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RICHARD P. ROTHWELL, C.E., M.E.,  
ROSSITER W. RAYMOND, Ph.D.,  
CHARLES KIRCHHOFF, Jr., M.E., } Editors.

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Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P.O. Box 1465, New York. Articles written by Mr. RAYMOND will be signed thus \*; and only for articles so signed is he responsible.

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We understand that the negotiations for the sale of the Poetsch patent for carrying out engineering works in quicksand by freezing have resulted in its purchase by a number of prominent capitalists.

A NEAT application of the Bower-Barff process came under our notice recently during a visit to the foundry of Messrs. PAULSEN & EGER in Brooklyn. They have lately put in a plant for depositing copper, and have been making very handsome reproductions of artistic clappers and ornaments. Some time since, they tried the effect of covering these copper ornaments with a coating of iron electrically deposited, and of converting the blush of iron thus obtained on its surface into a black

magnetic oxide by the Bower-Barff process. They have succeeded admirably, the color being a beautiful intense black, capable by polishing of bringing out the relief parts of the ornaments very strikingly.

AMONG to-day's dispatches from Europe on the spread of the cholera, appears the significant item that "the port of Huelva, in Spain, has been declared to be infected with cholera." Should it prove that this somewhat ambiguously framed statement means the adoption of strict measures against the entry and sailing of vessels or the creation of a scare, then the miners of the Tharsis and Rio Tinto companies whose port Huelva is, would be seriously hampered in their operations, and English speculators for a rise may take hold of the matter to give Chili Bars a good lift.

We are indebted to Messrs. H. V. & H. W. POOR, publishers of the well-known Manual of the Railroads of the United States, for advance-sheets of their usual valuable introduction, in which they summarize the great mass of statistical and other information relating to that interest, collected by them for the year 1883. As the heaviest single consumers of iron, steel, and coal, statistical data relating to the railroads and their prosperity should be closely studied, even though the figures given by Messrs. POOR are naturally retrospective rather than directed to conditions existing at the present time. The general causes that have led to the financial and industrial reaction that we have been suffering from are pretty generally understood. It has been insisted, over and over again, that the wild haste to embark in railroad undertakings has probably, more than any other single cause, contributed to that end. Messrs. POOR furnish the cold figures that give emphasis to these arguments. In a condensed form, the data for the last four years are as follows:

	1880.	1881.	1882.	1883.
Length of line owned, miles	92,147	103,530	114,461	120,552
Capital stock, thousands of dollars	2,708,673	3,177,375	3,511,036	3,708,061
Funded debt, " "	2,530,875	2,878,424	3,235,543	3,455,040
Floating debt, " "	162,490	222,766	270,171	332,370
Length of lines operated, miles	82,146	92,971	104,971	110,414
Gross earnings, thousands of dollars	613,734	701,781	770,210	823,773
Net earnings, " "	272,431	286,130	315,451	336,912
Interest paid, " "	107,866	128,587	154,295	173,139
Dividends paid, " "	77,115	93,344	102,031	102,052

At the close of the respective fiscal years of the railroads, their aggregate liabilities in 1883, including share capital, funded and floating debt, were the enormous sum of \$7,495,471,311, or \$62,176 per mile of completed road, and though the actual cost of construction per mile has steadily diminished, the apparent cost, as represented by share capital and debt, has steadily increased. Since 1880—three years—28,405 miles of railroad have been built. The cost, as represented by share capital and debt, was about \$70,000 per mile, while Messrs. POOR state that the actual cost did certainly not exceed \$30,000 per mile, and they add that the whole increase of share capital during that period, nearly one thousand millions of dollars, and a portion of the funded debt besides, was in excess of cost of construction. Assuming that the actual cost of construction was not greater than the funded and floating debt, and some that is certainly water, the average net earnings of the railroads of the United States are about 9 per cent. Apparently in 1883, it was only 4.49 per cent, so that one half of the entire nominal liabilities of the railroads of the country upon which they are expected to pay a fair return is simply and purely fictitious. For every dollar actually invested two are set afloat on paper. How onerous a burden upon the agriculture, the commerce, the manufacturing and mining interests of this country this enormous amount of fictitious capital must be may well be imagined. Let it be conceded that during the past six months there have been many cases where an often unwise competition has forced freights below cost, the fact remains that the many reductions made by force of circumstances prove that the railroads have in former years extorted, and many of them do still extort, exorbitant charges.

THE MINERAL STATISTICS OF GREAT BRITAIN FOR 1883.—I.

The mineral statistics of Great Britain, compiled from the returns of the fourteen mine inspectors, have just come to hand, earlier than is usual, it is true, but still, we are convinced, much later than it would be possible and profitable to publish them. We understand, from good authority, that the reports are substantially in the hands of the authorities toward the end of February, so that it takes fully four months to publish them. They are a mass of figures, carried to a detail that would be impossible in this country, and contain full lists of all the mines in the United Kingdom. It is to be regretted that what is necessarily dry reading is not enlivened by even brief conclusions to be drawn from the figures, which no one could better interpret than those engaged in gathering them. After all, industrial statistics really furnish only a text for a discussion, and it has been said with some truth that, cleverly handled, they may be made to prove directly opposed propositions.

The total production of coal in Great Britain in 1883 was 163,737,327

tons, against 156,499,977 tons in 1882, the principal districts participating being the following :

PRODUCTION OF THE PRINCIPAL COAL DISTRICTS OF GREAT BRITAIN IN 1883.

District	Tons
Cumberland	1,776,249
North Durham	7,738,870
Northumberland	7,527,065
South Durham	22,139,565
North and East Lancashire	9,931,585
West Lancashire	10,553,732
Denbighshire	1,924,392
Yorkshire	19,563,287
Derbyshire	8,787,967
Leicestershire	1,325,387
Nottinghamshire	5,315,880
Warwickshire	1,208,070
North Staffordshire	4,862,000
South Staffordshire	9,168,656
Worcestershire	1,136,144
Monmouthshire	6,345,503
Glamorganshire	17,708,740
East Scotland	14,839,091
West Scotland	6,386,706

The accident statistics of the year 1883, in the mines classed under the Coal Mines Regulation Act, and under the Metalliferous Mines Regulation Act, compare as follows with former years :

BRITISH MINE ACCIDENT STATISTICS.

	Coal M. R. Act.		Metalliferous M. R. Act.	
	1883.	1882.	1883.	1882.
Men employed under ground	416,696	406,192	30,492	33,814
Men employed above ground	98,237	97,795	19,743	21,692
Total men employed	514,933	503,987	50,235	55,506
<i>Cause of death :</i>				
Explosions of fire-damp	134	250		
Falls of sides	105	129	31	30
Falls of roof	364	339		
Overwinding	5	3		
Ropes and chains breaking	7	9	14	
Ascending or descending	34	24	1	3
Falling into shaft	7	6	2	1
Things falling from surface	5	8	1	1
Falling part way down	24	26	7	14
Things falling part way down	4	8	2	2
Miscellaneous in shafts	11	32		6
Explosions of gunpowder	34	11	8	9
Suffocation by gas	7	15		
Irruption of water		1	2	
Falling into water				1
On inclined planes	61	55		
By trains and tubs	102	96	1	
Machinery underground	5	6		
Sundries underground	37	22	10	6
Machinery on surface	13	9	4	8
Boilers bursting	3	2		5
Miscellaneous on surface	92	73	3	5
Total deaths	1,054	1,126	86	92

It will be seen, therefore, that, as usual, the most fruitful cause of accidental deaths are the falls of ground, and that accidents during the transportation of the coal in collieries, including those on inclined planes and by trains and tubs, are nearly as disastrous as the fire-damp explosions. For the ten years from 1874 to 1883, inclusive, the death-rate from accidents per 1000 persons employed was 2.238 for the mines under the Coal Regulation act and 1.645 for the mines under the Metalliferous Mines Regulation act, the death-rate for all the miners in Great Britain being 2.182 per 1000 persons employed. The deaths due to fire-damp explosions of course fluctuate within very wide limits, while those due to other causes are steadier. This is well shown by the following table, giving the ratios of persons employed to each death, in English collieries :

RATIO OF DEATHS BY ACCIDENTS IN ENGLISH COLLIERIES TO NUMBER EMPLOYED.

Year.	Fire-damp.	Falls of roof and sides.	Shaft.	Miscellaneous underground.	Miscellaneous surface.	Total.
1851 to 1860	1,068	653	1,161	2,074	4,802	245
1861 to 1870	1,408	767	2,121	1,666	4,119	300
1871 to 1880	1,795	1,069	3,557	2,535	5,369	425
1881	4,271	1,101	4,504	2,607	5,630	519
1882	2,015	1,076	4,344	2,423	5,999	447
1883	3,842	1,097	5,308	2,093	4,767	488

This shows in a general way a considerable improvement, the number of persons employed to one death being nearly double ; that is, the mortality is nearly one half only. How wide the fluctuations in the mortality due to fire-damp explosions are, may be gathered from the fact that in 1866 not less than 651 men were killed by explosions, or one in every 492 employed, while in 1876 there were only 95 victims, or one in every 5416. Since 1851, in thirty-three years, there have been 1900 fatal fire-damp explosions in Great Britain, causing the death of 7894 men, and altogether, out of 11,988,961 men, the aggregate employed one year during these thirty-three years, 35,127 have been killed in the collieries.

All accidents, except fire-damp explosions, are usually fatal to only one or a few men only. Thus, during the period from 1871 to 1883, there were 515 accidents from fire-damp explosions, killing 3186 men ; 4730 accidents due to falls of roof and sides, causing the death of 4895 men ; 1497 accidents in shafts, killing 1678 men ; 2374 accidents caused by miscellaneous misfortunes underground, leading to the death of 2546 men ; and 1151 accidents on the surface, killing 1178 men. It is this very fact that only too often explosions are attended with much frightful mortality, which has created with the public the deep-rooted conviction that they constitute the most serious danger to the miner, while in reality the destruction they bring with them makes them far more dreaded by the colliery proprietor. To the individual working miner, the unsound condition of the roof is a much more prolific

cause of disaster, especially since it, too, is the most frequent cause of temporary and permanent injury or disablement.

Concerning the production of iron ore in Great Britain, the following table is submitted, showing its source and roughly the percentage of iron it contains. Attempts have been made to compute, on the basis of these figures, the average percentage of iron in the charge in English furnaces, an attempt that was a failure, because it neglected the fact that a good deal of cinder is used, and that much of the stone is calcined and roasted.

PRODUCTION OF IRONSTONE AND IRON ORE IN GREAT BRITAIN.

Under Coal M. R. Act :	Quantity. Tons.	Average per centage of iron.
England (stratified iron stone)	7,266,550	30.00
Scotland	2,238,851	32.50
Total	11,495,401	
<i>Under Metalliferous M. R. Act :</i>		
Cumberland (red hematite)	1,477,052	55.00
Durham (spathose ore and siliceous hematite)	50,248	30.00
Glamorganshire (brown hematite)	25,119	38.00
Gloucestershire (brown hematite)	70,942	44.00
Lancashire (red hematite)	1,371,557	54.00
Leicestershire (brown hematite)	294,825	34.00
Lincolnshire (brown hematite)	1,006,219	30.00
Northamptonshire (brown hematite)	1,290,087	38.00
Oxfordshire and Rutland (brown hematite)	41,645	34.00
Somersetshire (spathose and brown hematite)	14,395	34.00
Wiltshire (brown hematite)	92,114	40.00
Ireland	146,452	36.00
Total	17,383,046	

The bulk of the stratified iron-stone mined under the Coal Mines Regulation Act comes from the Lias bed of Yorkshire, the quantity being 6,926,887 tons, and from the blackbands and claybands of the Scotch coal measures.

In 1883, England imported 3,581,073 tons of iron ore, of which 3,072,955 tons came from Spain. The following gives an idea of the quantity of iron ore available for the blast-furnaces of Great Britain in 1883 :

Iron ore mined	17,381,046 tons.
Ores imported	3,191,073 "
Purple ore (residue from pyrites)	390,000 "
Total	20,964,119 "
Ore exported	8,708 "
Quantity available	20,955,411 "

In 1883, there were in operation in England and Wales 151 works, with 753 furnaces, of which 444 only were in blast. They produced 7,400,300 tons of pig-iron, used 18,225,275 tons of iron ore, and 15,259,556 tons of coal, including coal converted into coke. Scotland had 175 works, with 147 furnaces, of which 107½ were producing, turning out 1,129,000 tons of pig with 2,788,000 tons of iron ore and 2,515,444 tons of coal, making a total in Great Britain of 552½ furnaces out of 900 in blast, producing 8,529,300 tons of pig iron, of which 3,287,000 tons were hematite pig and 179,500 tons of spiegeleisen, the consumption of iron ore being 21,013,275 tons and of coal 17,775,000 tons. The following were the principal producing districts :

PRODUCTION OF THE PRINCIPAL IRON DISTRICTS OF GREAT BRITAIN.

DISTRICT.	No of works in operation.	No of blast-furnaces	Furnaces in blast.	Pig-iron made.	Iron ore used.	Coal used.
Cumberland	14	56	36	876,445	1,577,077	1,668,970
Durham	10	65	36	83,659	2,165,604	1,591,384
Lancashire	9	49	33	796,770	1,504,742	1,422,775
Monmouthshire	10	46	35	522,135	942,189	1,055,162
Yorkshire, North Riding.	19	91	82½	1,867,329	5,681,971	3,878,628
Lanarkshire, Scotland	14	87	70½	714,278	1,860,370	1,626,474

The growth of the manufacture of pig-iron in the United Kingdom during the past ten years may be gathered from the following table :

PRODUCTION OF FIG-IRON IN TEN YEARS IN GREAT BRITAIN.

