feeling in favor of settling the troubles by arbitration.

At a meeting of the Executive Board of the United Nailers, Rollers, and Heaters' Association at Wheeling, West Va., on the 18th inst., a resolution was adopted reaffirming their determination to stand out for the 21 cent scale, and refusing any settlement that will allow the manufacturers to retain the feeder nailers.

The Calumet & Hecla Copper Mining Company, of Michigan, has issued an order signed by its president and superintendent, to the effect that the company will employ no Knights of Labor.

TRANSPORTATION NOTES.

A company has been formed, composed mostly of Pittsburg capitalists, for the purpose of building a railroad across the State of Kentucky into Tennessee. The line of the proposed road was surveyed from Evansville, Ind., down through Dekoven, Ky., to Jackson, Tenn. It is to be called the Ohio Valley Railroad, and extends in a southwesterly direction, opening up a portion of country the richest in minerals and agricultural products of any part of the State. The line will be 200 miles in length.

The annual report of the Baltimore & Ohio Railroad shows that the coal trade of the main stem has an aggregate of 3,487,170 tons, which includes 443,544 tons for the company's supply. Of this quantity, that transported for the public, delivered in Baltimore, is 2,288,949 tons, and that delivered at local and Western points, 754,677 tons. In the fiscal year, 2,003,982 tons of coke and coal were transported on the Pittsburg division, and 909,594 tons of coal on the Trans-Ohio divisions. The aggregate of coal and coke thus transported, including all divisions, was 6,400,746 tons, showing an increase for the year of 8071 tons, and an increase, compared with 1883, of 723,909 tons. Eight hundred and twenty-nine iron cars, of

the largest class, have been added during the year to coal car equipment.

Port Moody and Coal Harbor are competing for the western terminus of the Canadian Pacific Railroad, as are Seattle and Tacoma for the terminus of the Northern Pacific.

COAL TRADE NOTES.

A press dispatch, dated November 19th, says that a secret meeting of presidents of coal companies in the George's Creek region was held at Baltimore to-day, for the purpose of making an organized protest against the rule recently adopted by the Vessel Owners' Association, requiring either the consignee or consignor of coal to arrange for the discharge of the cargo, which rule, it is said, will be very much to the disadvantage of shippers. Among the gentlemen at the meeting were J. P. Lowell, G. P. Lloyd, Henry Loverridge, and W. S. Jacques, of New York, and all the shippers of Baltimore.

OREGON.

The Portland Journal of Commerce says: We have the New Castle, with two mines, the Renton Coal Company's mine, the Cedar River Coal Company's mine, the Black Diamond Company's two mines, and the Oregon Improvement Company's Franklyn mine, all of which are now pouring coal into Portland at the present rate of 1000 tons daily, which is expected to be increased soon to 4000 tons.

PENNSYLVANIA.

ANTHRACITE.

Reed & Stecker have completed their breakers on Big Mountain, and will soon begin operations. The vein of red ash is developing finely.

The Moosic Coal Company, at Moosic Mountain, is preparing to build a new breaker, the contract for which has been awarded.

The fire that was discovered in the old workings of No. 2 colliery, Lost Creek, some three months ago, has become very threatening, and every effort is put forth to extinguish it. The colliery is owned by the Lehigh Valley Coal Company.

The North Ashland colliery, at Ashland, which was drowned out last summer to extinguish the fierce fire raging in the working, is preparing for operation. The Philadelphia & Reading Coal and Iron Company is pumping out the water and improving the outside workings.

The Helfenstein colliery, near Mount Carmel, for which the Philadelphia & Reading Coal and Iron Company paid a large sum and subsequently spent much money in improving, has been permanently abandoned. After sinking a slope of 117 yards, the vein became faulty, and the men are taking down the large breaker.

COKE.

The syndicate is shipping 2440 cars weekly, as against 2300 cars two weeks ago. The independent operators have regained their lost ground and are shipping 1200 cars, their shipments of one month ago. The Connellsville Courier states that labor is getting scarce, as a natural consequence of the recent increase in ovens. Prices still remain at the old figures of \$1.20 for furnace coke; \$1.40 for foundry; and \$1.75 for crushed.

GAS AND PETROLEUM NOTES.

Exports of refined, crude, and naphtha from the following ports, from January 1st to November 14th:

| | 1885. | 1884. |
|--------------------|-------------|-------------|
| | Gallons. | Gallons. |
| From Boston..... | 7,654,385 | 6,505,301 |
| Philadelphia..... | 133,403,992 | 96,919,995 |
| Baltimore..... | 10,307,494 | 12,157,957 |
| New York..... | 327,780,173 | 337,160,983 |
| Total exports..... | 479,146,044 | 452,744,236 |

MARYLAND.

It is reported that natural gas has been discovered on the farm of Col. J. E. Wood, near Oakland, Garrett County.

PENNSYLVANIA.

A natural gas company has been organized at Scottsdale, with a capital stock of \$5000. A charter has been applied for and work will begin as soon as it is obtained.

The Philadelphia Natural Gas Company has struck another large vein of gas at its well, No. 43, on the Harvey farm, in the Murraysville District. The connections are all laid and the gas ready to turn into the mains.

The Alleghany Oil Company, which has sunk a well

outside the limits of Baden, has just struck a heavy vein of gas.

The Pittsburg Producers' Oil Company has struck a vein of natural gas at its well at Marr station on the Pittsburg & Western Railroad.

GENERAL MINING NEWS.

ARIZONA.

ARIZONA COPPER MINING COMPANY.—This company has been organized at St. Louis, under the laws of Illinois, with a capital stock of \$2,000,000, in 80,000 shares. The incorporators are Messrs. David C. Kling, C. A. Schnake, and M. O. Neil.

COCHISE COUNTY—TOMBSTONE DISTRICT.

CONTENTION.—An important strike was made in one of the drifts, and some fine ore, running as high as \$150 a ton, has been found. This strike, it is said, is of great importance, in that it demonstrates the fact that high-grade ore exists below the water-level. This ore was found about 25 feet below the water-level. The greater portion of the present month will be occupied in completing the new station at the 700-foot level, where the new set of pumps is to be placed. At the present time, the water gives little trouble.

GRAND CENTRAL.—The work has been chiefly confined to cutting the bob-station at the 700-foot level. From this station, the cross-cut to the ledge will be begun. There is plenty of water coming into the shaft, though as yet they have no trouble in controlling it. The usual daily shipments of 60 tons continue.

TOMBSTONE.—Work continues favorably. The greatest interest at the present time is centered in the workings in the 700 levels on the hill.

PIMA COUNTY—QUIJOTOA DISTRICT.

The secretary of the Peer, Peerless, and Crocker mining companies reports, under date of the 10th inst., that, as soon as cross-cutting the north drift from the Crocker main winze is completed, the work will be resumed of sinking the main winze to a depth of 100 feet below this drift, at which point the men will drift south to open up and more thoroughly develop the south end of the mine, which at the present time looks very favorable. The mill is running steadily, and is crushing from 45 to 50 tons of ore a day.

CALIFORNIA.

Mr. J. B. Randol has furnished us with the following statement giving the production of quicksilver during October:

| Mines. | 1884. Flasks. | 1885. Flasks. |
|------------------------|------------------|------------------|
| Etna..... | 153 | 52 |
| Napa Consolidated..... | 90 | 185 |
| Great Western..... | 328 | 236 |
| Guadalupe..... | 160 | 85 |
| New Idria..... | 115 | 123 |
| Sulphur Bank..... | 25 | 123 |
| Redington..... | 68 | 42 |
| Great Eastern..... | 104 | 65 |
| Various..... | | 82 |
| New Almaden..... | 1,625 | 1,598 |
| | 2,668 | 2,468 |

Decrease, 200 flasks.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED.—Official reports state that the year has been an unusually dry one. The rainfall of last winter and spring was extremely light, and the season began with but little snow in the mountains. A summer of excessive heat followed, causing large loss of water by evaporation. The supply of water for power has thus been curtailed, and this has made it necessary, for several weeks past, to run one of the mills on short time. On this account, the product in August and September was less than the average, and the same cause will reduce the output for October. Such a contingency may not occur again for many years. By November, the fall rains will have begun. For the same reason, all prospect-work in the tunnel on No. 2 level and on the Woodford ground has been temporarily suspended.

BUTTE COUNTY.

BIG BEND.—This tunnel is in 10,197 feet, and will be 12,000 feet long when completed, and cost about \$600,000. It is intended that the river shall be turned through the tunnel when completed, so that about fourteen miles of the river-bed in the Big Bend may be worked.

MONO COUNTY—BODIE DISTRICT.

Reports for the week ended November 9th:

BULWER.—The west cross-cut to the Stonewall ledge has been completed, and a drift started south on the vein, which is about 20 inches in width and of fair milling quality. This drift south will be pushed as

rapidly as possible, and if the ledge continues as at present, there is a prospect of starting the mill for a good run. The ore south on Ralston No. 2 is showing up well.

MONO.—The south drift from the No. 1 winze, 550 (Lent shaft) level, which is in 97 feet, is in good ore. The average assays for the week are \$315 a ton. They have begun to repair the Bodie mill for the purpose of working Mono ore.

NOONDAY.—William H. Virden, an attorney for the lien-holders on this company, states that Jim Showers, who was sheriff at the time the property of the company was attached, and was by him released, has agreed to give up all of his property for the benefit of the lien-holders, and will confess judgment in the suit brought by the lien-holders against the sheriff.

STANDARD.—Fifty men are employed. The ore-bodies continue strong. There were shipped to mill 363 tons of ore.

SYNDICATE.—During the past week, there were extracted and milled 115 tons of ore and 30 tons of cleanings. The ore is growing better in the stopes and pillars on and above the 200 level. On the 2d instant, bullion was shipped valued at \$4987.28.

PLUMAS COUNTY—GREENVILLE DISTRICT.

FOREST KING.—Work in the mine has been progressing steadily. The lower tunnel is now at a point where the backs are 200 feet. A four-foot ledge of good ore is reported. The company has leased the Kettle mill, which is situated about one-half-mile distant from the mine, whereas the Arcadian mill, formerly used, is about a mile distant. A considerable expense in the matter of hauling ore will be thus avoided. Crushing will begin as soon as the repairs to the mill are completed.

SIERRA COUNTY.

YOUNG AMERICA.—The third clean-up of this mine has been made. The result of the run of twenty-nine days is three large bars, valued at \$23,525. Ten additional stamps are nearly ready to start up, and hereafter the monthly clean-up will be about double that of the past month.

COLORADO.

CLEAR CREEK COUNTY.

Messrs. G. D. Blackford and Robert Massey have arranged to operate the Farwell mill, while the Stanton Engineering Company is getting its 100-ton plant in place. The Golden Gate concentrator will be used. All concentrating ore sent for treatment will be handled.

PAY ROCK.—The mill has been shut down for the winter.

CUSTER COUNTY.

BULL-DOMINGO.—The explosion of a box of giant powder in the boiler-room of this mine at seven o'clock on the evening of the 13th inst. set fire to the building, and in a few moments the entire shaft, house, and hoisting-works were burned to the ground. Ten men working in the lower levels were killed.

DOLORES COUNTY.

PASADENA.—The company's coke-ovens are shut down and the coal-banks will follow about December 1st. The smelter will clean up the ore on hand and then cease operations for the winter.

GUNNISON COUNTY.

The Jumbo smelter has started up again, and will run steadily all winter.

TOMICHI VALLEY SMELTING COMPANY.—Parties interested in various mining properties in this county have incorporated this company for the purpose of erecting a smelting plant at Gunnison. The plant is to have a capacity of 100 tons a day, and will probably be ready for operations in the spring.

LAKE COUNTY.

The Leadville *Herald* reports the following:

BREECE.—The resumption of work is expected. It is the intention of those interested in the Breece mines to carry exploration-work to greater depth. The deposit of iron, on which the property has so far been worked, is generally supposed to be located between two different kinds of porphyry, and the ore-body consequently does not conform to any of the bonanza deposits of this district. A shaft was sunk some years ago, on the Breece mine, to a depth of 380 feet. This shaft passed through the iron body and then into porphyry. Below this intermediate mass of porphyry, a second ore zone is expected to correspond with the ore now opened in the Park lode. The Galesburg lode, just north of the Breece mine, also shows lead ore, at a depth equal to about 400 feet in the Breece.