Year.	Pig-iron made.	Coal used.
1874	5,991,408 tons.	15,292,201 tons.
1875	6,365,462 "	15,645,774 "
1876	6,555,997 "	15,598,381 "
1877	6,608,684 "	15,942,445 "
1878	6,381,051 "	14,112,005 "
1879	5,995,337 "	13,117,411 "
1880	7,749,233 "	18,962,629 "
1881	8,144,449 "	17,484,990 "
1882	8,586,680 "	17,796,301 "
1883	8,529,300 "	17,775,000 "

TO TELL IRON FROM STEEL, IN SMALL PIECES. — A new fracture ordinarily furnishes the means for classifying test pieces, but its appearance is not a sufficiently safe guide in dealing with good, fine-grained iron or very soft steel. In order to effect the separation with ease and certainty in such cases, Walrand has given a simple method in the *Mémoires de la Société des Ingénieurs Civils*, 1883, page 531. It is by observing the fracture of the test piece after heating and allowing it to take a blue color. The trial can be conducted in the following manner. Take a test piece about twenty-five or thirty centimeters long and make a slight scratch about four or five centimeters from the end. Then heat one end slowly and uniformly to a dark-red color (325° to 400° C.), and cool it in water. During the cooling, while the piece is still warm, it must be rubbed with a file from time to time, until the shining metallic surface laid bare has assumed a dark yellow, or, better, blue color, when it is to be cooled quickly and completely. The fractures of the piece broken at the mark serve for comparison. Ordinary wrought-iron broken when cold appears fibrous or crystalline ; but, treated as above, its fracture is dull, irregular, and of short fiber. Hard and moderately hard steel are fine grained ; after the heating and subsequent treatment, they have a shining, totally or partially smooth fracture. Swedish iron has only traces of fibers, and is hardly to be told from soft steel ; after treatment, the fibers become distinct, the smooth appearance is lost, and the iron becomes so much the more distinguishable from soft steel treated in the same manner.

CORRESPONDENCE.

[Communications will be noticed only when accompanied with the full name and address of the writer. Unless specially desired, only initials will be printed. We invite criticism and comment by the readers of the ENGINEERING AND MINING JOURNAL. Replies not intended for publication should be addressed to the Editor of the ENGINEERING AND MINING JOURNAL in blank, stamped, and sealed envelopes. We do not hold ourselves responsible for the opinions of our correspondents.]

Tin Ore of the Etta Mine, Dakota.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Since the publication of my articles on the tin ore of Dakota last September, considerable development-work has been done on the Etta location. Two tunnels have been driven into the hill one hundred feet or more below the highest outcrop of ore. These tunnels have reached the vein and the ore. The ore found at that depth presents some peculiarities not before noted. In one of the tunnels, after passing through the country-rock of slate, quartz and feldspar were found in large crystalline masses associated with coarse and heavy tin-stone. This tin-stone, or black tin, is sub-crystalline; some of masses showing distinct crystalline planes, and giving promise of crystals from half an inch to two inches in length and in diameter. These crystals occur in the midst of both the quartz and the feldspar. Masses of the feldspar weighing several pounds sometimes contain half their weight of cassiterite. This feldspar is the potash variety—orthoclase—and it appears to be as favorable to the occurrence of the tin ore as the soda feldspar, or albite, of the greisen. This albite shows a prevailing lamellar, radial, or plumose condition of aggregation, much like that of the albite at Branchville, Conn. The greisen ore has also been found, but is partly replaced by the coarse aggregation of crystals just described.

The source of some of the green crusts and stains found on and between the masses of ore appears to be in disseminated grains of vitreous copper in small quantity, which decomposes on access of air and water. Some of the cassiterite crystals appear to be amorphous in the center, being filled with a yellowish-white powder, chiefly oxide of tin. Masses of a mineral resembling triphylite have been thrown out, and portions which have been altered by surface exposure are similar to heterosite, but the mineral is not easily fused.

The general average percentage of black tin in the mass of the vein has not yet been determined by working in the large way; but samples of several hundred pounds weight taken from one of the openings sustain the statement at first made, that the general average of the ore will not be less than three per cent of black tin. It is understood that a sample consisting of several sacks of greisen tin ore from the Etta, worked in New York, averaged about four per cent. The bars of metallic tin made from this ore are unusually pure. The difference between "black tin" and the metal does not appear to have been always understood or kept in mind by some writers, which may account for some extravagant statements in the daily papers respecting the percentage of tin. There is also considerable confusion of statement respecting localities. Many sanguine prospectors have mistaken garnet, staurolite, and tourmaline as well as ores of iron for tin-stone.

Among other interesting minerals of the granitic region, beryls, like those of New Hampshire, may be mentioned, but they are not so large.

MILL ROCK, NEW HAVEN, July 26. W. P. BLAKE.

OFFICIAL STATEMENTS AND REPORTS.

THE MINERAL WEALTH OF VIRGINIA TRIBUTARY TO THE LINES OF THE NORFOLK & WESTERN AND SHENANDOAH VALLEY RAILROAD COMPANIES.

Under the title of *The Mineral Wealth of Virginia*, a very neat volume of over 150 pages has been issued, being the second report by Mr. Andrew S. McCreath, of Harrisburg, the widely known chemist of the Geological Survey of Pennsylvania, on the mineral resources of the territory tributary to the Norfolk & Western and Shenandoah Valley railroads. Though perhaps the first part of the title is too comprehensive to stand alone, the report is certainly a very important contribution to the description of the mineral wealth of the State, particularly because Virginia as a commonwealth has really done nothing since the work of Rogers. For that reason alone, Mr. McCreath's volume would command more than ordinary attention. But when it is added that the report is in every respect a model of its kind, and covers a very considerable area of the State, it will be conceded a higher rank in literature than is usually accorded to the documents giving the results of expert examination of single properties. We do not wish to convey the impression that the latter are not often worthy of being treasured by every engineer, but they rarely take so wide a scope. Mr. McCreath's field has been an exceptionally large one. Stretching from Hagerstown, Md., southward, the Shenandoah Valley reaches Roanoke, a distance of 240 miles, while the Norfolk & Western main line extends from Norfolk, Va., to Bristol, Tenn., a distance of 408 miles. In addition, there are the New River Division from Central to Pocahontas, in the Flat Top region, 75 miles, with the Flat Top Extension, now building from Laurel Creek to Peter's Gap, and the 47 miles extension to the Cripple Creek iron ore mines. This, it will be seen, embraces a very considerable part of the Great Valley that stretches from New York through Pennsylvania, Virginia, and Tennessee. Mr. McCreath, in an introductory chapter, well describes its general geological features and discusses its different horizons with reference to their mineral-bearing character. Beginning then with the description of the iron and manganese mines along the line of the Shenandoah Valley Railroad, he follows it with details of the mines along the Norfolk & Western Railroad, and of the mines tributary to the New River Division, giving in each case analyses from as thorough samples as were available to show the quality of the ores. He discusses the red hematite and magnetic iron ores in the Lower Silurian limestones of Southwest Virginia and Tennessee, tributary to the Norfolk & Western Railroad, in a special chapter, because they are unique in character. Sometimes they show in the same mine red and brown hematite and magnetic iron ore. Wherever found, they have been remarkably rich in metallic iron and invariably low in phosphorus, making them suitable Bessemer ores. Mr. McCreath states "that at nearly every opening examined, iron pyrites was noticed; yet in no case does the ore itself carry an appreciable amount of sulphur; but the occurrence may have

some bearing on the origin of these ores. Wherever the red and brown hematites are found together, they are equally low in phosphorus, and this fact may be suggestive of a common origin.

Mr. McCreath's next chapter is given to the now well-known Cripple Creek brown hematite ores which he divides into two classes, the more accessible ores lying in the Lower Silurian limestone; and the apparently still more abundant, but thus far little worked "mountain" ores, which are geologically connected with the Potsdam sandstone. The limestone deposits occur in clefts and cavities of the limestone, mixed with clay, and naturally they yield widely varying quantities of ore. The deposits, however, are very numerous, the ores are free from flint, the clay is easily washed out, and there is an abundance of water for washing purposes. Mr. McCreath says: "The ore-deposits are geographically and topographically well situated for mining, and the ore-bearing material is frequently of unusual richness. As a result of all these favorable circumstances, the region is to-day producing very cheap limestone ore; and the amount of such cheap limestone ore can be quickly and largely increased. It is safe to say that the district can compare favorably in the cost of production with any other brown hematite iron ore producing region. While the high character of these ores will undoubtedly enable them to be shipped to a distance, yet the natural market for them seems to be in their own vicinity, where large furnaces will undoubtedly be built in the near future. The district possesses all the natural advantages for iron making—cheap and good coke from the Flat Top coal region, cheap and good ore, and a cost for flux and labor as low as any other locality."

In Mr. McCreath's final chapter giving a summary of the results, he gives some general averages of analyses, which we may quote:

	Metallic iron.	Phosphorus.
Shenandoah Valley, Va. (29 samples).....	48.646	0.259
Cumberland Valley, Pa. (46 samples).....	42.950	0.464
New River and Cripple Creek limestone ores (17 samples).....	54.514	0.106
Lower Silurian (Va.), red hematites (9 samples).....	62.060	0.032
Lower Silurian (Va.) brown hematite (4 samples).....	54.532	0.031

We may also present the following table of estimates and actual cost of making pig-iron at various points in Virginia, compared with the cost in other well-known iron regions:

Mines, Va.	Ore.	Coke.	Limestone.	Labor.	Incid-entals.	Total.
Actual cost, 1883.....						
(Ore, \$2 1/2 @ \$2).....	\$4.50	\$5.25	\$0.30	\$1.50	\$1.00	\$12.55
(Coke, \$1 1/4 @ \$4.20).....						
Buchanan, Va.						
Estimated cost.....						
(Ore, \$2 1/4 @ \$2.10).....	4.73	4.46	0.60	2.10	1.25	13.04
(Coke, \$1 1/2 @ \$3.25).....						
Roanoke, Va.						
Estimated actual cost, \$12.60.....						
(Ore, \$2 1/2 @ \$2.25).....	4.79	3.60	0.75	2.10	1.25	12.58
(Coke, \$1 1/4 @ \$2.95).....						
Pulaski, Va.						
Estimated cost.....						
(Ore, \$2 1/2 @ \$2.25).....	4.79	3.31	0.60	2.00	1.25	11.95
(Coke, \$1 1/4 @ \$2.65).....						
Cripple Creek, Va.						
Estimated cost.....						
(Ore, \$2 1/4 @ \$1.60).....	3.40	3.88	0.50	2.00	1.25	11.03
(Coke, \$1 1/4 @ \$3.88).....						
Middle Pennsylvania						
All ore, actual cost, 1882.....	9.37	5.02	1.00	2.35	0.48	18.22
Middle Pennsylvania						
Estimated cost, 1884.....	7.75	4.62	1.00	.....	3.25	16.62
Harrisburg, Pa.						
Actual cost, 1882.....						
(Ore, \$2 1/4 @ \$4).....	9.00	5.40	0.85	2.10	1.00	18.35
(Coal, \$1 1/2 @ \$3.60).....						
Harrisburg, Pa.						
Estimated cost, 1884.....	7.50	4.50	0.85	.....	3.25	16.10
Lower Susquehanna, Pa.						
Actual cost, 1882.....	7.60	7.00	0.56	.....	3.00	18.16
Lower Susquehanna, Pa.						
Estimated cost, 1884.....	7.25	4.95	0.56	.....	3.25	16.01
Lehigh Valley, Pa.						
Actual cost, 1882.....	9.34	5.30	0.77	2.23	2.64	20.38
Lehigh Valley, Pa.						
Estimated cost, 1884.....	8.00	5.00	0.77	.....	3.25	17.02
Lehigh Valley, Pa.						
Actual cost (cheap ore), 1884.....	7.28	5.20	0.51	1.81	0.95	15.84
Pittsburg, Pa.						
Actual cost, 1882.....						
(Ore, Lake S. Hem. \$1 1/2 @ \$9.75).....	11.81	3.39	0.77	.....	3.25	17.97
(Coke, \$1 1/4 @ \$3.88).....						
Pittsburg, Pa.						
Estimated cost, 1884.....	10.00	3.00	0.77	.....	3.25	17.02
Phillipsburg, N. J.						
Actual cost, 1881.....	9.46	5.64	0.42	1.59	0.76	17.87
Phillipsburg, N. J.						
Estimated cost, 1884.....	8.00	5.24	0.42	.....	2.25	16.91

These figures certainly warrant Mr. McCreath's conclusion that "pig-iron can be made at numerous points along the lines of your railroads to such advantage that, apart from the local demand for it which the development of country will undoubtedly make, it can bear long transportation to markets and successfully compete with other localities, and yet leave a handsome profit for capital judiciously managed." His final paragraph sums up the matter as follows: "The advantages which the territory traversed by your several lines of railroad offers to the iron-master may be summed up in a few words: "The ores are abundant and generally of very good quality; they can be economically mined; for the country in many localities is broken up by numerous ravines affording natural openings for mining operations; most of the deposits are within easy distance of the railroads, with easy down grades; the water supply, either for washing ore or for manufacturing purposes, is ample and permanent at all seasons; limestone for fluxing purposes exists in unlimited quantities; coke of the finest quality can now be obtained at a reasonable cost; and the railroad facilities for reaching markets in every direction are unusually good; thus forming a combination of favorable circumstances rarely equaled."