EVENING STAR.—During October, there were produced 545 tons of shipping ore, about half of which was silver and lead ore, and the remainder argentiferous iron ore. A day shift only is employed in the mine.

IRON SILVER.—The McKeon workings of this company look better than they have for some time past. A great deal of high-grade ore is extracted from this portion of the company's property.

LA PLATA MINING AND SMELTING COMPANY.—The returns for October show ore received from company's mine, 500 tons; total ore received, 3400 tons; ore smelted, 4800 tons; bullion produced, 375 tons; silver produced, 75,000 ounces.

MORNING STAR.—Work has begun on the McHarg shaft of this mine, preparatory to placing the pumps. During October, the property shipped 2023 tons, of which 381 tons were silver and lead ore, and 1642 tons consisted of argentiferous iron ore, used largely as a fluxing material by the smelters.

ROBERT E. LEE.—At the annual meeting, held at Leadville, the following officers were elected: Homer Pennock, of Chicago, President; C. J. Rowell, of Leadville, Vice-President; J. C. Mitchell, Leadville, Treasurer; and E. A. Guilbault, Secretary.

The suit tried in the district court at Leadville, on the 9th inst., between the Robert E. Lee Mining Company and the Omaha and Grant Smelting and Refining Company affirmed the validity of ore contracts as generally made in Leadville. In this suit, the Lee Company contracted through its agent to deliver the product of the mine for six months to the Grant Smelter, and to pay that establishment \$17.50 a ton for treatment. Ore was delivered under this contract for only a short time, and during its period of force over 3000 tons were sent to other works for reduction. The Grant works were awarded damages to the extent of \$8262. The defense of the mining company was, that the manager, according to the by-laws, could not enter into such a contract without first obtaining the consent of certain members of the board of directors.

PITKIN COUNTY.

It is stated that a gigantic consolidation of mining properties is forming at Aspen. H. B. Gillespie has transferred to Jerome B. Wheeler, of New York City, one half of all his interests on Aspen Mountain, embracing a fourth interest in the Spar, Washington, Enterprise tunnel, and other properties belonging to the Spar Consolidation, together with smaller interests in a number of other properties. The consideration given is \$200,000. This purchase makes Mr. Wheeler the owner of twelve twentieths of all the properties embraced in the Spar Consolidation. This transaction is to be followed by a consolidation of the Spar Consolidated, Emma, Vallejo, Aspen, Mammoth, and other properties, embracing a large tract of valuable territory. The surface ground included in these properties aggregates over 120 acres, covering a portion of the hill that is known to be rich. Messrs. H. B. Gillespie and W. B. Devereux will visit New York in the interest of this consolidation.

CASTLE ROCK.—This company has leased its properties, some seven or eight claims, to a syndicate of capitalists represented by Harvey Young and W. L. Marple.

HESSE.—This group of mines, which includes some thirteen properties, is leased and bonded to Harvey Young and others for one year, and \$15,000 is to be spent in development-work, beginning November 1st.

SUMMIT COUNTY.

ROBINSON CONSOLIDATED.—It is stated that the water is all out of this mine, and the property is not only looking but doing well.

DAKOTA.

LAWRENCE COUNTY.

CALEDONIA.—The bullion production for the first half of October amounts to \$19,210.14.

DESIRE.—This company has been organized at Deadwood with a capital stock of \$600,000, divided into 300,000 shares. The property is located in the Carbonate camp, and consists of the Iron Mountain, Patrick, and Desire lodes. This property was among the first located in the camp, and has been developed more or less each year since. The company proposes to construct hoisting and other works for the extraction of the ore. It is stated that 50,000 shares of the stock will be sold at five cents a share, to create a working capital.

FATHER DE SMET.—For the week ended November

8th, 2000 tons of ore were extracted from the first, second, and third levels. The bullion production for the first half of October amounted to \$20,091.32.

IDAHO.

James D. Wood has sold to A. J. Crook the Excelsior mine, the Beardsley Fraction and Beardsley Extension, situated in the Bay Horse District, and also the Germania and all his surrounding mining interests in the Germania Basin, East Fork District, for \$50,000. This sale includes also his interest in the Kinnickinac smelter and store, as well as stock in trade and all contracts in which Mr. Wood was interested with Mr. Crook.

D. C. Kerlee and James L. Cearley have leased to Watson & Faulkner, with the right of purchase at any time prior to July 1st, 1886, the mine known as the Summit in the Sheep Mountain Mining District.

ILLINOIS.

The lead mine of Messrs. Helm, Martin & Co., near Galena, is yielding 4000 pounds of ore a day. The discovery is said to be the richest ever made in this section. Another lead just struck in the same locality is yielding 3000 pounds daily.

MEXICO.

President Diaz, accompanied by the Ministers of the Treasury, Public Works, and Interior, has made a visit of inspection along the route of the proposed sewer for draining the Valley of Mexico. The plans involve the construction of a canal from Lake Tezcoco to Lake Zumpango, then the water is to pass through a tunnel five and a half miles long. The estimated expense of the work is \$4,000,000. Local sanitary authorities estimate that the drainage of the valley will result in reducing the death-rate one half.

COPPER KING.—Press dispatches state that O. D. Crocker, president of this company, who was arrested at the instance of D. A. Blennett, of Tombstone, Arizona, for securing \$10,000 worth of property under false pretenses, has brought suit against the company for \$100,000 advanced by him to improve and open the mines.

The *Mexican Financier* reports the following:

The mines of Maravillas, Bordo, Dificultad, and San Ignacio maintain their output of ore, and the prospects in the Pachuca District have never been more encouraging.

The Nazas River bridge having been repaired, ore-shipments are again going northward, and the sampling-works of the Mexican Ore Company, at El Paso, are said to have resumed operations.

It is denied by the Mexican consul at El Paso that the government has forbidden, for three months, the location of claims in the Sabinal Mining District of Sonora.

The St. Louis Smelting Company is reported as contemplating building assaying works at this capital.

MICHIGAN.

COPPER MINES.

DETROIT & LAKE SUPERIOR.—The company will start the "lower smelting-works" about the close of navigation, thereby affording employment to several more men. A new furnace has been built since the works closed last spring, making four now ready for use.

IRON MINES.

The following statement, published by the *Marquette Mining Journal*, shows the amount of iron ore and pig-iron shipped from the lake ports of that district for the season, up to and including November 11th:

| | Gross tons. |
|--------------------------|-------------|
| Marquette—Iron ore..... | 736,573 |
| L'Anse—Iron ore..... | 30,027 |
| Pig-iron..... | 8,587 |
| St. Ignace—Iron ore..... | 88,292 |
| Pig-iron..... | 11,415 |
| Escanaba—Iron ore..... | 1,170,386 |
| | 2,035,280 |

This week's work will practically close the shipping season of 1885 for the iron mines of the Lake Superior region. The output for the year will be the lightest since 1882; but the outlook for the ore mining industry is much more encouraging than it was at the close of the season last year or that preceding.

LAKE SUPERIOR.—This iron company proposes to sink a new shaft to tap its hematite mine at a point several hundred feet east of the present shaft, which will bring it between the county road and the Marquette, Houghton & Ontonagon Railroad company's main line. The mine produces ore of a fine quality. Work is principally carried on in the 340 and 400-foot levels, and is conducted somewhat differently from the

system employed in most of the hematite mines. A drift averaging six feet in width is run along the foot; every fifty feet, a cross-cut is put in, leaving a supporting pillar of forty feet, and a back of fifty feet. By this method, the ground is left perfectly secure, as the work done is really only of an exploring kind. When the bottom of the mine is reached, steps will be taken to take out all the ore, running rock into the mine through numerous winzes and uprisers that have already been put in connecting the different levels. So that with its many years of working, the mine is now getting in shape to do active mining. The underground workings to the west are within about a hundred feet of Lake Angelina. Some changes are making at "A" shaft in the hard ore-deposit, the ore about the collar of the shaft being taken away so that the skip-road may be continued to the surface. At this place, a shaft has been put down 300 feet, dipping to the north at an angle of some 30 degrees, to strike a body of ore found some years ago with the diamond drill. From the shaft, a drift has been run that struck ore the present week. It is not the intention to prosecute mining work vigorously at this point, the object being to merely reach the deposit and open it up sufficiently to determine something of its value.

MINNESOTA.

For the week ended the 11th inst., the Minnesota Iron Company's shipments of iron ore from the port of Two Harbors amounted to but 8307 gross tons, making the company's shipments for the season, up to and including that date, 217,021 tons.

MONTANA.

LEWIS & CLARKE COUNTY.

Fifty tickets, entitling the holders to seats in the Helena Mining and Stock Exchange, have been sold at \$20 each. This is the limit of tickets to be sold at that price. It is stated that every stock company in that section has contributed \$100 toward the enterprise, in order to have its stock listed and regular quotations given.

There is quite a boom in the Red Mountain mining properties, and new companies are constantly organizing. Thirteen new tunnel sites are reported to have been located on Red Mountain within the week ended the 12th inst. The mountain is about nine miles in circumference, and there is room enough for all, says the *Helena Independent*. There is also room for some sound judgment, and if this is not practiced, many will find themselves empty in pocket, but wiser in experience.

ASSINIBOINE.—This company has been organized with a capital stock of \$500,000—100,000 shares, to work the Wickiup and Assiniboine mines.

MONTANA COMPANY, LIMITED.—During October, the large mill worked fifty stamps for thirty days, crushing 3073 tons of ore, yielding \$71,200. Total working expenses for the month, \$27,316.

SILVER BOW COUNTY.

ALICE.—The vein has been cut in the south drift on the 500-foot level of the Rising Star, owned by this company. The drift in question has been run in 200 feet from the shaft, and tapped the vein, which has been cut into five feet, with no indication of striking the opposite wall.

MOULTON.—Some difficulty is met in the main shaft, which has now a depth of about 620 feet, in handling the water, which is increasing in volume as depth is attained; but as yet the tanks have been found sufficient to handle it. A No. 3 Knowles steam-pump will hereafter be used in sinking, which will raise the water to the tanks on the 500 level, where the Cornish pump will force it up to the surface.

NEVADA.

EUREKA COUNTY.

EUREKA TUNNEL CONSOLIDATED.—The report presented at the annual meeting shows the expenditures of the company during the past year to have been \$11,200.41. The receipts were as follows: Cash from ore smelted, \$8314.88; cash received from trustees, \$2885.53, making the amount balance with that of the expenditures. The following gentlemen were elected as trustees for the ensuing year: R. Sadler, William Pardy, H. T. Hoadley, W. O. Mills, and John S. Capron.

HUMBOLDT COUNTY.

GOLDEN JACKET.—This mine, in the Humboldt range, is yielding rich ore. It was one of the first mines discovered in the county, though it was never worked to any great extent. The ore carries consid-

erable gold, as well as horn-silver, and a lot of it recently shipped to San Francisco yielded \$389 a ton. The owners are making arrangements to build reduction-works on the mine.

STOREY COUNTY—COMSTOCK LODE.

According to the abstract statement taken from the assessor's roll, the total product of ore from the mines in Storey County during the quarter ended September 30th, 1885, was 42,634 tons. The gross bullion product resulting from the crushing of that amount of ore is given at \$555,219.16. The total cost, including extraction, transportation, and milling, is placed at \$587,629.11. There were milled during the same quarter 2800 tons of tailings, the stated gross bullion product from which was \$8556.65. The total cost of transforming them into bullion is given at \$8836.10.

CONSOLIDATED CALIFORNIA & VIRGINIA.—During the week ended November 7th, 812 tons of ore were stoped out from above the 1750 level. During the same period, 835 tons were shipped to the Morgan mill, which gave an average value of \$17.70 a ton, according to assays made from battery samples, which shows an increase in value of 26 cents a ton over that shipped the week previous. Bullion valued at \$19,821.25 was shipped to the San Francisco office during the week. Under the Jones contract, there has been a constant increase during the past two weeks in the amount of ore extracted. Almost daily shipments are now made to the Eureka mill. The shipments for the week aggregate 479 tons, the value of which is given at \$13.88 a ton.

HALE & NORCROSS.—No important developments have been made in advancing the drifts and cross-cuts on the 3000 and 3100 levels. The question of sinking the Combination shaft down to the 3200 level is under consideration.

JUSTICE.—The extraction of ore has been suspended and the force reduced to only one shift, which is engaged in prospecting the south end of the mine on the 350 level through the Woodville shaft.

NEW MEXICO.

SIERRA COUNTY.

Official advices state that the Sierra Grande, Sierra Bella, and Sierra Apache mines are shut down. An extensive addition to the mill is making, and a chloridizing and lixiviating plant is going in, calculated to treat from 80 to 100 tons of ore a day. It is built by the Colorado Iron-Works at Denver, and advices state that four cars were loading with the first installment of it on the 3d inst. It is built in the most substantial manner, and it is confidently expected to solve the vexed question how to treat the low-grade ores profitably. It is expected to have the whole completed by January 1st ready to start up.

NORTH CAROLINA.

RANDOLPH COUNTY.

NEW HOOVER HILL.—The result of milling for October shows 792 tons of ore crushed, producing 200 ounces of gold, of the approximate value of \$3250. It is stated that the directors will recommend at the annual meeting a dividend for the half-year ended September 30th, 1885, at the rate of 15 per cent a year free of income tax, or 9d. a share, making, with the interim dividend paid in May, a dividend of 10 per cent for the year.

PENNSYLVANIA.

NORTHAMPTON COUNTY.

INTERNATIONAL SLATE MINING COMPANY.—This company has been organized to operate extensive slate property at Bangor. The company has a full-paid capital stock of \$250,000. It is proposed to make the output 4000 squares a month. The International was adopted with the view of an interchanging of trade and foreign shipments directly with Europe and Australia.

SOUTH AMERICA.

BOLIVIA.

POTOSI.—The mines have passed into the hands of an English syndicate. The Royal tunnel, begun a hundred years ago, and which is about 1½ miles long, has been driven, and cuts the old veins at a depth of about 1600 feet from the outcrop; and about 300 feet below the old workings, it has found in bonanza one of the principal veins that formerly made Potosi famous.

UTAH.

SALT LAKE COUNTY.

The case of W. H. H. Bowers vs. the London Bank of Utah (Limited), the most important civil case of the

present term of the Third District Court, came up for trial before a jury at Salt Lake City on the 13th inst. The whole amount sued for is over \$60,000.

TOOELE COUNTY.

Messrs. F. G. & C. F. Niedringhaus, of St. Louis, have purchased, it is reported, the Calumet & Hecla group of mines in Stockton. They are said to have also bought the Ophir claims, and to have paid for both \$140,000. Some of the mines are already producing well. Work will be prosecuted on the claims during the winter, and arrangements have been made for the purchase of a large quantity of necessary machinery for the development of these mines. Regular shipments of ore will be made during the winter, if the roads are passable to Stockton. Mr. Karrick is to be the superintendent, and he has already contracted for the erection of commodious quarters for fifty miners.

BULLION PRODUCTION FOR 1885—SPECIAL OFFICIAL REPORTS.

| MINES. | States. | Month of October. | Year from Jan. 1st, 1885. |
|---------------------------------|---------|-------------------|---------------------------|
| Adams, s. L. | Colo. | | 241,103 |
| Alice, g. s. | Mont. | | 856,278 |
| Belmont. | Nev. | | 10,063 |
| Bodie, g. | Cal. | | **17,967 |
| Boston & Montana, g. | Mont. | 55,112 | 462,722 |
| Caledonia, g. | Dak. | 37,000 | 37,000 |
| Christy, s. | Utah. | | 198,507 |
| Chrysolite, s. | Colo. | | 54,727 |
| Colorado Central, s. | Colo. | 26,751 | 210,871 |
| Consolidated Bobtail, g. | Colo. | | 41,228 |
| Deadwood-Terra, g. | Dak. | | 328,783 |
| Derbec Blue Gravel, g. s. | Cal. | | 108,699 |
| Essex, g. s. | N. S. | | 6,474 |
| Eureka Consolidated, s. L. | Nev. | | 180,619 |
| Father de Smet, g. | Dak. | 35,263 | 312,671 |
| Freeland, g. s. c. | Colo. | 26,141 | 287,751 |
| Grand Prize, s. g. | Nev. | | 223,873 |
| Granite Mountain, s. | Mont. | 91,842 | 879,860 |
| Hall-Anderson, g. | N. S. | | 7,741 |
| Head Center & Tranquility. | Ariz. | | 85,396 |
| Hecla Consolidated, g. s. L. C. | Mont. | *69,453 | 732,308 |
| Helena, g. s. L. C. | Mont. | 100,000 | 846,584 |
| Homestake, g. | Dak. | | 954,042 |
| Hope, s. | Mont. | | 107,446 |
| Iron Silver, s. L. | Colo. | | 465,335 |
| Kentuck, s. | Nev. | | 3,562 |
| Lexington, g. s. | Mont. | 74,182 | 724,386 |
| Montana, Limited, s. g. | Mont. | 71,200 | 722,248 |
| Moulton, s. g. | Mont. | | 310,792 |
| Mount Diablo, s. | Nev. | | 325,251 |
| Navajo, s. | Nev. | | 82,894 |
| New Hoover Hill, g. s. | N. C. | 3,250 | 61,009 |
| New Pittsburg, s. | Colo. | | 14,594 |
| North Belle Isle, s. | Nev. | | 2,118 |
| Ontario, s. | Utah. | | 1,516,727 |
| Oxford, g. | N. S. | | 14,697 |
| Plymouth Consolidated, g. | Cal. | | 724,651 |
| Rooks, g. | Vt. | | 28,383 |
| South Yuba, g. | Cal. | | 3,085 |
| Standard Consolidated, g. | Cal. | | 136,918 |
| Stormont, s. | Utah. | 19,472 | 147,040 |
| Syndicate, g. | Cal. | | **62,327 |
| Tombstone, g. s. L. | Ariz. | | 403,875 |
| Total | | | 12,882,924 |

G., gold; S., silver; L., lead; C., copper. Silver valued by the different companies from \$1@\$.129 per ounce to \$1.05; gold, \$20.67. *Not including value of lead and copper. †Royalty. ‡Net. No shipments during month mentioned. ** Not official.

MARKETS.

NEW YORK, Friday Evening, Nov. 20.

| Silver. | | | | | |
|---------|---------|---------|---------|---------|---------|
| DATE. | London. | N. Y. | DATE. | London. | N. Y. |
| | Pence. | Cents. | | Pence. | Cents. |
| Nov. 14 | 47 7-16 | 102 3/4 | Nov. 18 | 47 5-16 | 102 1/4 |
| 16 | 47 3/4 | 102 3/4 | 19 | 47 5-16 | 102 1/4 |
| 17 | 47 3/4 | 102 3/4 | 20 | 47 5-16 | 102 3/4 |

Silver has fallen slightly, as shown in this table, owing to the condition of Indian exchange.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 3 per cent. During the week, the bank gained £215,744 bullion; and the proportion of its reserve to its liabilities was raised from 41% to 41%, against 38 1/8 per cent at this date last year. The weekly statement of the Bank of France shows gains of 6,921,000 francs gold and 2,107,000 francs silver.

Copper.—There has been quite a jump in the copper market in London, and prices of Chili Bars, which on the 10th inst. had reached the lowest point on record, £38 15s., went up as soon as the Anaconda sale was made; £39 17s. 6d. on the 13th; £40 2s. 6d. on the 14th; £40 15s. on the 16th; £41 on the 17th; £42 on the 18th; £43 15s. yesterday; and to-day, £43

10s.@£44. Figures were wildly varied from each day, and generally the market was excited and strong, nor is it thought that the price has yet reached its maximum. Best Selected has gone up 10s. to £45, but will, no doubt, advance still further. Thus, in one week, Chili recovered £5 a ton, which it had taken four months to lose. Our home market is much stronger, and the price has advanced somewhat, though not as far or as fast as the prices in London. We quote Lake 11@11 1/4c., and Orford and Baltimore 10@10 1/4c., though no large amount could be purchased at these figures, and yet Baltimore B. C. W. was offered yesterday at 9'90c.

The explanation of the foreign advance is variously made, but it is supposed to be partly speculation and partly due to the asserted fact that the furnaces, having purchased the Anaconda matte at a fixed price, are now interested in forcing the price up.

The supply of furnace material for our home works will now be very light; for the European price will allow the whole of Montana's production to be shipped abroad.

The Copper Prince (Arizona) works are to stop producing, as stated on another page, unless this recent advance in the English market causes a change of programme.

The capacity of the Calumet & Hecla new stamps, as stated in this report last week, was the maximum capacity per day of a Leavitt stamp; but it is not, of course, to be expected that this maximum will represent the average. The probable output of Calumet & Hecla next year is not expected to very greatly exceed 50,000,000 pounds. This year, as has frequently been stated in this journal, it will probably not exceed 48,000,000 pounds.

We are informed that the Osceola will begin running one head of Ball stamps (150 tons a day) on Tamarack ore about December 15th, and a second head of stamps before January 1st, so that we may expect this mine to add about half a million pounds of copper a month to the lake supply from the beginning of the year, and until the company gets its new mill running. Two stamps will be run on Osceola ore.

The recent re-import of some of our pig copper and ingots has no doubt helped to strengthen the foreign market.

We understand it has been decided to call Chili bar certificates on the New York Metal Exchange, and this will also have a tendency to strengthen the English market. Considerable purchases of Chili Bars were recently made on American account.

During the week, 801,625 pounds of copper and 1,704,686 pounds of copper matte were exported from this port.

Henry Merton & Co., of London, report the copper statistics as follows:

| | 1885. | Oct. 31, 1884. | 1883. |
|---|----------|----------------|---------|
| Stocks in England and France, and afloat thereto: | | | |
| Stock in Liverpool and Swansea, Tons. | 31,253 | 22,592 | 24,574 |
| Chili Bars | | | |
| Stock in Liverpool and Swansea, Chili ingots. | 195 | nil | 611 |
| Stock in Liverpool and Swansea, Chili ores and Regulus (fine) | 1,555 | 396 | 1,865 |
| Stock in Liverpool and Swansea, other stuff (fine) | 5,804 | 4,604 | 2,443 |
| Stock in London, foreign copper (chiefly Australian), and landing | 5,379 | 2,494 | 3,639 |
| Stock in Havre and Bordeaux, Chilean and other bars | 680 | 970 | 2,429 |
| Stock in Havre and Bordeaux, other copper | 1,080 | 785 | 345 |
| | 45,946 | 31,841 | 35,906 |
| Advised from Chili by mail and cable, ores and Regulus (fine) | 295 | 2,622 | 2,277 |
| Advised from Chili by mail and cable, bars and ingots | 8,650 | 5,572 | 8,218 |
| Advised from Australia, by mail and cable, fine copper | 1,656 | 1,725 | 432 |
| | 56,547 | 41,760 | 46,833 |
| Price of Chili Bars, per ton | £39 10s. | £52 12s. 6d. | £61 5s. |

Messrs. C. Levin & Co.'s monthly metal Circular, dated London, November 4th, says:

| DURING TWELVE MONTHS ENDED. | | | |
|--------------------------------------|------------------|------------------|-------|
| | Oct. 31st, 1885. | Oct. 31st, 1884. | 1884. |
| Supplies— | | | |
| Shipments from Straits to London | 14,485 | 13,430 | |
| Australia to London | 7,545 | 8,895 | |
| Straits to America | 1,865 | 4,140 | |
| Australia to America | 650 | 750 | |
| Consumption— | | | |
| Deliveries of tin in London | 15,800 | 17,745 | |
| London and Holland | 22,945 | 24,700 | |
| London and Holland and United States | 33,015 | 36,000 | |

Tin.—The London market has advanced rapidly during the week from £91 5s., at which it stood when we last went to press, It advanced on the 18th from

£91 15s. to £92 5s., and yesterday to £94, while to-day cables to the Metal Exchange quote £94 5s., and for three months £95.

The market here has followed this advance, and we now quote 21@21 1/4c. for spot straits, and 20 3/4c. for December.