Following out the iron resources of the territory that Mr. McCreath describes, we have been led to his closing words without referring to an important part of his work, that relating to the Flat Top coal region. The field, Mr. McCreath tells us, occupies a very large area of land in Tazewell County, Va., and in Mercer, Wyoming, McDowell, and Raleigh counties, West Va. Geologically, the beds belong to the lowest member of the coal measures, being equivalent to the Seral or Pottsville

conglomerate of Pennsylvania, where the group seldom contains coal-beds of economical importance. The "Quinnimont Group," as it has been termed by Professor Fontaine, reaches its maximum importance in the vicinity of the Flat Top area. In Southwest Virginia, it becomes insignificant; northeast, it soon becomes valueless; while at the northwest, on the New River, the beds become much thinner, though the coal still remains excellent in quality. Mr. McCreath has, for a number of reasons, confined himself to the comparatively limited area tributary to the completed railroad, of which Pocahontas is the present terminus. The area of 25,000 acres is practically controlled by the Southwest Virginia Improvement Company, the Flat Top Coal Company, the Bluestone Coal Company, and the Crane Creek Coal Company, the first of which has thus far done the bulk of the actual mining work. Pocahontas is 120 miles from Roanoke, 174 miles from Lynchburg, 298 miles from Richmond, 307 miles from City Point, and 378 miles from Norfolk, where tide-water is reached. The principal bed, the Nelson, or Pocahontas, or No. 3 bed, is nearly horizontal. At the No. 1 or East mine of the Southwest Virginia Improvement Company, the bed is 12 feet 7 inches thick, with 8 inches of top long coal and one half-inch and one 3-inch slate parting. In this mine, the large 6-foot bench is now being taken out, leaving the upper 4 feet 8 inches coal bench in the roof and the 1-foot coal bench in the floor, with the expectation of taking them out later. Mr. McCreath gives a number of returns at other points, which all show how great the thickness is. He states that it should yield 10,000 tons of coal to the acre. As to the cost of mining, he is of the opinion that, at the present rate of wages, the cost of putting run of mine coal upon the cars, with 6 or 7-foot bed of clean coal, good roof and floor, and free from faults, should not exceed 60 cents a ton, actual cost outlay. As to its quality, he gives the following table of analyses, the samples of the different coals being taken from the cars at different shipping-points:

Name of coal.	Water.	Volatile matter.	Fixed carbon.	Sulphur.	Ash.
1. Flat top coal—average of 10 samples....	0.694	18.832	74.066	0.761	5.647
2. Flat top coal—average of 8 samples, No. 3 bed.....	0.698	18.756	73.406	0.752	6.388
3. Cumberland coal—3 samples.....	0.958	19.139	72.798	0.787	6.408
4. Clearfield coal—3 samples.....	1.186	22.168	69.270	0.933	6.443
5. Broad Top coal.....	0.594	17.551	71.334	0.976	9.545
6. Connellsville coking coal.....	1.260	30.107	59.616	0.784	8.233
7. Westmoreland coal.....	1.430	36.145	55.891	0.929	5.595
8. Cardiff coal, Wales.....	2.552	33.123	56.774	1.326	6.225

Recognizing the fact that an analysis of coal may afford some aid in judging of its quality, but does not furnish the means of accurately arriving at comparative merits as a steam producer, Mr. McCreath quotes some elaborate tests made on a number of locomotives of the Shenandoah Valley Railroad, using Flat Top and Baltimore & Ohio, Hampshire Cumberland coals. Full tables of the results are submitted. Suffice it to quote as an instance that one engine making 44,316 ton-miles consumed 0.309 pounds of coal per ton mile of Flat Top coal, against 0.389 pounds in the same engine of Cumberland coal, both on through freight. Similar comparative results were reached with local freight and passenger engines.

Mr. McCreath's report, of which we have given only some of the salient features, will be found highly interesting. His wide experience and conservative judgment give it a special value, and will command general acceptance of his statements. We may add that the report is very neatly printed, well bound, equipped with maps, and, what is only too rarely the case, is provided with a full index.

#### BELGIAN ZINC-WORKS.

A recent issue of the *London Iron Trade Exchange* contained an account of the *Vieille Montagne Zinc-Works*, a portion of which we reprint:

These extensive works, the largest zinc-works in the world, are situated at Chénée, a village near to the Cockerill Works, at Seraing, near also to the glass-works of Val. S. Lambert, and employ 1800 hands. The industrial importance of the district may be appreciated when we state that, for the amount of space covered, the capital invested, and the number of workpeople employed, there are probably no three works on the continent, varying in character, but contiguous to each other, that compare with these vast establishments in the valley of the Meuse. The total number of workpeople employed by the *Vieille Montagne Company* is 7500, who are distributed over 18 mines and smelting-works in France, Germany, Algeria, Spain, Sardinia, and Sweden. Their mines annually supply them with 70,000 tons of mineral of various kinds, besides which they purchase large quantities. The total indicated horse-power of their engines is 5000. At the central works at Chénée, the processes of smelting the ore and rolling and manufacturing the zinc plates are carried on, and 750 men are employed. The grinding and mixing of the clay and the molding of the crucibles in which the zinc ore is smelted are among the most important operations performed in the works; the clay is mixed, pugged, and molded into crucibles by self-acting machinery. As an example of the saving of manual labor caused by the use of improved machinery, we are informed that three men and three boys now attend on one machine, which in a day of 10 hours makes 110 crucibles of 4 feet 6 inches in length, by about 8 inches in diameter, to produce which 40 men, at much higher wages, were formerly required.

There are no children employed, and boys are not admitted until they are 14 years of age. The hours of labor vary in the different departments; men engaged in the ordinary mechanical branches work 10 hours a day. The furnaces are kept constantly going, and most of the men in this department work in shifts of 12 hours each. The "over-men," who are actually responsible for the working of the furnaces, work in shifts of 24 hours. These latter are paid jointly by day and by tonnage. Half the excess of tonnage over day wages is retained, and only paid at the end of six months, if the men remain to the end of that time, the excess over day wages being considered a bonus, a portion of which may be kept back in case of an earlier termination of service. The ordinary payment is fortnightly. Zinc rollers earn about 4s. a day of 10 hours, and this branch of work goes on night and day. Makers of "lozenges" (for roofing tiles) earn from 3s. 3d. to 4s. a day.

#### THOMAS DICKSON.

Thomas Dickson, President of the Delaware & Hudson Canal Company, died on Thursday, July 31st, at his home in Morristown, New Jersey, of heart disease, from which he had been a sufferer for a long time. He was a son of James Dickson, a Scotch machinist, who came to this country in 1835, settled in Carbondale, Pa., entered the employ of the Delaware & Hudson Canal Company, and eventually became its master-mechanic. Thomas Dickson was born in Berwickshire, Scotland, in 1824, and was only eight years old when his father emigrated to Canada. The elder Dickson remained three years in the Dominion, and then came over to the United States and settled in Pennsylvania. For two years after settling in the Keystone State, Thomas went to school, but in 1837, at the age of thirteen, he abandoned the pursuit of knowledge for that of business. His first situation was with George A. Whiting, who had charge of the horses and mules of the canal company; but in the spring of 1838 he secured a clerkship in the store of Charles T. Pierson, in Carbondale. This store passed successively into the hands of Joseph Benjamin and F. P. and Galusha A. Grow; but young Dickson retained his place under these changes, and, in 1845, was able to start in business for himself and form a partnership with his former employer, Joseph Benjamin. This partnership continued until 1852, when he identified himself with iron manufacture by purchasing an interest in a foundry and machine-shop.

In 1856, Mr. Dickson entered upon his first business enterprise in which he took the initiative. He went to Scranton, Pa., and with the aid of his experience, acquaintance, and capital established the Dickson Manufacturing Company. Associated with him were his father and two brothers, George L. and John; Joseph A. Scranton, B. G. Clarke, J. J. Albright, and Joseph Benjamin. Thomas Dickson furnished \$30,000 capital, which was increased soon to \$75,000 by the contribution of others. The company originally contented itself with the manufacture of stationary engines and machinery intended for use in the mines around Scranton; but its prosperity increased under its founder's progressive management, and to-day it has a capital of \$1,500,000, employs about 800 men, and turns out some of the best locomotive engines in the country. Mr. Dickson was president and manager of the company up to January 1st, 1860, when he was succeeded by his brother, George L., his son-in-law, Henry M. Bois, now being the president.

Mr. Dickson entered the employ of the Delaware & Hudson Canal Company in 1860 as superintendent of the coal department, and four years later he was promoted to be general superintendent of all its business. In 1867 he was chosen vice-president and in 1869 he was elected president. When he was general superintendent, the corporation was of far less magnitude than it is now. Its only railroad was a gravity road from Carbondale to Olyphant, near Scranton, together with a branch to Scranton, the total mileage being only 63. Its roads simply furnished connection between the mines and the canal, by which the coal product was carried to tide-water. The company's annual output was only about 500,000 tons, and passengers were carried from Carbondale to Scranton by stage. Now the company owns or leases 149 miles of road in Pennsylvania and about 600 miles in New York.

Mr. Dickson held large interests in important iron mining properties. He was one of the first capitalists to recognize the importance of the ore-deposits along Lake Champlain, and to secure their development. When he died, he was a director of and heavily interested in the Crown Point Iron Company, organized in 1872, the Chateaugay Ore and Iron Company, incorporated in 1875, and the Hudson River Ore and Iron Company, organized in 1881. Mr. Dickson was interested in the Low Moor Iron Mines in Virginia, the Lackawanna Iron and Coal Company, the Oxford Iron and Nail Company, of New Jersey (in which he was a director), and the Grand Tower Mining, Manufacturing and Transportation Company of Southern Illinois. The latter company was consolidated with the St. Louis Iron and Steel Company, which recently suspended because of inability to realize on its assets. Among other concerns with which he has been connected is the Moosic Powder Company, of Scranton, Pa., and the Lafin & Rand Powder Company, whose mills are near Paterson, N. J., and back of Newburg.

#### NEW PUBLICATIONS.

LEITFADEN ZUR BERGBAUUNDE. Von Dr. ALBERT SERLO, *Oberberghauptmann und Direktor der Abtheilung für Berg-, Hütten- und Salinenwesen im Ministerium der öffentlichen Arbeiten. Vierte verbesserte und bis auf die neueste Zeit ergänzte Auflage.* [Guide to the Art of Mining, by Dr. Albert Serlo, Oberberghauptmann and Director of the Division of Mines, Smelting-Works, and Salines in the Ministry of Public Works. Fourth Edition, improved and completed to the most recent date.] Berlin: Julius Springer, 1884. Two vols. 8vo, pp. 841 and 668. With 745 woodcuts and 32 lithographed plates. Tables of contents, but no index.

The appearance of a new edition of this well-known treatise can not fail to be an event of interest to mining engineers throughout the world. The fact that three editions have been called for since its first appearance in 1868 is a strong evidence of its value and the recognition which it has won from the profession. The first edition was the product of the editorial skill of Dr. Serlo exercised chiefly upon the materials left by his lamented friend and colleague, Bergrath Heinrich Lottner, the founder and director of the Berlin Mining Academy (1859), and the professor of mining in that famous school, whose lecture-notes were bequeathed at his death (1865) to Dr. Serlo, and whose name appeared also upon the title-page. The third edition, however, which appeared in 1877, had been so thoroughly reconstructed by the editor that Lottner's name could no longer be retained as author, although the preface to the first edition and the preliminary sketch of Lottner's life still appeared, in honor of his memory and merit. The same is true of the edition now before us, which has been still further changed and extended by incorporating in it the results of an examination of the professional literature down to about October 1st, 1883.

It is not necessary at this late day to point out the excellence, both in plan and in execution, of this manual. It was never intended to take the place of more elaborate monographs on special subjects; yet on many heads, it is not surpassed in fullness and precision by such treatises. As a comprehensive survey of the methods and principles of min-

ing, it has probably never been surpassed. Certainly we have nothing in English that approaches it. Its clear yet compact style, its skillful use of suggestive drawings in the text, rather than large plates in an accompanying atlas, and its abundant references in foot-notes admirably adapt it for consultation by active practitioners who want to get suggestions and the necessary guidance for further inquiry, if such should be desired. The one defect which has always impaired the value of this work, and which grows more annoying as each successive edition increases the size of the book, is the lack of an alphabetical index. There is an amazing blindness on this subject among German scientific writers. They classify and sub-classify until the reader goes wild among their useless molecular divisions. Then they put this analytical hotch-potch into a table of contents, and seem to think that this is an adequate substitute for an index. In the book before us, which, by the way, is not by any means the worst case we could name—not nearly as bad as Grimm's work on Ore-Deposits, for instance—this fault is illustrated. If we wish to find, say, *Haloxylin*, we can not look in an index under the word itself, or under *Explosives*. We must study the table of contents. There we shall find, after a while, that the third section treats of *Excavation and its Tools*. Under this head, there are two sub-heads: A, *Hand-Labor*, and B, *Machine-Work*. Under A there are eight sub-sub-heads, of which the fifth is *Blasting*. Under "V. *Blasting*," we have four sub-sub-sub-heads, to wit, a, *Tools*; b, *Explosives*; c, *Loading and Firing*; d, *Execution of the Work*. Under "b, *Explosives*," we find six sub-sub-sub-sub-heads, 1. *Ordinary Gunpowder*; 2. *Other Kinds of Powder*; 3. *Nitric-Compounds*; 4. *Gun-Cotton*; 5. *Explosive Paper*; 6. *Explosive Gelatine*. Under the comprehensive sub<sup>4</sup>-head *Other Kinds*, etc., there are sixteen sub<sup>5</sup>-heads, designated aa, bb, and so on; and at last, having carried logic and wrath to the sixth power, we find that

III. A. v. b. 2. kk

is the formula which guides us to *Haloxylin*. Of course, we have learned in the search a good deal that we were not hunting for, and do not at the moment want. Of course, also, this laborious arrangement has its uses as furnishing a syllabus of the whole subject. Nobody desires that tables of contents should be omitted. But the attempt to make them serve as substitutes for indexes, by making them very elaborate after this fashion, is futile. They serve very imperfectly the great purpose of the index—ready reference. Unless one is using a volume so constantly as to know, and never forget, its interior structure, one must waste time and patience at every consultation in mastering the author's plan *de novo*. How is a man to know *a priori* that Dr. Serlo classes *Explosives* under *Hand-Labor* instead of *Machine-Work*? For the purpose now under consideration, we would rather have a book numbered in consecutive paragraphs throughout, with no attempt at classification, and an exhaustive index, alphabetically arranged, as a guide to the whole. But this extreme is not necessary. Only give us the index, and we will not complain of the typographical intricacies of the table of contents, which make it as hard to follow as a railroad guide.