Lead.—This market is quiet but firm at 4@4 1/4c. for round lots Common, and 4 1/4c. Refined, and 4'20@4'25c. for spot Common, small lots. About 1500 tons have been sold, mostly at 4@4 1/4c., and the market is quite strong, there being no stocks. Spot lead is very scarce, and the consumption fully up to production. It is said the Richmond Company has withdrawn the 500 tons mentioned in our last week's report. Soft Spanish, in London, is quoted to-day £11 10s., an advance of 5s. during the week.

Messrs. Everett & Post, of Chicago, telegraph to us as follows to-day:

There has been considerable more inquiry for both hard and soft lead, in consequence of which sellers have been asking a little more; but only a moderate amount of business has been transacted. Sales for the past week will probably foot up 250 tons Corroding and 100 tons Common. Some brands are offered at 4c., while others are held at 4'05c. Manufacturers report slight improvement. The stocks in hands of holders are limited.

Spelter and Zinc.—Spelter is quiet and unchanged at 4'40@4'65c. for Domestic, according to Brand, and 4'75@4'90c. for Foreign. London cables Silesian £14 5s., a recovery of 2s. 6d. during the week.

Sheet-Zinc.—Unchanged at 4'70@4'80c.

Antimony.—There is no feature worth recording. This market is dull and quotations continue at 8 3/4 @9c. for Hallett's. The London market is unchanged at £35.

IRON MARKET REVIEW.

New York, Friday Evening, Nov. 20.

George Wise, Secretary of the Western Nail Association, Pittsburg, reports, November 18th, to the New York Metal Exchange the following machines as running on the manufacturers' scale:

Behrnt Nail Company, 95; Belfont Iron-Works, 80; Kelly Nail and Iron Company, 70; Wheeling Iron Company, 50; La Belle Iron-Works, 26; Jefferson Iron-Works, 7; Laughlin Nail Company, 90; Norton Iron-Works, 90; Riverside Iron-Works, 55; Western Nail Company, 40; Terre Haute I. & N. Company, 15. Total machines, 608, showing a further increase of 50 machines over last week's report. The manufacturers have no stocks on hand, but still keep up their nominal quotations of \$2.10@2.15; while the actual business doing from store in rails received from other points is at prices ranging from \$2.75@3.25. Old material has had a sharp advance of \$1 a ton, but the general market is only steady with a moderate activity. The boom reported in the papers is simply nonsense.

The Board of Managers of the Metal Exchange held a meeting this afternoon, at which it granted a license to the National Storage Company to store pig-iron in its yards at Communipaw, which are connected with the tracks of the New Jersey Central Railroad. Both storage companies at Communipaw and Perth Amboy charge only 2 cents per ton a month, which makes the cost for carrying, outside of the interest on the investment, only about 1 1/2 per cent of the value per annum, as there is no insurance. At the same meeting, a new code of rules on spelter was adopted. The rules for lead and spelter are much the same for both metals, the minimum quantity for each being fixed at 32,500 pounds of domestic and 56,000 pounds of foreign; the margins at \$75 per contract, and commissions at \$10 per contract to non-members, or \$5 to members.

Iron Ore.—The Bessemer ore market here is very active in both foreign and domestic, and large sales have been made at advancing figures. There are inquiries in the market for fully 100,000 tons of foreign ore, and prices that a month ago would have been deemed satisfactory are now refused. Freight are unsettled, and there is a disinclination to quote prices for ore. The great activity in the steel rail trade is greatly stimulating the ore market. The Chattanooga Company is said to have placed nearly 200,000 tons.

Pig-Iron.—The pig-iron market is very active, and large sales have been and are being made. The Thomas Iron Company has now eight and will soon

have nine furnaces in blast, and is preparing its two remaining stacks with all possible speed. This company is said to have orders ahead for fully 40,000 tons, and is pressed in making deliveries fast enough.

Other makers also report a very active business, and a very strong feeling exists among the makers of the best brands. No figure has yet been made for next year's delivery; but when nominally made, it means but little; for manufacturers have no hesitation in contracting with any of the strong producers at any desired figure, say \$20 for No. 1 X, being satisfied from long experience that, should iron go below that price, they will be "taken care of," and get their iron at the ruling price. There is a pretty general desire to see pig go up \$2 a ton next year, and there is a possibility that some advance may take place here before the end of the year. We continue to quote standard brands of Lehigh iron at No. 1 X, \$18@18.50; No. 2 X, \$16@16.50; and Forge, \$15@15.50; but a fair quality of iron can be obtained at fully 50 cents below these figures. We hear of No. 2 Southern iron having been delivered up the Hudson River at \$16.

These low prices are, however, becoming more rare, and there is a decidedly stronger tone to this market, stronger apparently than exists in our other markets, as reported by correspondents from the chief iron districts.

Scotch Pig.—A sudden advance of 2s. a ton in Glasgow quotations, and an advance from 1s. to 5s. in freights, have completely closed the business in this market; for there has been no advance in prices of American irons, and at our late quotations of Scotch it was difficult to place it. Now, with an advance of fully \$2 a ton, no business whatever can be done.

Cables to the Metal Exchange to-day quote Coltness, 50s.; Langloan, 46s. 6d.; Summerlee, 48s.; Gartsherrie, 45s. 9d.; Glengarnock, 45s. 6d.; Eglinton, 42s. 6d., which is an advance of from 9d. to 2s. 3d. a ton.

Bessemer Pig.—We hear of sales of fully 10,000 tons of foreign Bessemer iron at \$19.75, and \$20 is now asked. This advance is due to the great activity in the steel rail business, and we also hear of Western open-hearth steel-works having contracted for some 12,000 tons of English hematite iron at \$19.50@19.75. Spiegeleisen is very active, and the price has advanced fully \$1 a ton, to \$17@17.50 for 20 per cent manganese.

Structural Iron.—The demand is falling off, and the market is dull. Angles, 1'90@2c.; Tees, 2 1/4c.; Beams and Channels, 3c.

Plate Iron.—Quoted 2@2 1/2c., according to quality; Common Tank, 2c.; Refined, 2 1/4c. Flange iron, 3 1/4@3 1/2c.

Bar Iron.—We quote still at 1'40@1'50c. for Common; 1'75@1'85c. Refined.

Steel Plates.—Quoted 3@3 1/4c. for Boiler and Ship Plates; 3 1/2@4c. for Flanges.

Steel Rails.—The rail market is steadily advancing, and the price here now may be quoted \$34@35, the latter figure being asked for small lots by mills that have their quota nearly all taken up. Western mills are quoting \$36@37.50, equal to Chicago delivery, and makers are now talking of \$40 at Eastern mills. The rapidity of the advance, and the magnitude of the orders that have been taken during the past two months, have greatly surprised even the most sanguine of the steel makers, and some predictions as to the amount of rails that will be required in 1886, and the prices they will reach, are indulged in that seem to us extremely wild. At the same time, there will probably be a very large demand both from new roads and for repairs of old. That it will exceed the capacity of our mills to produce is not probable, though there are those who say we shall have to import blooms and rails before the close of 1886. If we must, then, indeed, our prices here will advance enormously. Two of the steel mills have booked orders to their full quota, and a third has almost done so, while several other mills have orders so far ahead that they are very independent, and ask prices not intended to bring business.

Merchant Steel.—We continue to quote American Tool Steel, 8@10c.; special qualities, 12@15c.; Crucible Machinery, 4 1/2@5 1/2c.; Bessemer Machinery, 2@2 1/2c.

Old Rails.—Are scarce, and we quote nominally

\$18.50@19. We hear of sales at equal to \$18.25, Jersey City.

Scrap.—Wrought, \$18@18.50. Car-Wheels, \$15@16.

Philadelphia, Nov. 20.

[From our Special Correspondent.]

The Pennsylvania iron market has not lost any of the strong points that have been noted for several weeks past. The blowing in of furnaces is still talked of, and active preparations are making on four stacks that will soon be heard from. The other companies are talking over the question of blowing in this winter, but are wisely waiting to see how the fall demand will hold out. The market is pretty well canvassed for business, and the returns that brokers have made do not seem to warrant any particular increase in production just at this time. While prices are no weaker than they were ten days or two weeks ago, there seems to be a little flagging in the market. There are not quite as many buyers. Some falling off in inquiry is observable, and the top prices for small lots are not quite so readily paid. This is the natural result, the leading brokers say, of selling so much iron during the past sixty days. While consumers are willing to pay fair prices at any time, they will not pay the outside prices on account of being pretty well supplied for two or three months. The furnaces that have blown in and are well sold up are tempting other companies to follow suit, but it is likely that some of the projected blowing in will be indefinitely postponed. The standard makes of iron are not allowed to go begging for buyers. No. 1 Foundry is selling at from \$18 @ \$19 for special brands. More iron is offered and selling at and under \$18 than last week. No. 2 is attracting a little more attention, and several good orders are in hand, although that grade of iron is still a little heavy. The forge iron-makers have put themselves in pretty good shape, and are not now in a humor to shade down prices, although in the inferior makes of forge there is still more or less business done at low prices—that is, under \$15. A right good iron sells at \$15.50, and \$16 is held on to by two or three makers.

Foreign Iron.—Nothing outside of some very small lots of foreign irons have been sold this week. One or two brokers have inquiries for small lots, but the prospects for business do not seem to be very bright. There is also some very good inquiry for spiegeleisen, but nothing of an urgent nature.

Muck Bars.—Six or eight hundred tons of muck-bars were ordered this week at \$27.50@28 delivered.

Blooms.—A few sales of charcoal blooms were made at bottom figures.

Merchant Iron.—Common iron is selling at \$1.40@1.50, with a fair demand for car and like purposes. The car-makers have a good many orders in hand; but for all that, they are not buying ahead, as they feel the chances are for even cheaper irons. They will probably be mistaken in this. There is no room for any decline below \$1.40 for common iron worth using, or \$1.60 for a good medium iron, or \$1.70@1.80 for refined iron. The mills here and throughout the State are still running along, and could do so for three or four weeks to come without getting much business.

Nails.—Quotations for nails are \$2.40@2.50, with orders far ahead. The consumption seems to be slightly falling off, but the demand shows no signs of it. Orders must take their turn, and there is a great deal more business in hand than will be accommodated this year.

Plate Iron.—The business in plate iron has been made up altogether of retail lots and rather weaker prices. The capacity on plate is very large, and an enormous business must be done to keep them any thing like crowded. The quotations are 1'90@2c. for ordinary plate; Tank is 2'10@2'15c.

Bridge Iron.—The bridge-works of the State have been cleaning out some summer and fall business, and have now less business in hand than since midsummer. They will be kept running, however, though they are not quite so busy as they have been. A portion of the labor force will be laid off for a few weeks. Angles are 2c. in small lots; Beams and Channels, 3c.

Skelp Iron.—Skelp iron is extremely scarce, and pipe-makers are calling for it faster than it can be supplied.

Wrought Pipe.—The position of the wrought-iron pipe-makers is simply to wait and take advantage of every turn in affairs, which they are quietly doing. All makers here report abundant inquiry, with excellent prospects, and discounts held without trouble.

Sheet-Iron.—The sheet-iron mills are busy, and card rates are enforced for small lots.

Steel Rails.—The demand for rails shows no signs of abating, and quotations are firm at \$33@34, according to size of order. There are some inquiries in hand this week for April and May delivery.

Old Rails.—Old steel rails are offered at \$15, without any particular demand. Old iron rails are \$18.50. There is not much business to be heard of in this market, as such transactions as are taking place are, in many cases, conducted directly between owners and buyers, without the intervention of a broker.

Scrap.—Only selected scrap is in active demand; all other kinds are dull. The best figure paid this week was \$18 for Selected.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 20.

Statistics.

Production Anthracite Coal for week ended November 14th, and year from January 1st:

| Tons of 2240 lbs. | 1885. | | 1884. | |
|--------------------------|----------------|-------------------|----------------|-------------------|
| | Week. | Year. | Week. | Year. |
| P. & Pead. RR. Co. | 285,203 | 9,933,604 | 340,951 | 9,695,126 |
| L. V. R.R. Co. | 178,360 | 5,254,653 | 172,082 | 5,189,158 |
| L. & W. RR. Co. | 134,492 | 4,317,507 | 157,744 | 4,440,280 |
| O. & H. Canal Co. | 110,122 | 3,360,178 | 113,516 | 3,364,150 |
| Penna. RR.: | | | | |
| N. & West Br. RR. | 17,388 | 1,066,154 | 17,669 | 716,792 |
| S. H. & W. B. RR. | 2,408 | 186,127 | 1,883 | 139,184 |
| P. & N. Y. RR. | 10,917 | 877,155 | 17,033 | 467,846 |
| Penna. Coal Co. | 46,391 | 1,243,692 | 38,569 | 1,136,548 |
| Penna. Canal Co. | 15,124 | 398,452 | 12,897 | 403,961 |
| Shamokin Div., N. C. RR. | 25,898 | 885,884 | 23,296 | 923,178 |
| Lykens Valley. | *10,500 | 441,351 | 10,309 | 439,713 |
| Total | 836,803 | 28,005,057 | 910,789 | 26,914,936 |
| Increase | | 1,090,121 | | |
| Decrease | 73,986 | | | |

* Estimated.

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

Production for corresponding period:

1880.....20,847,775 1882.....25,770,651

1881.....24,827,454 1883.....28,060,808

Production Bituminous Coal for week ended November 14th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

| | 1885. | | 1884. | |
|----------------------------|----------------|------------------|----------|------------------|
| | Week. | Year. | Week. | Year. |
| Philadelphia & Erie RR. | 53 | 26,128 | + | |
| *Cumberland Region, Md. | 56,468 | 2,422,223 | + | 2,474,234 |
| *Barclay Region, Pa. | 4,573 | 204,639 | + | 254,467 |
| *Broad Top Region, Pa. | | | | |
| Huntington & Broad Top RR. | 5,388 | 143,741 | + | 169,500 |
| East Broad Top. | | | | |
| Clearfield Region, Pa. | | | | |
| Snow Shoe. | 2,288 | 127,111 | + | 155,203 |
| Karthus (Keating) | 4,035 | 114,273 | + | 46,600 |
| Tyrone & Clearfield | 59,351 | 2,508,518 | + | 2,686,920 |
| Alleghany Region, Pa. | | | | |
| Gallitzin & Mountain. | 14,155 | 465,029 | + | 349,026 |
| Total | 146,311 | 6,011,662 | + | 6,135,953 |

* Tons of 2240 lbs.

WESTERN SHIPMENTS.

| Pittsburg Region, Pa. | 1885. | | 1884. | |
|--------------------------|---------------|------------------|----------|------------------|
| | Week. | Year. | Week. | Year. |
| West Penn RR. | 5,104 | 192,781 | + | 243,574 |
| Southwest Penn. RR. | 2,624 | 87,569 | + | 108,277 |
| Pennsylvania RR. | 6,776 | 207,062 | + | 239,525 |
| Westmoreland Region, Pa. | | | | |
| Pennsylvania RR. | 42,641 | 1,008,501 | + | 1,123,085 |
| Monongahela Region, Pa. | | | | |
| Pennsylvania RR. | 5,817 | 240,787 | + | 133,117 |
| Total | 62,962 | 1,736,700 | + | 1,847,578 |

Grand total.....209,273 7,748,362 + 7,983,531

† Considerable gas-coal shipped East, of which no division is made in report.

Production of Coke on line of Pennsylvania RR. for week ended November 14th, and year from January 1st:

| | 1885. | | 1884. | |
|---------------------|---------------|------------------|----------|------------------|
| | Week. | Year. | Week. | Year. |
| Alleghany Region. | 4,123 | 160,907 | + | 117,035 |
| West Penn. RR. | 2,104 | 48,657 | + | 24,865 |
| Southwest Penn. RR. | 36,032 | 1,582,813 | + | 1,811,410 |
| Penn. & W. Region. | 5,293 | 206,021 | + | 163,374 |
| Monongahela | 2,019 | 80,966 | + | 62,840 |
| Pittsburg Region. | | | + | 139 |
| Snow Shoe. | 933 | 20,730 | + | 19,941 |
| Total | 50,501 | 2,100,094 | + | 2,204,600 |

+ Reports for week ended November 15th, 1884, were not published.

Chesapeake & Ohio Railroad Company's report of total output and distribution of coal and coke. Received from mines on line of Chesapeake & Ohio Railroad (including mines on Lexington Division) for the week ended November 7th and year from January 1st. Tons of 2000 pounds:

| Kind of coal. | 1885. | | 1884. | |
|------------------|---------------|---------------|------------------|----------------|
| | Week. | Year. | Week. | Year. |
| Cannel | 767 | 458 | 24,545 | 19,348 |
| Gas | 5,803 | 6,262 | 280,282 | 259,833 |
| Splint and block | 4,970 | 7,540 | 156,595 | 101,780 |
| New River, etc. | 10,733 | 5,092 | 496,254 | 329,365 |
| Coke | 2,527 | 1,982 | 103,366 | 63,527 |
| Total | 24,800 | 21,334 | 1,061,072 | 773,653 |
| Increase | 6,495 | | 287,519 | |

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

| NAME AND LOCATION OF COMPANY. | HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. | | | | | | | | | | SALES. | NAME AND LOCATION OF COMPANY. | HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. | | | | | | | | | | SALES. | | | | |
|-------------------------------|---|-------|----------|-------|----------|------|----------|-------|----------|------|--------|-------------------------------|---|------|----------|-----|----------|-----|----------|------|----------|-----|--------|----------|--------|----------|----|
| | Nov. 14. | | Nov. 16. | | Nov. 17. | | Nov. 18. | | Nov. 19. | | | | Nov. 20. | | Nov. 14. | | Nov. 16. | | Nov. 17. | | Nov. 18. | | | Nov. 19. | | Nov. 20. | |
| | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | | | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | | H. | L. | H. | L. |
| Alice, Mon. | | | | | | | | | | | | 4,100 | Allouez | | | | | | | | | | | | | 1,500 | |
| Amie Con., Co. | .05 | | .05 | .04 | | | .04 | | .04 | | | 4,100 | Alta | .04 | .03 | .04 | | | .30 | | | .28 | | | 1,500 | | |
| Argentina | | | | | | | | | | | | | American Flag | | | | | | | | | .04 | | | 8,500 | | |
| Bassick, Co. | | | | | | | | | | | | | Barcelona, G. | | | | | | | | | | | | | | |
| Belle Isle, Ne. | 2.55 | 2.50 | 2.50 | 2.45 | 2.45 | 2.40 | 2.40 | 2.30 | 2.25 | 1.95 | 2.10 | 4,120 | Bechtel Con., G. | | | | | | | | | | | | | | |
| Bodie Cons., Ca. | | | | | | | | | | | | 4,500 | Belvidere | | | | | | | | | | | | | | |
| Breece | .22 | | | | | | | | .21 | | | 4,500 | Belcher | | | | | | | | | | | | 100 | | |
| Bulwer, Ca. | | | .27 | | | | | .30 | .35 | .28 | | 4,500 | Best & Fisher, G. S. | | | | | | | | | | | | | | |
| Cal. & Hecla, Mich. | | | | | | | | | | | | | Big Pittsburg, S. L. | | | | | | | | | | | | | | |
| Castle Creek | | | | | | | | | | | | | Bowman Silver | | | | | | | | | | | | | | |
| Chollar | | | | | | | | | | | | | Bull-Domingo, S. L. | | | | | | | | | | | | | | |
| Chrysolite, Co. | 1.35 | | | | | | 1.25 | | 1.20 | | | 880 | Cal., B. H., G. | 2.75 | | | | | 2.65 | 2.60 | 2.75 | | 2.90 | 1,300 | | | |
| Colorado Central | | | | | 2.80 | | 2.85 | | 2.60 | | | 300 | Central Arizona, S. | .15 | | | | | | | .18 | | | 500 | | | |
| Cons. Cal. & Va., Ne. | 1.65 | 1.55 | 1.60 | 1.55 | 1.50 | | 1.40 | 1.50 | 1.55 | | | 9,482 | Chollar | | | | | | | | | | | | | | |
| Crown Point | | | | | | | | | | | | | Cons. Imperial | | | | | | | | | | | | | | |
| Dunkin, Co. | | | | | | | | | | | | | Con. Pacific | | | | | | | | | | | | | | |
| Eureka Cons., Ne. | 3.00 | | 3.55 | | | | | | | 3.15 | 3.05 | 185 | Cust. | | | | | | | | | | | | | | |
| Father de Smet, DK. | | | | | | | 4.65 | | | | | 100 | Decatur | | | | | | | | | | | | | | |
| Franklin | | | | | | | | | | | | | Durango, G. | | | | | | | | | | | | | | |
| Gold Stripes, Ca. | | | | | | | | | | | | | Eastern Oregon | | | | | | | | | | | | | | |
| Good & Curry, Ne. | | | | | | | | | | | | | Goodshaw, G. | | | | | | | | | | | | | | |
| Grand Prize, Ne. | | | | | | | | | | | | | Harlem M. & M. Co. | | | | | | | | | | | | | | |
| Green Mountain, Ca. | | | | | | | | | | | | | Harshaw | | | | | | | | | | | | | | |
| Hale & Norcross, Ne. | | | 4.00 | | | | 4.00 | | | | 4.00 | 600 | Kossuth | | | | | | | | | | | | | | |
| Hall-Anderson, N. S. | | | | | | | | | | | | | Lacrosse, G. | | | | .10 | | .12 | .11 | .12 | | .10 | 7,400 | | | |
| Homesake, DK. | | | | | | | 22.50 | | 2.00 | | 2.00 | 100 | Mariposa Pref., G. | | | | | | | | | | | | | | |
| Horn-Silver, Ut. | 1.90 | | 1.95 | 1.90 | 1.95 | 1.90 | 2.00 | 1.95 | 2.00 | 1.95 | 2.05 | 6,575 | Com. G. | | | | | | | | | | | | | | |
| Independence, Ne. | | | | | | | | | | | | | Mexican, G. S. | | | | | | | | | | | | | | |
| Iron Silver, Co. | | | | | | | | | | | | | Mono | | | | 7.00 | | | 6.50 | | | | | 500 | | |
| Leadville C. Co. | | | .35 | | | | | | | | | 600 | New Pittsburg | | | | | | | | | | | | | | |
| Little Chief, Co. | | | .28 | | | | | | | | | 100 | Nooday | | | | | | | | | | | | | | |
| Little Pittsburg, Co. | | | | | | | | | | | | | North Standard, G. | | | | | | | | | | | | | | |
| Martin White, Ne. | | | | | | | | | | | | | N. Horn-Silver, S. L. | | | | | | | | | | | | | | |
| Moulton | | | | | .90 | | | | .30 | | | 600 | O'Brien & Miller, S. | | | | | | | | | | | | | | |
| Navajo, Ne. | | | | | | | | | | | | | Potosi | | | | | | | | | | | | | | |
| North Belle Isle, Ne. | | | | | | | | | | | | | Sappahannock, G. | | | | .06 | | | | | | | | 1,000 | | |
| Ontario, Ut. | | | | | | | | | | | | | Red Elephant, S. L. | | | | | | | | | | | | | | |
| Ophir | | | | | | | | | | | | | Ridge | | | | | | | | | | | | | | |
| Oscoda | | | | | | | | | | | | | Silver Cliff, S. | | | | | | | | | | | | | | |
| Plymouth | 21.18 | | 29.50 | 28.00 | | | | 27.88 | | | 29.50 | 900 | Sonora Con. | | | | | | | | | | | | | | |
| Quicksilver Pref., Ca. | 30.00 | 29.50 | 28.00 | | | | | 27.88 | | | 29.50 | 1,100 | South Bodie, G. | | | | | | | | | | | | | | |
| Com. Ca. | 9.63 | 9.50 | | | | | 9.00 | 8.00 | 8.50 | | | | South Bulwer, G. | | | | | | | | | | | | | | |
| Quincy | | | | | .81 | | .97 | | .90 | | | 2,410 | South Hite | | | | | | | | | | | | | | |
| Robinson Cons., Co. | .58 | .96 | | | 2.00 | | 2.00 | 1.95 | | 2.00 | | 750 | South Pacific | | | | | | | | | | | | | | |
| Savage, Ne. | | | 2.00 | | | | 1.10 | | | | | 300 | State Line, 1 & 4, S. | | | | | | | | | | | | | | |
| Sierra Nevada, Ne. | | | | | | | | | | | | 170 | " Nos. 2 & 3, S. | | | | | | | | | | | | | | |
| Silver King, Ar. | | | 7.50 | | 7.00 | 6.50 | | | | | | 410 | Sutro Tunnel | .19 | | .19 | .18 | .18 | | .18 | | .18 | | .19 | 13,800 | | |
| Spring Valley, Ca. | | | | | | | | | 1.10 | | | 410 | Tamarack | | | | | | | | | | | | | | |
| Standard, Ca. | | | 1.20 | | .14 | | .14 | | .15 | .14 | | 3,100 | Toga | | | | | | | | | | | | | | |
| Stormont, Ut. | .18 | .1 | | | .14 | | .14 | | .15 | .14 | | | Union Cons., G. S. | | | | | | | .30 | .25 | | | | 500 | | |
| Tip Top, Ar. | | | | | | | | | | | | | Utah | | | | | | | | | | | | | | |
| Yellow Jacket | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Dividend shares sold, 41,802. Non-dividend shares sold, 30,600.