In this connection, we point with a good deal of pride to the indexes which Dr. Drown appended to the successive volumes of the *Transactions* of the Institute of Mining Engineers. The first volume appeared without any; but this fault was quickly perceived and remedied by a subsequent publication. Then two indexes, one of topics and one of authors, were added to each volume. This was a surviving element of the German mania for classification. It may be seen also in the three indexes to the reports of the writer as U. S. Commissioner of Mining Statistics. Mines, districts, and general subjects are there separately indexed—a piece of youthful inexperience, which we are sorry to see the Director of the Mint still imitating. We can assure him that there is no sense in it; and he may believe us; for we have learned our wisdom by exasperating experience, as we turned to the wrong list in a hurry. Dr. Drown made the same discovery; and since Vol. V., we believe, the *Transactions* of the Institute have carried but one index, and that a thorough one. The recent appearance of a consolidated index to the first ten volumes really doubles for practical purposes the value of the series, by rendering it, of all the works in the library of a mining engineer, the one which will most quickly reveal to him whether it contains what he wants, and, if so, on what page.

To return to the work now in hand. It contains innumerable facts of importance to which the table of contents gives no clue. For example, we wish to know which rock-drill was used at the Mont Cenis and which at the St. Gothard tunnel. There is no way to find out whether the information is here, except by reading through all that is said about the various rock-drills, until we come to those of Sommeiller and of Dubois and Francois.

We have not said half enough on this subject, and we would say a good deal more if we could thereby make sure that our cry of distress and remonstrance would be heard on the other side of the water. German technical literature is so thorough and conscientious that it ought not to be left in such a mutilated state as often cripples its usefulness. It is a thousand pities that a patient workman should forge and temper and sharpen and polish a perfect blade—and then offer it to us without a handle.

Having thus unburdened our soul, we proceed to our main purpose, which is to show the extent and nature of the improvements and additions in this fourth edition of Dr. Serlo's books, as compared with the third edition, issued in 1878.

That the additional matter is both considerable in amount and distributed throughout the whole work, will appear from the following tabular summary of the sections, showing the extra number of pages given to each, and the total.

	Additional.	Total.
I. <i>Das Vorkommen</i> , etc. (Occurrence of useful minerals).....	4	54
II. <i>Aufsuchen der Lagerstätten</i> (Prospecting).....	16	147
III. <i>Die Hauerarbeiten</i> , etc. (Tools and work of excavation).....	67	235
IV. <i>Gruben</i> , etc. (Mines, stopes, and workings).....	23	189
V. <i>Grubenausbau</i> (Mine-supports).....	20	216
VI. <i>Förderung</i> (Hauling and hoisting).....	61	247
VII. <i>Führung</i> (Going in and out of the mine).....	7	38
VIII. <i>Wetterführung</i> (Ventilation).....	42	218
IX. <i>Wasserhaltung</i> (Drainage, pumping, etc.).....	24	159
Totals (apart from preface, contents, bibliography, etc.).....	364	1,503

The number of illustrations has been increased from 640 woodcuts and 23 lithographed plates to 745 of the former and 32 of the latter; and

examination shows that these, like the extra text, have been distributed throughout the book. By these simple tests, we satisfy ourselves that this edition is symmetrically enlarged—not merely padded with disproportionate additions in a few spots. It represents faithful and well-digested work.

An inspection of the above table reveals that the largest increase has been in the third, sixth, and eighth sections. The additions to the third section comprise a number of new explosives (compressed powder, Harvey powder, diorrexin, heraklin, explosive gelatine), a number of new drills of the pressure-type, such as those of Jordan, Loch, Brandt, and Jarolimek—the two latter, in particular, belonging to a class of machines not yet, so far as we are aware, introduced into American practice—and a number of cutting-machines, and devices for breaking rock without blasting (wedges, lime-cartridges, etc.). Dr. Serlo mentions among his authorities only three from this country. Drinker's book on *Tunneling*, the *Transactions* of the American Institute of Mining Engineers, and this journal. But from this small list he has gathered much, though his references to it are usually brief. Still, they are sufficient to put the inquirer on the track. We miss a good many names, familiar to us, such as Atlas, Hercules, and Rendrock powder, Wood and Waring drills, etc. But perhaps we do not recognize them under their foreign names; and perhaps, having no index, we have given up the search too soon. Life is short; and an editor's life is shorter, relatively to his art, than any body else's. There is in this section an interesting account of the use of wedges in coal mining, to avoid blasting (mentioned in our columns, vol. xxiii. p. 55), and of the breaking-down of coal, after under-cutting, by means of the expansion of burnt lime, when slacked (*ibid.* vol. xxxiv., p. 19). Dr. Serlo's third edition mentioned merely the unsuccessful experiments of Elliott in this direction. He now records the reported success of Shipley and Moore with their compressed lime-cartridges in Shipley, concluding with these words: "According to the accounts before us, this method has been greatly successful in English mines, where the coal is but moderately solid; while for very solid coal, the pressure is not great enough, and in broken, crumbly (*mürbe*) coal, the generated steam passes into the cracks without effect. At the Saarbrücken mines and in Upper Silesia, no favorable experience has been obtained with this method; moreover, Klose proved by testing with lead cylinders the ineffectiveness of the operation." The reference here is to the Prussian *Zeitschrift*, vol. xxxi., B., p. 91, where Klose's experiments at Saarbrücken are recorded. Dr. Serlo describes (vol. i., p. 235) the lead cylinder test. It consists in measuring the force of an explosive by firing a charge of it inside a lead cylinder, which the expansive force of the gases of explosion of course enlarges. Equal weights of different explosives fired within similar cylinders under similar conditions will expand the cylinders in different degrees; and this affords a means of comparing them as to force. It seems to us, however, rude and imperfect in two respects. First, it does not permit the absolute measurement in foot-pounds of the energy developed. Secondly, since the enlargement of the cylinder is irregular, an exact measurement is difficult. In both respects, the apparatus employed by General Abbot, United States Engineer Corps, in his tests of explosives at Willett's Point, is much better. That apparatus is described in General Abbot's report, published a year or more ago, and noticed in our columns. By an ingenious arrangement, he caused the force of the explosion to hammer, as it were, the end of a lead cylinder, by driving a piston upon it; and he measured subsequently by comparative experiments with a ballistic test-machine the actual energy in foot-pounds exerted upon the sectional area of the lead cylinder. It is a pity that Dr. Serlo has not included this method in his book. He seems to have overlooked General Abbot's experiments altogether. But here we must again remark that, having to examine the book without the help of an index, we may have overlooked that of which we were in search. Under such circumstances, when we say that this or that is lacking, we must be understood as meaning merely that looking in the place or places where it ought, according to our best judgment, to be found, we do not find it. If we are thus led to perpetrate an unintentional injustice, we trust our distinguished friend, the author, will both pardon us and blame himself therefor.

In the sixth section, the electric transportation at Zankeroda (see vol. xxxvi., p. 14 of this journal) is described; but apart from this, we notice no new topic in the table of contents. The increase in this section is distributed throughout, and is principally due to the addition, under each head, of later information. Thus the space given to steam hoisting-engines has been doubled.

In the eighth section, we find as novelties the screw-ventilator of Pelzer and the turbine-ventilator of Kraft. There is also a pretty full description of the Westphalian improvement upon the English method of closing hoisting-shafts, so that they can be used as air-ways (upcast) to mechanical ventilators. As is well-known, the necessity of having a closed shaft to connect with the fan, and the supposed necessity of an open shaft for hoisting, was for a long time a chief ground of the preference shown for furnaces by English mine superintendents, who were accustomed to use the hoisting-shaft as an upcast. This arrangement obviates, it is true, that objection to the use of the fan; but in our judgment the objection should have been abandoned anyhow; because the passage of the warm, moist, foul air of the upcast-current through the main working-shaft is both disagreeable and destructive of timbering. A deep colliery should have two exits at least; they are indeed in most places required by law. The one used for hoisting, which needs to be large and thoroughly timbered, should be a down-cast, and the air-shaft should be used under ordinary circumstances for air only. It need not be so expensively timbered, and its maintenance will involve but a trifling cost. Moreover, the ventilation can be much better managed through such an upcast.

Under the head of safety-lamps, there are descriptions, not found in the third edition, of the lamps of Rosenkranz, Jüttner, Goddin, Gildenmeister, and Kamp, Fox, Birckel, and Wolf. The latter, a benzine-burner, which can be both extinguished and relighted without opening, is perhaps the best safety-lamp—both as to amount of light and as to degree of safety—now in existence. Dr. Serlo's book does not contain a drawing of it; and American mining engineers will be glad to know that the paper on the Wolf lamp, presented by Mr. Eugene B. Wilson, of Drifton, Pa., at the Chicago meeting of the Institute, and shortly to be distributed to the members, is accompanied with an illustration.

The use of the electric light, whether stationary or portable, in mines, is mentioned briefly. It does not seem to have made any greater progress abroad than here. There has been talk of it in a good many quarters; but Dr. Serlo reports no regular use of it in a colliery, and only one instance of any kind, namely, the Hungarian salt mine of Maros-Ujvár. The portable apparatus of Benoit and Dumas, which consists of a zinc-carbon battery, a Ruhmkorff coil, and a Geissler tube, can scarcely be called a lamp, since it gives less than  $\frac{1}{2}$  as much light as a common Davy, or less than  $\frac{1}{4}$  as much as the ordinary naked light of a miner, and weighs some 16 pounds. But it is of inestimable value in emergencies where no safety-lamp can be trusted, since by the feeble glimmer of the gases in the Geissler tube, work can be done in the presence of the most explosive fire-damp—as, for instance, in cases of rescue, or as in the case at Saarbrücken, where a violent “blower” of fire-damp was walled up by a party working with this light alone. On the other hand, it appears that the true electric lights, whether arc or incandescent, are not absolutely safe; since if the glass globes inclosing them should be broken in the presence of explosive mixtures, the spark or glowing filament would be capable of igniting the gas. For stationary illumination, however, we think the incandescent lights will undoubtedly prove useful in collieries, and will be much safer than the gas-lights now frequently employed in Great Britain.

We could go on indefinitely to notice the new matter contained in this edition of Dr. Serlo's great work; but the limitations of space forbid further comment. We have said enough to show that it is a contribution to technical literature of the highest practical value for mining engineers in practice as well as for students of the art. To those who do not already possess an earlier edition, we can give emphatic advice, to purchase this; and those who, already possessing an earlier edition, know its character and value, can scarcely afford to go without it in its present extended form. The necessity of continually buying new editions of standard works is one of the incidents of the progress of our art. It advances with great rapidity, adopting promptly the latest discoveries of science; and its practitioners must keep pace with it, at any cost.

We should be glad if such books as this existed in English. But a mere translation of them into English would not be sufficient. Although they are coming more and more to quote American practice, they do so at second-hand, and can never, in the nature of the case, take the place of indigenous literature. Their chief value to us is as epitomes of foreign practice, from which we may obtain valuable suggestions. And since the German mining literature is incomparably the most abundant and thorough in the world, we earnestly advise all mining engineers to acquaint themselves with it, in its own language. In lecturing to classes of students, we have been accustomed to name the knowledge of German among the necessary qualifications of the accomplished mining engineer; and in looking back upon our professional career, while we notice many utterances which time and experience would lead us to recall, that is not one of them.

#### QUARRYING SLATE BY MACHINERY.

In the slate district of Pennsylvania, a machine has recently been introduced which bids fair to supersede the old method of drilling and blasting. The machine is the invention of John Crump, of Philadelphia, and of Richard Brereton, superintendent of Mr. Crump's quarry. Mr. Crump four years ago proposed to himself the project of devising a machine to cut and finish with true surface all kinds of building stone as it lies in the ground, thus saving the enormous waste of blasting processes and the handling of the waste. He engaged Mr. Brereton to assist him, and the result of their labors is this novel “rock quarryer and stone shaper,” which they have had patented in all countries under the above name. Its cutting power is shown by the ease with which it goes through the flint in this slate quarry, where, at least, it is capable of doing remarkable work. Whether it can be as successfully employed in cutting and shaping granite and other hard rocks is not decisively proved as yet, though it is designed for such use.

The machine in its essential features is as novel as it is effective. It looks like a very coarse circular saw, but is not driven like a saw, and it makes its cut in an entirely different way. Thus, it runs backward, cutting upward instead of downward, moves very slowly instead of rapidly, and is driven not from its axle, as saws are generally driven, but from its periphery. The cutting disk is substantially like that of a saw, with removable chisel teeth. These have an alternate “set,” right and left, and at intervals there is a straight tooth to clear out the sliver that the two sets of teeth might otherwise leave. Near the outer edge of the steel disk there are two rows of oval holes in which the teeth of two pinion-wheels, one on each side, engage. This is the driving mechanism, and it serves two useful purposes. It applies the power at the most advantageous point, and it steadies the large, thin disk,  $\frac{1}{4}$  inch thick, while cutting through very hard rock, or rock containing hard particles of flint. The circular cutter is, in fact, simply journaled on its axle, and is pulled around by its periphery while making an upward cut. The feeding mechanism is worm-screws and cog-wheels, so geared with the cutter that they move in unison. The whole machine (including the boiler and the steam-engine for driving the cutter) is mounted upon one framework, and all of the mechanism travels together upon pinion-wheels, the pinions of which engage in holes in an iron trackway laid upon the rock to be cut. The depth of the cut made is nearly one half the diameter of the cutting disk, and may be of any length that the quarry permits. The cutter may be set at any desired angle, and if the stone is to be finished before its removal, files are attached to each side of the saw-plate, slightly wider than the cutter, thus removing the saw-tooth marks.

The teeth of the cutter are, as before remarked, removable, and they are removed and replaced while the cutter is at work. The cutters do not get hot. The machine moves so slowly that a boy has plenty of time to take out a dull tooth as the saw comes up from the stone, and replace it with another before the part of the blade from which it was removed has again passed below the surface of the stone. A boy is employed at this work all the time, and with a set of machines at work, the teeth are being constantly resharpened, ready for return to the cutting disks of

steel. In the slate quarry, the machine is said to work admirably. It makes a cut “across grain” about 36 feet in length, or with the grain 75 feet in a day, and of a depth proportioned to the diameter of the saw or cutter. There is practically no waste in quarrying slate by this process. It saves from 10 to 30 tons of waste for each ton made marketable. Cross cuts, leaving sharp square edges and corners, can be made, but in quarrying for roofing slate only lateral cutting is required. Two parallel cuts having been made at any desired distance apart, say 2 $\frac{1}{2}$  feet, a line is nicked out where it is desired to split off the block, and a few sharp blows determine the fracture. The blocks are then removed from the quarry, and at once split and shaped by expert workmen into roof slate. All the work except the simple process of splitting and cutting to size is done in the quarry, and without handling or any waste except that of the saw cuts. The slate, moreover, is removed without such incipient fractures as are liable to result from blasting and other violent processes of dislodgment. Roofing slate is sold by the “square,” a square being as much slate as will cover 100 square feet of roof—say, a space 10 by 10 feet. It is claimed that slate can be quarried by this machine and prepared for the market at from one third to one fifth the present cost, besides saving a vast amount of material that is now wasted.