OUR USUAL TABLE GIVING CAPITAL, ASSESSMENTS, AND DIVIDENDS OF ABOUT 250 MINES IS OMITTED THIS WEEK.

Anthracite.

Mr. John H. Jones, official accountant, furnishes the following statement of the anthracite coal tonnage for the month of October, 1885, compared with the same period last year. This statement includes the entire production of anthracite coal, excepting that consumed by employes, and for steam and heating purposes about the mines:

| COMPANIES. | Oct., 1885. | Oct., 1884. | Difference. |
|------------------------|-------------|-------------|-------------|
| Phila. & Reading RR. | 1,237,321 | 1,147,107 | I. 90,214 |
| Lehigh Valley RR. | 700,743 | 596,319 | I. 104,424 |
| Del., Lack. & West RR. | 642,161 | 502,203 | I. 139,958 |
| Del. & Hud. Canal Co. | 387,370 | 330,128 | I. 57,242 |
| Pennsylvania RR. | 341,193 | 305,461 | I. 35,734 |
| Pennsylvania Coal Co. | 183,810 | 139,713 | I. 44,097 |
| N. Y., L. E. & W. RR. | 69,570 | 42,503 | I. 27,067 |
| Total | 3,562,166 | 3,063,434 | I. 498,732 |

| COMPANIES. | For Year 1885. | For Year 1884. | Difference. |
|------------------------|----------------|----------------|-------------|
| Phila. & Reading RR. | 9,370,612 | 9,122,560 | I. 248,046 |
| Lehigh Valley RR. | 4,817,843 | 4,837,668 | D. 19,825 |
| Del., Lack. & West RR. | 4,070,652 | 4,218,236 | D. 147,584 |
| Del. & Hud. Canal Co. | 2,598,792 | 2,757,040 | D. 158,248 |
| Pennsylvania RR. | 2,783,373 | 2,659,728 | I. 123,645 |
| Pennsylvania Coal Co. | 1,195,958 | 1,136,208 | I. 59,750 |
| N. Y., L. E. & W. RR. | 510,358 | 324,157 | I. 186,201 |
| Total | 25,347,588 | 25,055,602 | I. 291,986 |

The stock of coal on hand at tide-water shipping points, October 31st, 1885, was 661,616 tons; on September 30th, 1885, 815,907 tons; decrease, 154,291 tons.

| Per cent quota. | 1885. | | Under or over quota. | Nov. Quota. |
|-----------------|--------------|--------------|----------------------|-------------|
| | Quota. tons. | Mined. tons. | | |
| Phil. & R. | 38.85 | 9,576,525 | 9,370,612 | 205,913 |
| L. V. RR. | 19.60 | 4,831,400 | 4,817,843 | 13,557 |
| D., L. & W. | 14.05 | 3,956,325 | 4,070,652 | + 114,327 |
| D. & H. | 11.00 | 2,711,500 | 2,598,792 | 112,708 |
| P. RR. | 8.00 | 1,972,000 | 2,783,373 | + 811,373 |
| Pa. Coal | 5.00 | 1,232,500 | 1,195,958 | 36,542 |
| Erie. | 1.50 | 369,750 | 510,358 | + 140,608 |
| 100.00 | | 24,650,000 | 25,347,588 | + 697,588 |
| | | | | 3,250,000 |

From these tables, it appears that the Pennsylvania

Railroad still keeps on increasing its surplus, and no doubt by the close of the year will have mined a million tons over its allotment, while the other companies will probably run half a million tons behind. The active season is now drawing to a close, and even during the past month of good business, stocks at tide-water points have declined but little, and on the 1st of November stood at 661,616 tons. At the end of the present month, they will probably have increased, and the prospect for December business is not encouraging. No doubt prices will recede, and the fight for next year's allotments will wax warm.

The past week and, in fact, the whole fall have been bad for coal consumption. This is not so much felt in the coal trade at present, as dealers and consumers who are dependent upon water-ways that freeze up in the winter are calling for a large amount of coal to supply prospective requirements that they must provide for now. It will probably be found, later in the season, that those who are all-winter purchasers are not requiring nearly as much as usual, because the mild fall has greatly reduced the consumption.

Shipments of coal are still, to a very great extent, upon old orders taken at lower prices than are now asked. In fact, there is but very little new business, and such as there is, is only in rare cases at the latest announced prices. We quote as follows, f. o. b.:

| | |
|----------|--------------|
| Stove | \$3.85@34.00 |
| Broken | 3.10@ 3.40 |
| Egg | 3.35@ 3.50 |
| Chestnut | 3.20@ 3.35 |

We hear of lower prices in some instances, and think that the tendency is rather downward, although there is not at present any sign of a material change one way or another for some weeks to come. Among those who can secure coal as they want it during the winter months, there is a great lack of confidence in prevailing prices, and unless the weather becomes so severe as to counteract the unusually mild weather of this fall, prices are likely to rule considerably in buyers' favor later in the season.

There are no indications of any plans to control next year's business. Indeed, it would probably be useless to begin negotiations until it is pretty well understood who will control Reading's policy for the next year. There are some knotty questions to be met; and until they are settled, there must be great uncertainty in the trade.

The labor question is attracting great attention. We

do not look for immediate trouble in this direction. As the readers of the ENGINEERING AND MINING JOURNAL know, the pay in the Schuylkill region is practically on the old agreement of 1874, which established as the basis the price of coal at Port Carbon, with a sliding-scale as the price goes above or below \$2.50 a ton. Every month, five collieries of the region are drawn by lot, and the average price of coal is made the basis of wages for the next month. In October, the following was the result:

| Collieries. | Average price. |
|------------------------|----------------|
| Connor Colliery | 217.5 |
| Locust Spring Colliery | 247.3 |
| Eagle Colliery | 243.0 |
| Otto Colliery | 242.0 |
| Kehley Run Colliery | 233.8 |
| Average | 240.9 |

The rate of wages would thus be 3 per cent below the basis that gave miners \$11.34, inside laborers \$9.60, and outside laborers \$8.73 a week, which were the actual wages paid during last month.

The Reading Company's stocks at Port Richmond increased a little last week.

Proposals will be received until December 12th, by the Navy Department, Washington, D. C., for the delivery at the New York station of 4000 tons of anthracite broken coal for steamer use.

Bituminous.

Cars have been and are scarce. This, with the fact that vessels have been very scarce, has permitted better prices to be secured for spot cargoes or early deliveries. There is perhaps a shade better demand than there was, and a hope that it will improve. Upon the whole, however, we can not see that the situation has made any material change for the better. We hear of a contract for one year, beginning next spring, for Beech Creek coal at \$2.75 alongside. We are informed that the Hamburg-American steamship contract for two years, about 50,000 to 75,000 tons a year, has been taken by Messrs. Berwind White & Co. We did not learn prices. Vessel rates are \$1.50 from Baltimore to Boston, \$1.35 from Philadelphia.

Buffalo. Nov. 19.

[From our Special Correspondent.]

Coal has been and is coming forward quite freely now from the mines by rail. There is an active demand for anthracite for shipment by lake, and there is some delay still in loading vessels through lack of supplies.

At a meeting of the Coal Exchange, held Tuesday

COAL STOCKS.

Quotations of New York stocks are based on the equivalent of \$100. Philadelphia prices are quoted so much per share.

| NAME OF COMPANY. | Par value of shares. | Quotations | | | | | | | | | | | | Sales from Nov. 14th to Nov. 20th, inclusive. |
|---------------------|----------------------|------------|------|----------|-----|----------|------|----------|------|----------|-----|----------|------|---|
| | | Nov. 14. | | Nov. 16. | | Nov. 17. | | Nov. 18. | | Nov. 19. | | Nov. 20. | | |
| | | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | |
| Barclay Coal | 50 | 18½ | 17½ | 17½ | 17½ | 17½ | 17 | 19¼ | 17¼ | 19¼ | 18¾ | 19¾ | 18 | 11,200 |
| Cameron Coal | 10 | 24½ | 24 | 25 | 24 | 25 | 24½ | 25¼ | 25¼ | 23¾ | 25½ | 24¾ | 25 | 14,594 |
| Col. C & I | 100 | 10½ | 10 | 10½ | 10 | 10½ | 10½ | 10½ | 10 | 11¼ | 10¾ | 12¾ | 11½ | 5,768 |
| Consol. Coal | 100 | 99 | 98½ | 99 | 98½ | 99¼ | 98½ | 100¼ | 99¾ | 100¼ | 99¾ | 100¼ | 99½ | 12,017 |
| Cumb. C. & I. | 50 | 121¼ | 120¼ | 121¼ | 120 | 123 | 120¾ | 122½ | 121¾ | 123¾ | 122 | 124 | 122½ | 157,754 |
| Del. & H. C. | 100 | 47½ | 47½ | 47½ | 47½ | 47½ | 47½ | 47½ | 47½ | 47½ | 47 | 47 | 47 | 1,816 |
| D. L. & W. RR. | 50 | 57½ | 57 | 57 | 57 | 57 | 56½ | 57 | 56 | 57 | 57 | 57 | 57 | 1,308 |
| Elk Lick Coal Co. | 50 | 13½ | 13 | 13 | 13 | 14 | 13¾ | 15¾ | 14¾ | 15¾ | 16 | 15 | 15 | 2,880 |
| Lehigh C. & N.† | 50 | 45 | 43½ | 45¼ | 44½ | 45¼ | 44½ | 47½ | 44½ | 47 | 46 | 46½ | 44¼ | 85,373 |
| Lehigh Valley RR.† | 50 | 55 | 54¾ | 55 | 54¾ | 55½ | 54¾ | 55½ | 55¼ | 55¼ | 55 | 55 | 55 | 10,166 |
| L. & W. C. & I Co. | 50 | 24½ | 23¾ | 24 | 23¾ | 24¾ | 23¾ | 25½ | 24¾ | 24¾ | 23¾ | 25¾ | 24½ | 115,794 |
| Maryland Coal | 100 | 13½ | 13 | 13 | 13 | 14 | 13¾ | 15¾ | 14¾ | 15¾ | 16 | 15 | 15 | 2,880 |
| Montauk Coal | 100 | 45 | 43½ | 45¼ | 44½ | 45¼ | 44½ | 47½ | 44½ | 47 | 46 | 46½ | 44¼ | 85,373 |
| Morris & Essex | 50 | 129½ | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 10 |
| New Central Coal | 100 | 13½ | 13 | 13 | 13 | 14 | 13¾ | 15¾ | 14¾ | 15¾ | 16 | 15 | 15 | 2,880 |
| N. J. C. RR. | 100 | 45 | 43½ | 45¼ | 44½ | 45¼ | 44½ | 47½ | 44½ | 47 | 46 | 46½ | 44¼ | 85,373 |
| N. Y. & S. Coal | 50 | 55 | 54¾ | 55 | 54¾ | 55½ | 54¾ | 55½ | 55¼ | 55¼ | 55 | 55 | 55 | 10,166 |
| Penn. Coal | 50 | 24½ | 23¾ | 24 | 23¾ | 24¾ | 23¾ | 25½ | 24¾ | 24¾ | 23¾ | 25¾ | 24½ | 115,794 |
| Penn. RR.† | 50 | 55 | 54¾ | 55 | 54¾ | 55½ | 54¾ | 55½ | 55¼ | 55¼ | 55 | 55 | 55 | 10,166 |
| Ph. & R. RR.† | 50 | 24½ | 23¾ | 24 | 23¾ | 24¾ | 23¾ | 25½ | 24¾ | 24¾ | 23¾ | 25¾ | 24½ | 115,794 |
| Spring Mountain | 50 | 55 | 54¾ | 55 | 54¾ | 55½ | 54¾ | 55½ | 55¼ | 55¼ | 55 | 55 | 55 | 10,166 |
| Westmoreland Coal.† | 50 | 24½ | 23¾ | 24 | 23¾ | 24¾ | 23¾ | 25½ | 24¾ | 24¾ | 23¾ | 25¾ | 24½ | 115,794 |

* Of the sales of this stock, 36,971 shares were in Philadelphia and 78,823 in New York. Total sales, 419,203.
 † The quotations for these stocks are not percentage, but actual price.

last, it was decided to advance all sizes of coal 25 cents a ton retail, excepting pea, yesterday. This resolve was not agreed to without great opposition on the part of many members, and one of the trustees immediately resigned.

A well-known producer said yesterday: "Before many days elapse, there will be general howling for coal in the West and Northwest, as the stocks there are very light." Another, who has just returned from an extended tour through that region, says: "The coal-yards at all points are nearly bare, and especially so in the larger towns."

The different railroad shops in the city are now very busy repairing and rebuilding crippled cars that have accumulated in the yards during the summer and fall months. In consequence, it may reasonably be expected that transportation facilities will be increased considerably before winter sets in.

The movement of coal by lake has been quite liberal for several days past, with strong market. Vessels are in great demand for Milwaukee; but owners do not care to send them there, as, from present prospects, they could not get away from that port before December 1st, when very high marine insurance begins, and it is not desirable, they say, for vessels to lay up there, Chicago being the most desirable harbor. Unloading is very slowly done at that port, and vessel men will only go there when it is "Milwaukee or nothing."

Bituminous coal is fairly active at nominally unchanged quotations, although for some varieties higher figures were paid.

The coke trade is up to a fair average, with no variation in prices. It is reported that 60 per cent of the syndicate ovens are in operation, against 50 per cent a month since. The ovens not in the syndicate, have not, for some unexplained reason, increased production.

Vessels have begun laying up here and elsewhere for the winter. Heavy snow fell here last Saturday, followed by severe frost. A strong westerly gale with heavy snow prevailed last Friday evening, and continued until noon Saturday, on Lake Superior, Huron and Michigan, but no disasters affecting coal cargoes or vessels were reported.

The shipments of coal from Buffalo from November 12th to 18th, both days inclusive, were large, 70,115 tons, as follows: 48,390 to Chicago, 11,150 to Milwaukee, 3185 to Duluth, 2640 to Detroit, 850 to Toledo, 400 to Port Huron, 700 to East Saginaw, 1300 to Washburn, L. S., 500 to Kincardine, 1000 to Racine.

The freight engagements were as follows: \$1 to Chicago, Milwaukee, Duluth, Washburn, L. S., and Green Bay; \$1.25 to Racine; 50c. to Saginaw; 40¢ to 50c. to Toledo; 35c. to Detroit; 50c. to Port Huron; 60c. to Kincardine; closing strong.

The only shipments by canal were: 3 loads coal to Syracuse, 85c. gross, free on board, captain to pay unloading; and 1 load coal to Lyons, 75c. net, captain to pay loading and unloading.

The Executive Committee of the Lake Superior Business and Waterways Association, met at Ishpe-

ming, a few days since, and planned active measures to secure the deepening of the Sault Ste. Marie Canal and the purchase of the Portage Lake Canal by the United States government. Colonel Poe, of the United States Engineers, will recommend both in his next annual report. A committee was appointed to proceed to Washington next session of Congress, to secure appropriate legislation.

A Duluth newspaper says, "Coal has gone up fifty cents a ton this week, and the wails of those who did not contract for their winter supply before the rise, may be heard on the clear and frosty ozone!"

The receipts of coal at Duluth for the week ended November 14th were 18,363 tons. The St. Paul & Pacific Coal Company's receipts for the season will aggregate 150,000 tons; the stock now on hand is 70,000 tons, and from 70 to 80 car-loads are shipping to interior points daily. Only 600 tons were lost by the fire last week. The Northwestern Coal Company's receipts thus far are 250,000 tons, with probably ten or a dozen cargoes yet to arrive. Shipments active. The Ohio Coal Company has received during the year fully 200,000 tons, mostly bituminous, and is shipping at the rate of ninety cars daily. The Pioneer Coal Company has unloaded about 25,000 tons on the blast-furnace dock. The total coal receipts at Duluth for the season will range from 650,000 to 700,000 tons.

Boston. Nov. 18.

[From our Special Correspondent.]

There is but little to remark about the anthracite coal trade. Egg coal has been very firm at \$3.50, but Stove coal may be had at \$4 f. o. b. at New York, or only 25 cents above the lowest prices of the year. Parties who persist in asking \$4.15 for Stove coal have none to sell at present. The advance in freights has added another 25 cents to the delivered price, so that stove coal costs about 50 cents more than the lowest summer prices. There begins to be an improvement in the way of prompt dispatch; but it is still difficult to get coal along readily both from New York and Philadelphia.

Dealers in bituminous coal have had little else to disturb the quietude of the situation of late, save the reports of a case of spontaneous combustion in this vicinity in genuine George's Creek Cumberland coal.

Dealers are all hurrying forward their contract coal, so that as little as possible may pay the winter freights. There is no sharp competition for new business, as many shippers have sold about all they can deliver in this market. Parties having stray cargoes on the market are able to dispose of them at very fair advantage therefore. We should quote delivered prices at \$3.40@3.60.

There is a feeling that freights will be easier when the large fleet of colliers that has been at this end of the route is distributed at shipping ports; but of course, the weather will have much to do with it at this time. At present, rates are strong at the advances last noted. We quote:

New York, \$1@1.10; Philadelphia, \$1.30@1.35; Baltimore, \$1.45@1.50; Newport News,

\$1.35@1.40; Richmond, \$1.40@1.45; Cape Breton, \$1.60@1.75; Bay of Fundy, \$1.40@1.50.

Retail trade continues quiet. The efforts to advance prices have not been successful, notwithstanding the fact that it costs 50 cents a ton more to put on coal now than it did in the summer. The status of affairs seems to be, that dealers have not yet received enough late-bought coal to feel the advance at wholesale, or else they are content with even less margin for profit.

We quote:
 White ash, furnace and egg..... \$4.75@5.00
 " " stove and nut..... 5.25@ 5.50
 Shamokin, egg..... 6.00
 " " stove..... 6.25
 Lorberrry, egg and stove..... 6.50@ 7.00
 Franklin, egg and stove..... 7.25@ 7.75
 Lehigh, furnace, egg, and stove..... 5.25@ 5.50
 " " nut..... 5.50@ 5.75

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, Nov. 20.

The market remains without any special feature. Prices changed very little, and the total transactions amounted to 72,402 shares, showing an increase of 2395 shares, as compared with those of the preceding week.

There is evidently some movement to boom Mono, which sold for \$2 a few weeks ago; the price this week jumped to \$7, closing at \$6. Only occasional and small sales are made. Bodie has been very active, with lower prices, opening at \$2.55 and closing at \$2.05. Standard has been quiet at from \$1.20@1.10. Bulwer was steady at from 27@35c. Some 20 shares of Plymouth Consolidated sold at \$21.13. Quicksilver Preferred declined to \$27.88, but the closing prices showed \$29.50. Common went from \$9.63@8.

The Homestake and the Father de Smet have again each declared their monthly dividend; the former, one of \$50,000; and the latter, one of \$20,000. Both stocks remain firm, and are respectively \$22.50 and \$4.65. Caledonia is advancing, and, judging from the good prospects at the mine, will continue to do so; it ranged from \$2.60@2.95.

No sales were made in Ontario, but a dividend of \$75,000 has again been announced, making the total to date \$6,950,000. Horn-Silver, which in the beginning of the week declined to \$1.90, closed at \$2.05, the price at which it has been quoted for some time. Stormont advanced from 11@15c.

Colorado stocks have been quiet. Robinson Consolidated has been the most active, with sales at from \$1@94c. Colorado Central has been lower, at from \$2.80@2.60. Chrysolite sold at from \$1.25@1.20. Little Chief, at 28c. Leadville, at 35c. Breece, at 22@24c.

Eureka shows a small business, running from \$3.55 @3.05. The Comstocks have received but little attention. Prices have remained unchanged. Hale & Norcross is quoted at \$4. Consolidated California & Virginia, at \$1.50@1.60. Sutro Tunnel, at 19 and 18c.

Horn-Silver sold at from \$7.50@6.50. Central Arizona, at 15@13c.

A complete summary of the market will be found elsewhere.

The Board of Managers of the Consolidated Petroleum and Stock Exchange has voted to make the presidency of that institution a salaried office—\$5000 being fixed as the sum to be paid for the current fiscal year.

California Water and Mining Company, 2800 shares, were sold at auction in this city on the 18th inst., for 5 cents a share.

Coal Stocks.

The stock market has been somewhat feverish during the past week, although prices had an upward tendency. Mr. Robert Garrett, President of the Baltimore & Ohio Railroad, is playing his "railroad myth" of "\$40,000,000 surplus," against the other trunk lines, to get an arrangement with the Pennsylvania Railroad quite satisfactory to his company, until he can make a connection with the Reading system, when he would expect an entirely new deal. He refuses in the mean time to sign the trunk line agreement, and there is a fear that the labors of months to produce peace and harmony in the railroad world may come to naught. There is a feeling, however, among those who are best able to comprehend Mr. Garrett's position, that he will in due course of time accept from the Pennsylvania Railroad what it will willingly give, and that his efforts at bulldozing will fail. The coal

stocks have been more active and higher. The market closes weak and feverish.

The dealings in Lackawanna aggregated 157,754 shares at \$120@124, closing at \$123. The sales of Delaware & Hudson amounted to 12,017 shares at \$98½@100½, closing at \$99½. New Jersey Central sold at \$43½@47½, and closed at \$45½. The transactions were 85,373 shares. The dealings in Reading amounted to 78,823 shares at \$23½@25½, closing at \$25. The bituminous coal stocks have had a large advance on moderate transactions. Cameron sold up to \$19½, and closed at \$18½. New Central, with dealings of 2880 shares, sold at \$13@16, closing at \$15. Maryland ranged between \$13½ and \$16½.

Dividends.

Derbec Blue Gravel Mining Company, of California, has declared a dividend (No. 9) of ten cents a share, which was payable at San Francisco on the 9th inst.

Father de Smet Mining Company, of Dakota, has declared a dividend (No. 49) of twenty cents a share, payable on the 30th, at the office of Messrs. Laidlaw & Co., No. 14 Wall street.

Granite Mountain Mining Company, of Montana, has declared a dividend (No. 11) of \$40,000, payable in St. Louis, November 17th.

Homestake Mining Company, of Dakota, has declared a dividend (No. 89) of forty cents a share, payable on the 29th inst., at the office of Messrs. Lounsbury & Co., Mills Building.

Ontario Silver Mining Company, of Utah, has declared a dividend (No. 114) of \$75,000, payable on the 30th inst., at the office of Messrs. Lounsbury & Co., Mills Building.

Westinghouse Air-Brake Company, of Pennsylvania, has declared its usual 30 per cent dividend, payable in December. This dividend was on the old stock.