#### CRESTED BUTTE MINING CAMPS.

Correspondence of the Engineering and Mining Journal.

This is one of the most interesting little cities in Colorado. It is of importance, not only as a metal mining center, but for soft and hard coals; good coking coal in abundance in the city limits, and a genuine anthracite coal almost in sight of the workings of the other. There is an extensive coke-plant here, and a fine quality of coke is made. The company is preparing for still more extensive works. It is going to put up another set of ovens on the mesa just above the present ones. The Gunnison and Crested Butte branch of the Denver & Rio Grande Railroad extends beyond this city some three miles to the “Anthracite Breaker.” Passing along yesterday, I picked up some fine specimens of anthracite as one would wish to see. In a future letter, I may have something to say on the whole question of hard and soft coals in such close proximity. I have been over Cascade Mountain, up through Baxter Basin, over the crest of the basin, and along the sides of Dark Cañon. Along this route, there are some fine prospects and several good mines, that is, regular producers of good ore in paying quantities. The coal business will keep up this city while the metal mines are developing, and better roads than burro trails are constructed. Here are some facts about the coal industry of these mesas that will be of interest to those who have not looked into the matter. The “Anthracite Breaker” has a capacity of one thousand tons a day, but only about three hundred can be mined at present. The dip of vein is 9° 30'; average thickness, five and a half feet.

The basin will average net about six thousand tons per acre of land area. With present liberal rates of the Denver & Rio Grande road, a profit of one dollar per ton ought to be realized on coal shipped to Gunnison, Leadville, etc. This anthracite, by analysis, carries of

Fixed carbon.....	93.93
Moisture.....	3.15
Ash.....	2.92

According to Prof. C. P. Williams, Ph.D., it carries of

Fixed carbon.....	90.200
Of moisture at 105°.....	1.160
Of volatile matter at red heat.....	4.700
Ash.....	3.940
Specific gravity.....	1.419

It is what is known as red ash coal. Coal men from Pennsylvania own about one half of the whole field.

I next invite attention to the Crested Butte bituminous coal and the made from it:

Fixed carbon.....	68.70
Volatile matter.....	22.80
Water.....	1.50
Ash.....	7.00

A contrast of this with the Connellsville coking coal, which is generally regarded as the standard, shows the superior quality of this coal:

Connellsville—Fixed carbon.....	59.62
Volatile matter.....	30.11
Water.....	1.26
Ash.....	8.23
Sulphur.....	.78

An analysis of the coke made of these coals gives an instructive contrast. Crested Butte coke carries—

Carbon.....	92.03
Ash.....	6.20
Sulphur.....	none

Connellsville coke gives of

Carbon.....	89.57
Ash.....	9.11
Sulphur.....	.82

There is a deposit of coal twelve miles west, about Irwin, but not so thick as the one at this point. The railroad will be extended to that point at no distant day, and then there will be a great increase in the coal business of this basin. Colorado mined 2,500,000 tons of coal last year.

When I have studied the situation as to the geology of this section more carefully, I will make it the topic of a future letter. Suffice it to say at present, that in my humble opinion there can be few more interesting and remarkable parts of the surface of mother earth than this to the geologist.

Pen pictures of the scenery of this picturesque country are out of place probably, in a scientific and industrial journal; hence, I leave such as I may be able to make for the home paper.

T.  
CRESTED BUTTE, COLO., July 23.

In the United States Court at Pittsburg, the application for an injunction by the Atlantic Giant Powder Company of California to restrain the Marquis Hulings, Wilson Barr Howe, and others from infringing upon letters patent for a method of exploding nitro-glycerine was dismissed by Judge Acheson on the ground that the method under which the defendants have been operating had been disclaimed by Albert Nobels, to whom the original letters patent were issued.

## THE LEGG COAL MINING MACHINE.

The Legg coal mining machine consists of a bed frame, occupying a space 2 feet wide by 7 feet 6 inches long, composed of two steel channel bars firmly tied with iron braces. The top plates on each forming racks, with their teeth downward, into which the feed-wheels of the sliding frame engage. Mounted upon and engaging with this bed frame is a sliding frame similarly tied, consisting mainly of two steel T bars, upon which are mounted at the rear end two small 5 inch by 5 inch engines, from which power is transmitted through straight gear-wheels to the rack, by means of which the sliding frame is fed forward. Upon the front end of this sliding frame, is mounted the cutter-bar, held firmly by two solid steel shoes, with suitable brass boxes. The cutter-bar contains twenty-six bits made of tool steel, held in place by set-screws. When the cutter-bar is revolved, these cutters or bits cover its entire surface. The cutter-bar is revolved by one endless steel chain from the driving-shaft. The feed is thrown on and off by means of a lever. We are informed that the cut under

is made and the cutter bar withdrawn in from 4 to 6 minutes. The machine is easily handled by two men, and will undercut from 500 to 800 square feet of floor per day of 10 hours.

The construction of the machine is very simple, so that any body of ordinary intelligence can understand and handle it with a few days' instruction. Special pains have been taken to make the parts durable; so that, with ordinary care, they will last a long time. The bits are easily changed, requiring but about ten minutes to take out one set and put in another. These should be changed from two to three times each day, and oftener if the cutting is hard and gritty. Any blacksmith who understands working steel can make them.

The operation of the machine is about as follows: The machine is placed in front of the coal at one side of the room, on the floor of the mine; the cutter-bar is then driven into the coal to a depth of about 5 feet, and by means of the reverse feed is withdrawn when the machine is moved over the length of the cutter-bar, and another cut is made, withdrawn again and set over as before, and so on continually, until the entire room is undercut. This machine, which is manufactured by the Lechner Manufacturing Company, Columbus, Ohio, has been thoroughly tested in the mines of Ohio, Pennsylvania, and Illinois, and has proved very satisfactory.

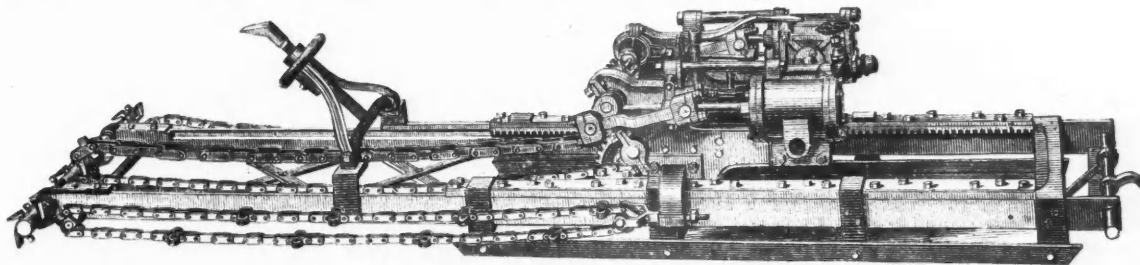
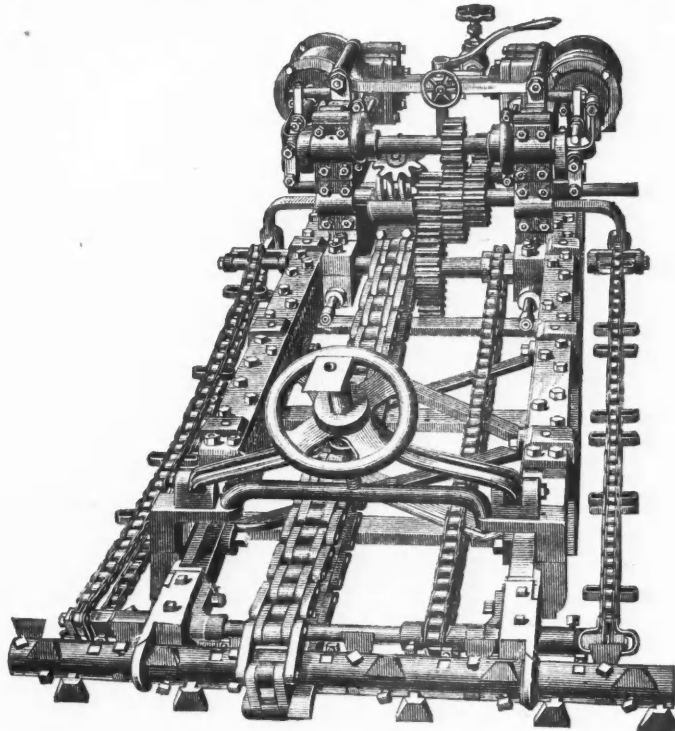
## THE LAW AS AFFECTING MINING AND METALLURGICAL INTERESTS.

*The Form of a Lode Claim.*—A lode claim need not be in the form of a parallelogram, as has been held by the Commissioner of the General Land-Office for the last few years, but may be of any shape or form, so as

being traced by its outcroppings. Your decision holds that, "as the peculiar conditions do not exist that would make such a location satisfy the intent of the mining act, it will be necessary to amend the survey so as to conform to all the requirements of the statute, Sec. 2320, R. S., as construed by this [your] office, to wit: "A lode claim must be, to all intents and purposes, essentially a parallelogram." Such a construction should be founded on the reason of the thing, or the clear intent of the statute. As to the former, I fail to perceive any reasonableness in the requirement of a parallelogrammic form. If a fissure-vein deviates literally at an angle, it is reasonable, as the primary purpose of the statute is to grant the mineral, that the location should deviate with it. If the mineral is not deposited in a fissure, but in irregularly shaped masses, as in this instance, then, as it can in no wise affect the interests of either the United States or adjoining locators, whether any given L-shaped lot be covered by one or by two locators, it is unreasonable to hold that it shall not be embraced by one location.

Turning to the statute referred to, it reads that "a mining claim located after the 10th day of May, 1872, may equal, but shall not exceed, 1500 feet in length along the vein or lode," and that "no claim shall extend more than 300 feet on each side of the middle of the vein at the surface." It is apparent that the purpose of these provisions is to limit the dimensions of the location, and not to prescribe its shape. It is to be not more than 1500 feet long, and not more than 600 feet wide. The point of measurement selected is the "vein," and if the measurements be made along and from the middle of a vein that departs literally from its course at a right angle, it is obvious the statute is satisfied. Precisely the same quantity of land and lode is appropriated by an L-shaped as by an I-shaped location, where the length and width are determined from the middle of the vein. "There is no language in the act," says the court, in *Wolfley vs. the Lebanon Mining Company* (4 Col., 112), "that requires the diagram to be in the form of a parallelogram, or in any other particular form." I will go farther, and say that the language of the statute precludes the conclusion that it contemplated a parallelogrammic location. The requirement of such a shape might be inferred, if the language had been, "no claim shall exceed

1500 feet in length by 600 in width;" but the introduction of the provisions requiring a measurement of length "along the vein," and of width from "the middle of the vein," plainly points to a reason for the selection of the central line of the location instead of the side-line, and that reason must have been the possible tortuous course of the vein. There could be no practical purpose in selecting the middle of the vein as the place of measurement, except to provide for an appropriation of the same quantity of surface by a deflecting as by a straight location. Since the statute authorizes an L-shaped or other irregularly-shaped location in the case of a fissure-vein, it must authorize it in the case of a horizontal deposit,



THE LEGG COAL MINING MACHINE.

to embrace therein the lode, and not to exceed the surface ground allowed by law. The following is the text of the Secretary's decision:

WASHINGTON, D. C., July 2, 1884.

TO THE COMMISSIONER OF THE GENERAL LAND-OFFICE.

SIR: I have considered the claim of the Breece Mining Company upon the Philadelphia lode, Leadville, Colorado, on appeal by claimants from your decision, requiring an amended survey of the location. The plat shows a location running northeasterly 875 feet, measured along the line marked "center of vein;" thence southeasterly, at a right angle with its former course, 450 feet; thence northeasterly, parallel with its original course, 175 feet. It is thus 1500 feet in length, measured along said "center of vein," and it is 300 feet or less between the side-lines. The location appears to be surrounded by other locations on all sides, its western end-line being part of the east line of lot 487, and its eastern end-line lying within the limits of lot 474, and parallel with the former. A few feet south of the center vein of the location, and at its western extremity, is the discovery shaft, and a second shaft appears some 600 feet to the eastward, being a few feet north of said center-line. There appears to have been no discovery of mineral elsewhere in the location. Affidavits set forth that the underlying mineral is found as a comparatively level deposit, irregular in form, in no wise a fissure-vein, and not capable of

such as is found in this case, if the reason of the thing does not forbid. That such a deposit is within the meaning of the descriptive terms "vein or lode," in the statute is settled (*Stevens vs. Williams*, 1 McC., 430), and I have said above that there are no practical considerations opposing it. Therefore I see no reason for objecting to the location in the case before me, and reverse your decision.

H. M. TELLER, Secretary.

TRANSMISSION OF POWER BY ELECTRICITY.—One of the most remarkable instances of the transmission of power by electricity is that presented by the electric railroad in one of the main cross-cuts of the Opper colliery, Saxony. This cross-cut is 2365 feet long, and is the outlet for the coal mined in the vein, the quantity delivered to it being six hundred mine-cars per day of sixteen hours, each car weighing, loaded, 1594 pounds. A train of fifteen cars is moved at a speed of from seven to ten feet a second, the steam-engine at the mouth of the shaft making from 225 to 250 revolutions during the run, lasting from three and one half to four and one half minutes, through the cross-cut. When doing this amount of work, the steam-engine delivered 11.2 horse-power; or, assuming the friction of the engine's gearing to have occasioned a loss of twenty-five per cent, the power actually transmitted by the electric current to the locomotive was 5.23 horse-power, or 46.6 per cent.

## THE LAW OF THE APEX.\*

By R. W. Raymond, New York City.

This name is applied to the present mining law, as enacted in 1872 and since, to indicate its leading characteristic—in which it differs from all previous mining laws of this or any other country. The earlier act, passed in 1866, was practically the first attempt of Congress to deal with the question of mining titles upon the public domain. It was framed after nearly twenty years of acquiescence on the part of the government in the self-constituted tribunals, officials, rules, and customs of the mining districts. In its recognition of these, and in several other particulars, the act of 1866 was open to serious criticisms. It is the purpose of this paper, not to trace the history of legislation on this subject, or show in detail what were the faults of the earlier law, but rather, by a discussion of certain aspects of the present law, to point out how great a revolution it has effected in the rights of mining locators, and to indicate some of the difficulties attending its application.

In the attempt to correct the vagueness of the act of 1866, an entirely new element was introduced into the law, bringing with it a new set of difficulties. Under the act of 1866 and the miners' customs that it followed, the lode was the thing claimed and subsequently acquired by patent. And the claim to a given number of feet on the longitudinal course of the lode was rooted in a discovery of any part of the lode in any part of the claim. ("Extensions" could in many districts—perhaps universally—be located and claimed on the strength of the discovery in the principal claim to which they referred; but this is a point not essential to the present discussion.) It was not necessary to find the outcrop or the upper edge of a lode, in order to lay a valid location upon it. An explorer, sinking a shaft and intersecting a lode not already discovered and claimed by another, could claim by that discovery the number of feet along that lode that the local laws might permit (not exceeding the maximum set by the United States statute), whether his surveyed surface claim included the outcrop or not. The surface, although it might be surveyed and bought for so much an acre from the United States, was not conveyed in fee to the locator. He acquired only an easement or right to occupy this surface with shafts, adits, buildings, machinery, dumps, etc., necessary for the working of his mine. By one decision, at least, in Nevada, it was held that a patentee could exclude explorers from the surface of his claim; but this was overruled by the Supreme Court of the State, on the ground that the United States statute was intended to confirm, not diminish, the rights of miners as existing before its passage. On the same ground, it was held in Utah (in the Emma-Illinois case) that the right to a certain number of feet of the course of a lode "together with the right to follow such vein or lode, with its dips, angles, and variations, to any depth, although it may enter the land adjoining," was independent of the surface-lines of the location. This case was never appealed, but the decision was reversed by the United States Supreme Court in the Flagstaff case (Flagstaff S. M. Co. vs. Tabet, 8 Otto, 453), to which further reference will be made.

The act of 1872, in its third section (now section 2322 of the Revised Statutes), reads as follows:

"The locators of all mining locations heretofore made, or which shall hereafter be made, on any mineral vein, lode, or ledge, situated on the public domain, their heirs and assigns, where no adverse claim exists on the tenth day of May, 1872, so long as they comply with the laws of the United States, and with State, territorial, and local regulations not in conflict with the laws of the United States governing their possessory title, shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface-lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side-lines of such surface locations. But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward as above described, through the end-lines of their locations, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges. And nothing in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the vertical lines of his claim, to enter upon the surface of a claim owned or possessed by another."

Section 2 of the act of 1872 (section 2320 of the Revised Statutes) makes the following provisions as to shape and size of claims:

"Mining claims upon veins or lodes of quartz or other rock in place, bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits, heretofore located, shall be governed as to length along the vein or lode by the customs, regulations, and laws in force at the date of their location. A mining claim located after the tenth day of May, 1872, whether located by one or more persons, may equal, but shall not exceed, 1500 feet in length along the vein or lode; but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. No claim shall extend more than 300 feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than 25 feet on each side of the middle of the vein at the surface, except where adverse rights existing on the tenth day of May, 1872, render such limitation necessary. The end-lines of each claim shall be parallel to each other."

Section 12 of the act of 1872 (section 2329 of the Revised Statutes) reads as follows:

"Claims usually called 'placers,' including all forms of deposit, excepting veins of quartz or other rock in place, shall be subject to entry and patent, under like circumstances and conditions, and upon similar proceedings, as are provided for vein or lode claims."

The same section of the act of 1872 (section 2330 of the Revised Statutes) fixes the maximum size of a placer claim at 160 acres for any one person or association, and section 11 of the act (section 2323 of the Revised Statutes) provides that—

"Where the same person, association, or corporation is in possession of a placer claim and also a vein or lode included within the boundaries

thereof, application shall be made for a patent for the placer claim, with the statement that it includes such vein or lode, and in such case a patent shall issue for the placer claim, . . . including such vein or lode, upon the payment of five dollars per acre for such vein or lode claims and 25 feet of surface on each side thereof. The remainder of the placer claim, or any placer claim not embracing any vein or lode claim, shall be paid for at the rate of two dollars and fifty cents per acre, together with all costs of proceedings; and where a vein or lode such as is described in section 2320,\* is known to exist within the boundaries of a placer claim, an application for a patent for such placer claim, which does not include an application for the vein or lode claim shall be construed as a conclusive declaration that the claimant of the placer claim has no right of possession of the vein or lode claim; but where the existence of a vein or lode in a placer mine is not known, a patent for the placer claim shall convey all valuable mineral and other deposits within the boundaries thereof."

These extracts from the law will suffice to bring before us the points to be discussed in the present paper. A careful examination of them will show the following facts:

1. There is no difference of status between locators and patentees of lodes as to the extent of their rights of possession and enjoyment. Other sections than those quoted above show the difference to be one of tenure only—the mere possessory owner being obliged to maintain his title by annual work and by obedience to local regulations, and being liable to attacks upon his title against which the patentee is expressly protected, after the period of his public advertisement has passed, and his patent has been granted. But there is this important difference between a locator and a patentee of placer claims, that the former does not own by virtue of his placer claim any lodes that may be discovered within it; while the latter, by virtue of placer patent, has a complete title to all lodes within the placer claim that were not known to exist there when the patent was granted, or probably, even, when the application for patent was made. But this right does not extend, as it might do under a lode location and patent, to "exterior parts" of such lodes.

2. The title conferred by a lode patent comprises the usual common law right to the surface and all that is upon it or beneath it—with one addition and one corresponding reservation. The addition is the right to follow certain veins under certain conditions and within certain limits, into adjoining ground; the reservation is its counterpart, namely, the liability to be intruded upon, through the exercise of the same right by the adjoining owner. That is to say, all parts of lodes within the claim or patent that have their top or apex outside of it belong to the locators whose claims include such top or apex; and they have also the right to come and get their property—without which right, the mere ownership of it would be a barren pleasure.† These extra-lateral mining rights are often spoken of as something different in character and origin from the common law right. But, as I have elsewhere shown,‡ this is not the case. We have simply to deal with the fact that the United States, as sole owner of the public domain, has chosen to permit its occupation and exploration, and to sell it to citizens on certain terms and conditions. However whimsical or unprecedented these terms may be, or whatever hardship they may involve in special cases, there is no appeal from them to any supposed "principles" of mining law.

3. The old right of discovery, which was the basis of the miners' title down to 1872, has dwindled under the present law to a nominal importance. It is true that a "discovery of the lode" within the claim is made a pre-requisite to location. But the right to follow the lode in depth beyond the side-lines of the claim depends no longer on having discovered it, but on having included its top or apex within the surface survey. Even to that portion of the lode actually discovered that lies within the surface boundaries, the right of the locator is not secure, unless his location includes the apex; for, if he have it not, his adjoining neighbor may have it, in which case the neighbor will have the right to follow the lode into the land adjoining. And, on the other hand, the original discovery may turn out to have been valueless; nevertheless, the location based on such a poor or barren seam will carry with it the right to all rich veins that may have a top or apex in the same ground, though the actual discovery of such seams be made elsewhere, even at a prior date.§

\* That is, a vein or lode "of quartz or other rock in place, bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits."—R. W. R.

† "The property in minerals is not necessarily accompanied by the right to work for them." Collier's *Treatise on the Law Relating to Mines*, Am. ed., Philadelphia, 1853, section 3, p. 14.

‡ In Lalor's *Cyclopædia of Political Science*, article "Mines;" also in letters to the Public Land Commission, published in the *ENGINEERING AND MINING JOURNAL*, November 22d to December 20th, 1879, and in the Report of the Public Lands Commission to the Senate and House of Representatives (Washington, Government Printing-Office, 1880), from which I quote the following passages (pp. 645 *et seq.*):

"The mineral right, however [under the common law], although it accompanies the surface ownership, is separable by the act of the owner. A farmer in New Jersey may lease or sell the right to mine and carry away all the iron ore in his farm, with the privileges of entry and use of the surface necessary to mining operations, retaining his title in all other respects unimpaired; or he may thus dispose of the right to a single bed or vein of ore, retaining all others. A farmer in Pennsylvania may in like manner lease or sell all his coal rights, or the right to one or more specified seams of coal, reserving to himself, undiminished, whatever is not thus transferred. A party owning the adjacent farms may grant the mineral right to a given deposit of coal, ore, or other mineral upon one of them, with the right to follow and mine in the other that deposit only. All these and many other varieties of grants actually occur in our Eastern States; and the rights thus conferred, as defined by the agreements creating them, are independent of surface ownership, although in their origin they rest upon the principle that the owner of the surface owns also the minerals beneath it.

"The government occupies precisely this position toward the public domain. It can do what it likes with its own. There is no 'miners' right' created by the discovery of valuable mineral in any part of that domain, except what the government chooses to create by its own voluntary acts. By such acts it is bound, as an individual would be, neither more nor less. It is as free as any individual would be to dispose, as it may see fit, of any rights not already conveyed away; to change its policy at any time; to lease or sell on new conditions, or to decline to lease or sell at all. This elementary statement seems to be required to correct a popular impression that the principles of the law of mines are different in different parts of our country, and that there is some mysterious obstacle in this difference to the introduction of a uniform system."

§ I am aware that it was held in the United States Circuit Court of Colorado, in *Vandant vs. Argentine Mining Company* (Copp's *United States Mineral Lands*, p. 410) that a location along the line of the top, apex, or outcrop of the vein can not prevail against a senior location on the dip. But, while this is in accordance with the spirit of the old miners' customs, and grants a praiseworthy recognition to the merits of the prior locator, it is squarely against the letter of the statute, which can scarcely be evaded in such a way. The court, in the above case, gave no reason for its ruling, and indeed seemed scarcely to be conscious of its revolutionary character. The law is plain and uncompromising. Whoever has the apex takes the vein, *quoad* the section between the end-lines of his claim. There is no reservation whatever in favor of prior locators.

\* Read at the Troy Meeting of the American Institute of Mining Engineers, October, 1883.



4. What I have called the extra-lateral mining right of the locator is granted in a peculiar form. There is first a sweeping grant of "the exclusive right of possession and enjoyment" of "all veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface-lines [the surface-lines of his location] extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side-lines of such surface locations." This phraseology has the merit of clearly conveying the meaning intended, though descriptive geometry and the English language suffer somewhat in the operation. "Vertical side-lines" of surface locations, and horizontal lines "extended downward vertically," are perhaps fit accompaniments to the singular "top or apex" of the plural "veins, lodes, or ledges." But the goal is reached, though the vehicle is damaged. In these particulars, every body knows what the law means; because every body assumes that it means something, and every body sees that it can not mean any thing else. This sweeping grant is followed by the limitation: "But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward, as above described, through the end-lines of their locations, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges." It will be seen that nothing limits the rights of the locator, outside of his location, to "all veins," etc., having their top or apex in or under his surface-claim, except the vertical planes drawn through his surface end-lines.

5. That the term "vein," "lode," and "ledge" are synonymous in the statute appears from the manner in which they are employed. Thus, in section 2322, above quoted, we have the phrases, "vein, lode, or ledge;" "veins, lodes, and ledges;" "veins or ledges;" "vein or lode"—all apparently referring to the same thing. It is evident that the omission of "lode" in one place, and of "ledge" in another, from the comprehensive triple phrase, is not intended to make it less comprehensive. Nor does section 2329, which includes under "placers" "all forms of deposit, excepting veins of quartz or other rock in place," mean that "lodes" or "ledges" are placers, whatever it may mean as to irregular masses or impregnations. I should not deem it necessary to dwell on this point, but that in one case, at least, an important ruling has been based upon the supposed distinction between veins and lodes.\*

It appears, then, that the miner's rights are dependent upon the lode, the top or apex, the downward course of the lode, and the end-lines of the location. Yet the statute gives no light upon the all-important questions, what is a lode? What is the top or apex of a lode? How is the downward course of a lode to be determined? while, as to the direction in which the end-lines are to be drawn, it prescribes only that they must be parallel.†

The typical or normal case, evidently contemplated by the statute, is that of a well-defined lode, without variation in dip or course, having a horizontal outcrop, and a location in the form of a rectangle, covering this outcrop throughout the entire length of the location, and terminating in end-lines which cross the course of the lode at right angles. All other "veins, lodes, or ledges," having a top or apex in the same ground, are conceived to be parallel in course and dip with the lode first discovered, which is the foundation of the location. If all mining properties presented this beautiful simplicity of structure, and all mining locators exhibited a corresponding simplicity of purpose, the application of the law would be easy. But the *naïveté* of the statute fares badly between the freaks of nature and the tricks of man. The decisions of the courts have done something to clarify, and not a little to complicate, the situation. On the whole, they have, perhaps, improved it; and by the time the various questions involved shall have been finally passed upon by the Supreme Court, we shall have found out whether the statute can be fairly applied in practice or not. My own impression is, that to construe the law is not difficult; but that its strict construction may make it odious. So long as local tribunals try to accommodate it to local needs or prejudices, it will remain vague—and popular with the litigating classes which form so large a part of the mining communities. If its enforcement brought hardship to them, we might hope for their assent (hitherto withheld) to its salutary amendment.