ASSESSMENTS.

| COMPANY. | No. | When levied. | Delinquent in office. | Day of sale. | Amount. |
|-----------------------|---------|--------------|-----------------------|--------------|---------|
| Baker Divide, Cal. | 10 | Oct. 29 | Dec. 1 | Dec. 21 | .25 |
| Booker Cons., Cal. | 8 | Oct. 23 | Nov. 27 | Dec. 17 | .05 |
| Buchanan, Cal. | 14 | Oct. 30 | Dec. 5 | Dec. 21 | .15 |
| Bullwer, Cal. | 2 | Oct. 29 | Dec. 10 | Jan. 20 | .20 |
| Central Cons., Nev. | 4 | Oct. 20 | Dec. 1 | Jan. 16 | .05 |
| Chollar, Nev. | 4 | Oct. 21 | Nov. 24 | Dec. 16 | .50 |
| Cons. Amador, Cal. | 10 | Nov. 2 | Dec. 2 | Dec. 18 | .50 |
| Courier, Idaho | Nov. 4 | Dec. 10 | Dec. 29 | .03 | |
| Del Norte, Cal. | 1 | Oct. 8 | Nov. 14 | Dec. 7 | .30 |
| Equitable, Utah | 32 | Aug. 3 | *Oct. 15 | *Dec. 4 | .10 |
| Golden Jacket, Nev. | 1 | Oct. 27 | Dec. 3 | Dec. 26 | .05 |
| Guadalupe, Cal. | 1 | Oct. 10 | Nov. 16 | Dec. 5 | .05 |
| Hale & Norcross, Nev. | 87 | Oct. 8 | Nov. 12 | Dec. 3 | .50 |
| Holmes, Nev. | 10 | Sept. 28 | Nov. 2 | Nov. 27 | 1.00 |
| Johnson Gravel, Cal. | 2 | Sept. 3 | Oct. 15 | Nov. 20 | .05 |
| Julia Cons., Nev. | 21 | Nov. 4 | Dec. 9 | Dec. 30 | .10 |
| Justice, Nev. | Nov. | | | | .10 |
| Mountain Tunnel, Cal. | 1 | Sept. 28 | Nov. 2 | Nov. 24 | .10 |
| Navajo, Nev. | 13 | Oct. 29 | Dec. 2 | Dec. 23 | .30 |
| New York Hill, Cal. | 9 | Oct. 30 | Dec. 3 | Dec. 24 | .15 |
| North Peer, Ariz. | 2 | Nov. 7 | Dec. 10 | Jan. 4 | .02 |
| Potosi, Nev. | 20 | Sept. 28 | Nov. 4 | Nov. 25 | .40 |
| Russell, Cal. | 1 | Oct. 15 | Nov. 25 | Dec. 18 | .25 |
| Savage, Nev. | 64 | Oct. 5 | Nov. 9 | Nov. 30 | .50 |
| Sierra Nevada, Nev. | 83 | Sept. 30 | Nov. 4 | Nov. 24 | .25 |
| Sul. Bank Qu'r, Cal. | 4 | Aug. 29 | Oct. 9 | Dec. 3 | .51 |
| Summit, Cal. | 8 | Oct. 23 | Nov. 30 | Dec. 21 | .05 |
| Trinity, Cal. | 1 | Nov. 2 | Dec. 8 | Dec. 24 | .10 |
| Triumph, Idaho | Oct. 22 | Dec. 3 | Dec. 23 | .05 | |
| Tuolumne, Cal. | 1 | Sept. 15 | Nov. 13 | Dec. 15 | .55 |
| Willow Creek, Cal. | 2 | Oct. 12 | Nov. 16 | Dec. 14 | 1.00 |

* Assessment postponed until above date.

Pipe Line Certificates.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report for the week as follows:

The oil market this week has been sadly demoralized by rumors that a new well called the Clemminger, at Kane, in McKean County, Pa., was in black sand similar to that at Bradford, and that it would be a good or fair producer. It is not the size of this well that is important or depressing in effect. It is the fact that it is entirely new and "wild-cat" territory, and that the sand is black. It is supposed to be good for about 50 barrels a day at present, from its present level, five feet in the sand, but will be drilled deeper next week. It will be watched with interest; and if it should prove to be inconsequential, its failure naturally would have a bullish effect upon the market.

Another influence in to-day's market was the report that Anchor Oil Company's No. 1, at Kinzua, was flowing 55 barrels an hour. This well disturbed the market some time ago. It is not new territory, but was drilled deeper last night, and its flow increased. It is not important. Refined oil was advanced ½ to 8% on Tuesday, but was dropped back to 8½ to-day.

The volume of transactions this week has been very large. The market closed rather weak to-night. We

have issued a circular giving facts concerning the oil field, market statistics, etc., which will be mailed upon application.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

| | Opening. | Highest. | Lowest. | Closing. | Sales. |
|-------------|----------|----------|---------|----------|------------|
| Nov. 14 | 1.07½ | 1.07½ | 1.06¾ | 1.07 | 4,082,000 |
| 16 | 1.07½ | 1.07½ | 1.07½ | 1.07½ | 4,536,000 |
| 17 | 1.07½ | 1.10¼ | 1.07½ | 1.10¼ | 9,328,000 |
| 18 | 1.10¼ | 1.11 | 1.06¾ | 1.07½ | 11,584,000 |
| 19 | 1.07½ | 1.08¾ | 1.07½ | 1.07½ | 6,748,000 |
| 20 | 1.07½ | 1.07½ | 1.04 | 1.04½ | 11,898,000 |
| Total sales | | | | | 48,176,000 |

San Francisco Mining Stock Quotations.

Daily Range of Prices for the Week.

| NAME OF COMPANY. | CLOSING QUOTATIONS. | | | | | |
|------------------|---------------------|----------|----------|----------|----------|----------|
| | Nov. 13. | Nov. 14. | Nov. 16. | Nov. 17. | Nov. 18. | Nov. 19. |
| Albion | | | | | | |
| Alpha | | | | | | |
| Alta | .25 | .25 | | .25 | .25 | .25 |
| Argenta | | | | | | |
| Bechtel | | | | | | |
| Belcher | 1.37½ | 1.37½ | | 1.37½ | | 1.50 |
| Belle Isle | | | | | | |
| Best & Belcher | 1.50 | | | 1.37½ | 1.25 | 1.25 |
| Bodie | 2.62½ | 2.50 | | 2.37½ | 2.50 | 2.25 |
| Bullion | | | | | | |
| Bullwer | | | | | | |
| Chollar | .70 | .70 | | .65 | .65 | .90 |
| Con. Pacific | | | | | | |
| Con. Cal. & Va. | 1.50 | 1.50 | | 1.50 | 1.50 | 1.50 |
| Crown Point | | 1.25 | | 1.25 | 1.25 | 1.25 |
| Day | | | | | | |
| Elko Cons | | | | | | |
| Eureka Cons | 3.50 | | | 3.25 | 3.00 | 2.75 |
| Exchequer | | | | | | |
| Gould & Curry | .90 | .90 | | .85 | .75 | .85 |
| Grant Prize | | | | | | |
| Hale & Norcross | 3.87½ | 3.87½ | | 3.75 | 3.75 | 3.75 |
| Independence | | | | | | |
| Martin White | | | | | | |
| Mexican | .90 | .90 | | .85 | .75 | .80 |
| Mono | 6.87½ | 6.50 | | 6.87½ | 6.00 | 6.00 |
| Mount Diablo | | | | | | |
| Navajo | .30 | | | .40 | .35 | .30 |
| Northern Belle | | | | | | |
| North Belle Isle | | | | | | |
| Ophir | 1.25 | 1.25 | | 1.25 | 1.12½ | 1.12½ |
| Overman | | | | | | |
| Potosi | .50 | .50 | | .50 | .50 | .45 |
| Savage | 1.75 | 1.87½ | | 1.75 | 1.75 | 1.87½ |
| Scorpion | | | | | | |
| Sierra Nevada | 1.00 | 1.00 | | 1.00 | .85 | .90 |
| Silver King | | | | | | |
| Tip-Top | | | | | | |
| Union Cons. | .70 | .70 | | .70 | .65 | .65 |
| Utah | .70 | .70 | | .70 | .70 | .65 |
| Wales Cons. | | | | | | |
| Yellow Jacket | 1.62½ | | | 1.50 | | 1.62½ |

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

| Cash on hand. | | | |
|------------------|------------|---------------|-------------|
| Alpha Con. | \$5,767.91 | Mexican | \$21,068.85 |
| Alta | 13,940.18 | Occidental | 2,231.67 |
| Best & Belcher | 29,738.18 | Ophir | 29,680.10 |
| Benton Cons. | 2,048.54 | Sierra Nevada | 5,802.60 |
| *Con. Cal. & Va. | 52,981.10 | Union Cons. | 9,189.27 |
| Exchequer | 8,622.57 | Utah | 7,773.09 |
| Gould & Curry | 17,917.15 | | |

Indebtedness.

The following companies report their indebtedness November 1st as follows:

| | | | |
|-----------------|------------|--------|-------------|
| Chollar | \$7,438.44 | Potosi | \$16,495.22 |
| Hale & Norcross | 22,982.66 | Savage | 18,325.27 |

* \$61,780.63 in cash and assay value of unsold bullion in office.

Boston Copper and Silver Stocks.

[From our Special Correspondent.]
BOSTON, Nov. 19.
The market for copper stocks the past week has shown a good deal of activity, and prices are generally higher throughout the list. Calumet & Hecla has ruled steady, with not much stock offering, and no pressure to sell. The market opened at \$210, and declined on small lots of from one to two shares each to \$207, but rallied to \$210 whenever any reasonable sized lots were offered, closing at \$210 bid, with sales of 60 shares only for the week. Tamarack started at \$80, sold up to \$85, and declined again to \$82, making a gain of \$2 for the week; sales, 73 shares. Quincy opened at \$39, a gain of \$1 from last week's closing

sale, declined to \$38½, and then rapidly advanced on large buying orders to \$40, which was the closing price; sales, 520 shares. Franklin has been in good demand, and ruled very steady at \$8½ until to-day, when it advanced to \$9, and was firm at that price bid and but little offered; sales, 1200 shares. Atlantic declined from \$7@8½, but rallied again to \$7; sales, 300 shares. Osceola has been very quiet, with sales of only 50 shares for the week at \$12½, an advance of \$½. There is nothing doing in the remainder of the list. Total sales for the week, 2203 shares.

In silver stocks, we note sales of 1400 shares Napa Quicksilver at \$1, same as last week. Breece Mining has been quite active, about 1000 shares having changed hands at from 25@30c. Dunkin advanced to 25c. Catalpa is wanted at 25c. bid. Crescent sold at 12½c. Bowman Silver is again coming to the front, and shows an advance from 9@15c., closing to-day at 15c. We look for greater activity in mining stocks if the general market continues to advance, and see no reason why good stocks bought at present prices should not pay handsome profits in the near future.

BOOKS ON COAL.

Rare Books and Books on Coal, Coal Mining, Metallurgy, and Engineering are made a special feature; but books of all kinds will be furnished, post-paid, at publishers' prices.

- ANDRE, GEORGE G. A Practical Treatise on Coal Mining. 2 vols. royal 8vo, cloth. Lond. 1878. \$28.
 - ATKINSON, J. J. A Practical Treatise on the Gases met with in Coal Mines. 16mo, boards. N. Y. 1875. 50 cents.
 - ATKINSON, J. J. Friction of Air in Mines. 12mo, boards. N. Y. 1879. 50 cents.
 - ATKINSON, J. J. A Practical Treatise on Mining Machinery. 2 vols. 4to, cloth. Lond. 1878. \$28.
- Remittances to be made to the SCIENTIFIC PUBLISHING COMPANY, 27 Park Place (P.O. Box 1833) New York.

OFFICE HOMESTAKE MINING COMPANY,
MILLS BUILDING, 15 BROAD STREET,
NEW YORK, Nov. 14, 1885.

DIVIDEND No. 87.
The regular monthly Dividend—Forty Cents per share—has been declared for October, payable at the Office of the company, San Francisco, or at the Transfer-Agency in New York, on the 25th inst. Transfer-books close on the 20th inst.

LOUNSBURY & CO., Transfer-Agents.

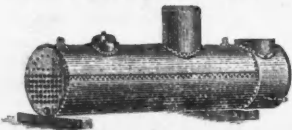
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A. PEYSSON,
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Purchasing Agent for French and European houses of AMERICAN COPPER ORES, and DEALER IN ALL ORES FROM SPAIN, ALGERIA, AND GREECE.

COPPER ORE WANTED: Any quantity of copper ore from 20 to 25 per cent. Send samples, prices, and analyses to above address. Will also buy antimony at 60 degrees. Send samples, prices, and analyses to above address.

R. J. BUCHANAN,
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THE ONLY PRACTICALLY SUCCESSFUL DIAMOND PROSPECTING DRILLS THAT ARE PROTECTED BY PATENTS.
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POTTSVILLE, PA., Oct. 15, 1884.