I propose to consider, in their order, the inherent difficulties of applying the law, connected with the lode, the top or apex, the course downward, and the end-lines.

(TO BE CONTINUED.)

#### THE SOUTHERN COAL TRADE.

In a recent issue of the *Philadelphia Press*, Robert P. Porter presents some facts about the Southern coal trade, from which we take the following extracts:

In my recent tour through the industrial regions of the South, I visited the principal coal mining districts in Alabama, West Virginia, Tennessee, Virginia, and Georgia, and obtained some interesting facts relative to the quality of the coal, its present and future market, and the condition of the coal miners, many of whom I found to be convicts. One of the principal reasons for the rapid development of the Southern coal industry is the fact that it has been found available for coking purposes. Though a large portion of this country is underlain by coal, the supply of coking coal is limited. In all the coal deposits around Pittsburg, there is only one that is used for coking and for iron making purposes, namely, the celebrated Connellsville coal. The coal of Illinois, Missouri, Kansas, and Iowa is not used for coking. When you leave Connellsville and go through Virginia, you do not find very much, but at one point on the New River (Pocahontas) they have been coking recently and making iron. Outside of Virginia and West Virginia, there is no coking coal in the South until Middle Tennessee is reached, where the Sewanee mines are located. I found the coal at this point a good coking coal; it makes coke that makes good iron. It is not a strong coal, and it takes a good

deal of it to make coke, and more of the coke to make a ton of iron than it does of Connellsville coke.

The largest mining operation in this coal district, and with the exception, perhaps, of the Pratt coal mines of Alabama, the largest in the South, is at Tracy City. It is an enchanting spot for such grimy operations, and, in its picturesqueness and beauty, unlike any coal region I have ever visited. It is reached from Cowan by the Tennessee Coal and Iron Company's Railroad, which climbs the mountains at a steep grade until we are 2500 feet above the level of the sea. Nearly 1000 men are engaged here in mining and coking operations, more than half of whom are convicts. I staid in the community two days, and was afforded opportunity to observe the working of this peculiar system of free and prison labor working side by side. The convicts are housed in a large wooden stockade; their beds are of straw; their food is coarse, but wholesome; and they are guarded rather by the musket than with lock and key. To a stranger, Tracy City looks like a community that had adopted the convict garb. Men in striped suits are driving mules, building coke-ovens, blasting rock, fishing, running of errands, cooking, washing dishes, butchering, mending the roads, mining coal, working at the forge, and I had almost said guarding the stockade, for there seemed as many men on the outside as on the inside. However, they were all within range of a rifle should they attempt to escape. If the convict performs his task, which is from five to seven "boxes" per day, ranging from 80 to 112 bushels of coal, that is all that is required of him. He is paid for extra work and may spend the money on any luxuries. He may smoke, chew, talk, play the banjo, sing, or amuse himself and others with a double shuffle. Free miners earn from \$1.75 to \$2 a day.

In Alabama, the system is similar to that of Tennessee, and the celebrated Pratt mine, a few miles from Birmingham, is the great center of coal mining, and here are employed 600 or 700 convicts. How much cruelty and inhumanity enter into the Southern method of dealing with convicts I do not know. A Southern man, Mr. Cable, has told the worst story of convict life in the South. That he had ground-work for it, my own inquiry into three Southern prisons, with their mining adjuncts in the coal-fields, attests. Both in Tennessee and Alabama, the managers of these convict gangs assure me that many of the prisoners become honest miners; that they were taught trades in prison, etc. Next to the Sewanee mines, the best coking coal is found in the Warrior coal-field. The supply of this coal is inexhaustible, and the next ten years the development of the Alabama mines will be nothing short of those of Illinois, which, during the last decade, have jumped from a product of 2,000,000 to 10,000,000 tons. The Alabama mines ought to and will supply coal to an immense Southern and Southwestern territory. The opening of the Warrior coal-fields has already greatly decreased the cost of coal at Mobile. In 1880, the government paid as high as \$11 a ton for coal used on the revenue cutters. The coal came from the North. The extensive development of native coal has brought down the price of coal to \$3.74 a ton at Mobile. It will be laid down at Mobile for \$2 a ton.

#### THE SPECTROSCOPIC EXAMINATION OF THE VAPORS EVOLVED ON HEATING IRON, ETC., AT ATMOSPHERIC PRESSURE.\*

By Mr. John Parry, Ebbw Vale.

Metallurgists favored with opportunities of observing the behavior of metals while being heated or fused are of opinion that the fumes usually seen are due to the volatilization of the metal itself or of some more volatile constituent. In casting alloys of the more fusible metals, this dissociation or volatilization is an accepted fact, and is usually considered when adjusting the proportions of the constituents. Alloys of the more infusible metals, such as iron, manganese, nickel, cobalt, etc., have not been studied; but those who have observed the behavior of crude iron and steel while being fused, or otherwise manipulated at high temperatures, have noted that, in addition to the well-known evolution of gas, fumes are given off, which has led to the inference that, as before stated, some more volatile constituent is being evolved; and Professor Ledebur asserts that, as iron is being volatilized, the chemical composition of the metal may be changed, presumably, within certain narrow limits. It may be that crude iron is slowly dissociated, and certainly at the high temperature of the Bessemer process iron is volatilized, and may be seen far above the mouth of the converter, forming a red cloud, quite unlike ordinary smoke or vapor. The spectroscopic examination of the flames issuing from blast and other furnaces show only continuous spectra, with but few lines, very similar to the spectrum of the ordinary Bunsen flame, with the exception of the Bessemer flame, which gives the carbon spectrum, together with (according to some observers) that of manganese.

I have, however, found that many of the metals are volatilized at a comparatively low temperature, but give only continuous spectra when examined in the flame. The vapor requires the intense heat of the electric spark to be passed through it to insure complete dissociation, and consequent production of the usual line spectra. (A list of metals tested is attached hereto.) Spiegeleisen fused in a crucible evolved a fume in which I detected zinc, copper, manganese, calcium, and, with less certainty, magnesium. Bessemer pig-iron, similarly treated, gave copper, manganese, calcium, either lead or arsenic, as well as gas burning with a flame resembling that of carbonic oxide. Bessemer pig-iron burnt in a stream of oxygen at a dull red heat gave copper, manganese, etc., as before, but more intensely; also a great number of lines which appear to be derived from iron. This spectrum requires careful study, and, when developed, may throw some light on the reactions occurring during the Bessemer blow. Spanish iron ore reduced in a crucible with charcoal, at a heat sufficient to form a button of fused metal, evolved zinc, copper, and manganese. It is therefore probable that matter may be evolved during the ordinary heating processes in the manufacture of iron and steel, as previously explained, but giving no visible indications of the fact, in consequence of the heat being sufficient only to volatilize without effecting dissociation. With my present limited experience, I am of opinion that the actual quantity of matter evolved from iron, steel, etc., is very small, and not at all likely to affect the quality of the coarser kinds of iron and steel, although it may be otherwise when a material of good quality and great purity is required. The germ of the

\* In the case of the Colorado Central (G. W. Hall et al.) vs. Equator Mining and Smelting Company (Georgetown, Colorado), tried first before Judge Hallett, February 3d, 1879. At the second trial, in July, 1879, Judge Miller took a different view. This case will be more fully discussed farther on.

† Even this provision "is merely directory, and no consequence is attached to a deviation from its direction."—*Eureka Cons. M. Co. vs. Richmond Cons. M. Co.* Field, Sawyer and Hillyer, JJ., 4 Sawyer, 311.

\* *London Chemical News*.

foregoing is to be found in the recent work of spectroscopists, more especially of Mr. Lockyer, who, in his *Studies in Spectrum Analysis*—a volume abounding in suggestions which should, in my opinion, be carefully studied by those practically engaged in the iron manufacture—says, "Depend upon it, that as spectroscopy becomes the daily work of iron-founders, and the like, it will be found to be bristling with scientific truth which may be used in these practical applications."

NOTE.—Spanish iron ore evaporated to dryness with hydrochloric acid. The dried chlorides were carefully and gradually heated in the blow-pipe, and copper, zinc, calcium, barium, lead, silver, and manganese lines successively detected in volatilized chlorides. At the highest obtainable heat, iron lines are seen. The impure ferric chlorides, obtained by digesting steel or iron in hydrochloric acid and evaporating to dryness, heated as above, show—first, copper and calcium; secondly, manganese; next, with less certainty, chromium and magnesium. On increasing the heat, the iron spectrum is vividly seen. Steel or iron filings, mixed with ammonium chloride, and heated also, give the foregoing series of spectra, which last longer, and may be repeated by successive additions of the chloride. Very fine spectra of sulphur and phosphorus may be obtained by slightly heating either, on a moderately hot plate of iron, placed just below the spark from the coil.

NOTES ON THE VOLATILITY OF THE METALS HEATED IN CRUCIBLES—FLETCHER'S INJECTOR BLOW-PIPE USED.

Thallium.....	Very volatile.	Seen in flame and spark above.
Arsenic.....	Very volatile.	Seen in spark only.
Copper.....	Very volatile.	Volatilized from most metals, in flame and spark.
Cadmium.....	Easily volatilized.	Seen in spark only.
Zinc.....	Easily volatilized.	Seen in spark only.
Bismuth.....	Volatilized at highest red heat.	Seen in spark only.
Antimony.....	Easily volatilized.	Seen in spark only.
Potassium.....	Easily volatilized.	In flame and spark.
Sodium.....	Easily volatilized.	In flame and spark.
Tin.....	Volatilized at highest temperature of blow-pipe.	Spark only.
Lead.....	Volatilized at lower temperature than tin.	Spark only.
Silver.....	Not volatile.	Copper spectrum seen. Spark only.
Gold.....	Not volatile.	Copper spectrum seen. Spark only.
Chromium.....	Not volatile.	Copper spectrum seen. Spark only.
Manganese.....	Volatilized with difficulty.	Spark only.
Aluminium.....	Volatile.	
Selenium.....	Very volatile.	Spectra require further study.
Tellurium.....	Very volatile.	Spectra require further study.
Phosphorus.....	Easily volatilized on hot plate.	Good spark spectrum.
Sulphur.....	Easily volatilized on hot plate.	Good spark spectrum.

Notes of Experiments on the Spark Spectra of the Chlorides of the Metals and Alkalies Volatilized at Atmospheric Pressure.

The chlorides of lithium, strontium, copper, and calcium are volatile in the flame of an ordinary alcohol lamp, showing the characteristic spectral lines in the spark about one inch above the flame.

Zinc, barium, copper, and magnesium chlorides are also faintly seen. Query about arsenic? Filter-paper moistened with zinc chloride and placed in the alcoholic flame gave the line W. L. 4809.

Steel filings, mixed with ammonium chloride and heated—copper and manganese first appear, next calcium (zinc?), next iron spectra; after heating thirty minutes, only on copper and manganese two lines are seen. Iron lines nearly gone; calcium seen. Further heated thirty minutes, only calcium; traces of copper flashing out.

Spiegeleisen as above; in addition, magnesium seen; brighter spectrum throughout.

Copper chloride mixed with ammonium chloride and heated with spirit-lamp in a glass tube 20 inches long—copper distinctly seen in the spark at the top of the tube.

Impure steel chlorides, as above, heated in glass tube 4 inches long, spark at top—calcium first seen, copper, next, manganese group. After heating some time, only calcium and copper were visible.

Ordinary nickel, cobalt, bismuth, tin, and antimony show copper spectrum when heated. All metals hitherto tested evolve copper.

Query zinc in steel?

Query magnesium in spiegel? Only first line of magnesium seen on edge of nitrogen line, W. L. 5712.

Compared this line with magnesium, by clamping cross wires down on it; magnesium line distinctly seen on edge of nitrogen, W. L. 5712.

FURNACE, MILL, AND FACTORY.

The 250 horse-power Cummer engine, just started in the Amoskeag Cotton Mills, Manchester, N. H., has attracted the admiration of all in that vicinity, and is looked upon with a great deal of pride by the owners and manufacturers. During the past week, the Cummer Company has made the following shipments: A 55 horse-power engine, with complete outfit, to the Goshen Electric Light Company, Goshen, Ind.; one of 170 horse-power to Lorin Mitchell, Wausau, Wis.; a 130 horse-power to C. B. & D. H. Cowan, Canal Winchester, O.; one of 55 horse-power, with complete outfit, to R. Dietly & Son, Moorheadville, Pa.; and a 250 horse-power engine to I. P. Evan & Co., Indianapolis, Ind. The Cummer Engine Company has just started one of its ice and refrigerating machines in the plant of the Robert Portner Brewing Company, Alexandria, Va.; and another in the Brewery of Albert Ziegele & Co., Buffalo, N. Y. This is the second Ballantine ice and refrigerating machine furnished the Ziegele Company, and the makers consider it a strong indorsement of their machine. The Cummer Company has just completed the erection of two of its refrigerating machines in the plant of the Co-operative Brewing Company, Buffalo, N. Y., and expects to ship another ice machine and four more engines this coming week. It reports a very flattering outlook for its business, and that it is running to its full capacity on ordered work.

After long and careful experiments with five different speed and power tricycle attachments in different forms, the Pope Manufacturing Company, of Boston, Mass., has completed one which seems to it satisfactory, and has it ready in sufficient numbers to supply it on its new machines, and to any Columbia tricycle. The Columbia power-gear is of simple construction; is applied to the crank-shaft; is operated by a handle, easily accessible, at the left hand of the rider as he sits on the tricycle; is certain and effective in its operation; reduces the speed, and so increases the power for hill-climbing about one third, and is made of the finest material and with the finest workmanship, and so as to avoid all unnecessary added friction by its use. The advantages of a power gear are to well understood by tricycle riders that it is unnecessary here to explain them. It may not, however, be so obvious to all that a power gear has the advantage of a speed-gear, because by its use the normal or unmodified leverage and speed of the machine remain dependent upon the same direct action as if the power-gear

were not on the machine, and the machine is used so much more on levels and down-grades and slight inclines that it is undesirable to make any added friction or loss of power through connections for this riding, while the power-gear in use on stiff grades or rough pieces of road gives an advantage of leverage so much that the little unavoidable loss of power is best placed upon the machine when the gear is in use. The power-gear adds but a trifle to the weight of the machine, and makes but a slight change in the appearance.

A. Lappan & Co., of Pittsburg, have just finished and shipped a lower jacket or boss for the Victoria Blast Furnace Company at Goshen, Virginia.

A large order has just been finished at the Atlas Foundry, Pittsburg, which will be shipped this week for the St. John's Nail and Manufacturing Company, at Newfoundland. The order consists of a 24-inch cylinder, 36-inch stroke engine, a fly-wheel weighing 18 tons, an 18-inch train of nail plate rolls, a 15-ton shipping plate shears, a large crocodile squeezer, and other rolling-mill machinery. The shipment is to be made via New York, and will take three weeks to reach the point of destination. The company will make nails principally for codfish packages. Formerly it made its nails from nail plates rolled in England, but now it will make its own from scrap iron obtained from wrecked ocean steamers around the coast.

The *Morning News*, of Wilmington, Del., says: The new cable railroad at the stone quarries of Andrews & Locke, on the north side of the Brandywine, above Riddle's Mills, gives great satisfaction. Its length is 750 feet, just the same as that of the new Baltimore & Potomac Railroad bridge, and the cable, which is composed of steel wires, is two inches thick. The velociped car is quite different, the new invention avoiding the clamping and the old system of raising and lowering the car to take on its loads. The present one has a Lidgerwood patent friction engine of fifty horse-power, with two drums. Over one runs a wire rope which passes to the south side, where it runs over a sheave and returns to the forward end of the car, while the other end is attached to the hinder part, thus making an endless wire, by which the car is propelled back and forth. Around the other drum runs a wire rope by which the car is lowered to the ground to load or unload or raise by a single hand upon a lever. The engine, which weighs 25,000 pounds, was made by the Lidgerwood Manufacturing Company of New York, and is a fine piece of mechanism. The improved car is Colonel Locke's own device. It is able to make the trip in twenty seconds, moving much more rapidly than the one at the bridge. The railroad is so arranged that the massive stones, weighing tons each, can readily be deposited on the cars of Andrews & Locke's private railroad, or on cars on the branch of the Wilmington & Northern Railroad. After the completion of the bridge masonry, the latter arrangement will be a very beneficial one, for the firm has taken a lease of the quarries, and will continue to work them and sell the stone, which is of a very superior quality.

The Heudey & Meyer Engineering Company, Denver, Colo., is to manufacture the 100 horse-power engine that is to drive the machinery at the Denver Exhibition.

The first practical trial was made at Cleveland of an electrical motor for street cars, the Brush Electric Works, in connection with the East Cleveland Railroad Company, having fitted up about two miles of track and attached a motor to the car.

At Chicago, the Hardy Four-Cylinder Engine Company was incorporated with a capital stock of \$100,000. The incorporators are Robert H. Cowdry, Henry D. Ames, and William F. Howe.

Ground will be broken at Chicago for the new works of the Baraganath steam-jacket feed-water heater and purifier. They will be of brick, two stories and an 11-foot basement high, and 75 x 150 feet in size. New machinery will be added, and it is intended to have all completed this fall.

Titusville, Pa., is to have new steel and iron-works, the Eames Petroleum Iron-Works plant having been purchased by Burgess, Garrett & Co. It is not their intention to manufacture the ordinary grades of iron and steel, but special grades of both. They also assert that they can make a self-tempering steel.

A dispatch from Ironton, O., announces the failure of Hiram Campbell & Sons, iron manufacturers, and places their liabilities at \$300,000. There is no statement of assets.

The National Foundry of James McCullough, Jr., at Kittanning, was damaged \$500 by fire recently.

The Lancaster Rolling-Mill, at Hempfield, Lancaster County, formerly operated by Manuel McShain & Co., is now leased by the Franklin Iron Company, Limited, of which Mr. W. G. Mendinball is chairman and Mr. G. Albert Smith, secretary and treasurer. The office of the company is at Lancaster.

The rolling-mill which was started at Houston, Texas, in May last contains one 9-inch and one 16-inch train of rolls, three heating-furnaces and two spike-machines. The mill produces light iron rails, merchant iron, railroad spikes, fish-plates, and general railroad supplies. The works are owned by the Houston Rolling-Mills and Iron Company, of which A. Groesbeck is President, William J. Faux Secretary and Treasurer, and William Faux General Manager and Superintendent.

The Ohio Valley Foundry Company, Bellaire, has been incorporated, with a capital stock of \$30,000.

The Western Nail Company, Belleville, Ill., started up its machines last Monday. These works now have a capacity of 35,000 kegs per month.

About two o'clock on the morning of the 21st inst., a fire broke out at the open-hearth steel-works of the Cambria Iron Company, Johnstown, Pa., which destroyed the elevator used to elevate stock for the melting-furnace and the washer. It also consumed some wooden sheds in the rear of the works, entailing altogether a loss of some \$3000. The open-hearth works will be stopped for some days to repair the damage.

The mills and furnaces of Kimberly & Co. and of the Sharon Iron Company, Sharon, have shut down.

The Waterman-Campbell Iron Company has been incorporated in St. Louis with a capital of \$75,000.

The *Ætna* rolling-mill at Cleveland has shut down for an indefinite period.

A small crucible-steel plant has been in successful operation for over six months at the corner of Albany and Swett streets, Boston, Mass. The works are owned by Joseph W. Howard, Limited, and contain four 4-pot steel melting-boles. They have an annual capacity of 300 tons of castings of every description.

The Harrington Rotary Engine Company, of Chicago, has been incorporated, with a capital stock of \$1,000,000. The incorporators are Seth Turner, E. I. Ballou, and George S. Bowen.

LABOR AND WAGES.

The coal miners, at their State convention at Pittsburg on the 25th ult., elected as President, George Harris; Vice-President, Louis Hopkins; Secretary, Richard Davis; Treasurer, Thomas A. Armstrong. It was decided to change the name from the Miners' Amalgamated Association to the Miners' and Laborers' Association. The convention then adjourned.

The union stove mouners at Fuller, Warren & Co.'s works and at Bussey & McLeod's foundry, Troy, N. Y., who struck some time ago, have offered to work with non-union men, but now they find their places all filled.

Circulars calling a State convention of coal miners to meet in Massillon, O., were sent to the mines throughout Ohio on July 25th by John H. Williams, who still claims to be general secretary of the Ohio Miners' Association. The circular is signed by Williams and T. Smith, Secretary of the Executive Board. The subjects for consideration are the disturbances in the association, the Hocking Valley strike, and prices for mining at present and in the fall. The call is issued by

the faction of the association opposed to John McBride, the general president, and the convention will probably result in bringing the bitter fight which has been in progress some time nearer to a settlement of some sort.

The molders of the Manhattan Hardware Works, Reading, refused to accept a reduction of from 10 to 15 per cent in wages, and went out on a strike. The firm says a reduction is necessary to enable it to compete. The men say they have suffered several cuts since the first of the year, and they refuse to accept any more.

The annual convention of the Amalgamated Association of Iron and Steel Workers will be opened in Pittsburg on August 5th, and continued five days. The convention is expected to take action looking to the strengthening of the Association in the East; also to bring about the conclusion of the strikes at Beaver Falls, Pa.; Aurora, Ind.; and Birmingham, Alabama. The men have been out at these places a long time, because the manufacturers refused the association recognition. It is stated that there will be no change in the officers. About one hundred and fifty delegates from all parts of the country will be present.

The officers of the Bethlehem Iron Company on the 28th ult. announced that a general reduction of twenty per cent in the wages and salaries, including those of all the officers of the company, as well as of the workmen, would take place on August 1st. The occasion for this announcement, the officers say, is the great reduction in the price of steel rails, a fall of \$3 per ton within the past ten days. The works of the Bethlehem Iron Company will be kept going, the officers say, as the company will be enabled by this reduction in the expenses to furnish steel rails at the market price. The company employs about 2500 men.

Shipley & Wells, owners of the largest boiler shop and iron foundry near Binghamton, have notified their men of a cut of ten per cent in their wages. The alleged cause is dullness in the trade. The men have accepted the cut without a strike.

About one thousand miners and laborers of the Highland and Jeddo collieries have gone on a strike to resist what they claim is a demand upon them to sign away their rights under the act of 1881 which assures to laborers in and about the mines the payment of their wages at regular intervals. The collieries are operated by G. B. Markle & Co., and the firm owns a large supply store near the works where the miners get their groceries and general supplies as they desire. The men who were in debt to the firm for supplies furnished by the store always received their checks, less the amount due on store bills, and were not asked to sign any receipts. On Saturday, however, a waiver in the form of a receipt was presented to each man which he was requested to sign. The men refused, and at a meeting of the men a request was sent out to all other miners and laborers of the State to resist any similar attempt made elsewhere. This move on the part of the operators at the Jeddo collieries is looked upon as a forerunner of a general movement to be made to compel employes to waive their rights under the act of 1881, and is exciting great indignation on the part of the miners throughout the whole of the anthracite regions. The strikers have been promised liberal assistance.

#### RAILROAD NEWS.

The first audit of the accounts of Messrs. Keim, Caldwell, and Lewis, receivers of the Philadelphia & Reading Railroad and Coal and Iron companies by the Master, George M. Dallas, Esq., shows that when the receivers' accounts began, June 3d, a balance of \$10,017.23 was carried over by the railroad company, and this, including the receipts for the month, makes a total of \$2,153,539.03. Deducting wages, contingent expenses, drawbacks, etc., the balance at the close of the month was \$237,571.22. The Coal and Iron Company's audit shows that the cash balance on hand June 2d in its treasury was \$9108.28, which, added to receipts, etc., made a total of \$1,003,355.63. After deducting payments for wages, freight, royalties, etc., the balance on hand at the close of the month was \$2179.23.

#### COAL TRADE NOTES.

##### COLORADO.

J. B. Wheeler & Co.'s coal mine, comprising six miles of coal belt, lies thirty-five miles west of Aspen. The total development is 1000 feet, the main tunnel being 500 feet long, and there being 500 feet of levels and cross-cuts. He has a seven-foot vein of coking coal, which is coked in pits, yielding coke containing 13 per cent of ash. Ovens will be built next month. He employs 40 miners at \$3 a day.

##### MARYLAND.

In the Cumberland region, Jackson, Koontz, Detmold, and Old Coney mines are working full-time. New Coney, not quite full-time. Pekin, doing little or nothing. Potomac, full-time. Swanton, six hoppers a day. Ocean, full-time. Miller, Hoffman, full-time. Eckhart, full-time. Hampshire, half-time. Franklin, half-time.

##### MEXICO.

The Sonora Anthracite and Development Company has been formed in San Francisco, Cal., having for its object the development of the coal-fields in Sonora. The government has granted it a concession of 5,000,000 acres of mineral lands with all the contents, except gold and silver. These lands are located near Guaymas. The capital stock is \$10,000,000.

##### OHIO.

The Seneca Coal Company is opening a new mine in a 5-foot vein of bituminous coal in new territory, near Senecaville. It has contracted with Griffith & Wedge, of Zanesville, for a full hoisting-plant, including double cylinder hoisting-engines, boilers, cars, and cages, and expects to be in full operation by the middle of August.

##### PENNSYLVANIA.

###### ANTHRACITE.

The Derringer colliery at Derringer, a small village near Hazleton, owned by Coxe Brothers, was destroyed by fire recently. The shops and offices near by were, with the utmost difficulty, saved. The breaker was one of the largest in the coal regions. It was a new one, having been completed only one year ago. It cost, complete, over \$150,000, being filled with the most improved and expensive machinery, and was fully insured. By this fire, over 600 men and boys will be thrown out of work.

At the Continental colliery, near Centralia, preparations are making to lay a narrow angle road, and twenty-five new mine cars have been received to be used on it. The shipments of the colliery are expected to be more than doubled. The Lehigh Valley Coal Company, the present operator, expects to snip nearly 150 cars a day.

The Locust Run Creek has been turned into the old Wadleigh slope, with the view of quenching a fire in the Potts colliery workings. This fire has been burning for many years, and the plan adopted for extinguishing it is the only practicable one.

###### BITUMINOUS.

A charter has been granted to the New York & Westmoreland Gas, Coal, and Coke Company, the head office of which will be at Manor, Westmoreland County. The directors are: W. S. Bissell and John W. McLain, Pittsburg; John Graffey, Greensburg; and G. W. Stone and William N. Robbins, McKeesport. The capital is \$400,000.

#### GENERAL MINING NEWS.

##### ARIZONA.

**ALICE.**—This mine, adjoining the Old Dominion, has been sold to M. H. Simpson, the largest stockholder of the Old Dominion Company, for \$45,000.

**ARIZONA COPPER.**—Three water-jacket furnaces are constantly kept in blast by the Arizona Copper Company in Clifton. The combined furnaces consume on an average 180 tons of ore every twenty-four hours. In order to get down the required amount of ore, the inclines at the Longfellow and Metcalf mines and the Coronado Railroad are kept very busy. It is the intention to put another train on this road shortly. At present, Engineer Arbuckle makes four trips a day, two of them to the end of the road, and all as far as the Metcalf. For the week ended July 19th, the company shipped 212,400 pounds of black copper. The Clifton *Clarion* reports that during the last month the White Hawk claim of the Metcalf group has been prospected, and ore was struck at two places. At present, the ore occurs in small seams, but it is supposed that these seams lead into one solid ore-body. There are already about 75 tons of good ore on the dump, and as this ore contains manganese and iron in excess, it will be a very desirable smelting ore. At the King mine, preparations are made for stoping. At a depth of 100 feet, two levels are driven, and this mine has a very well-defined vein. The Detroit claim of the Longfellow group promises to become a very heavy ore-producer. The upper drift is for the last 40 feet entirely in ore. The ore of this claim is of the same character as the Longfellow ore. A new shaft has been started, in order to furnish a more economical working of the mine, and a whim will be put up to facilitate the hoisting.

**CROCKER.**—The Tucson *Citizen* reports that there has within the last few days been a big strike made in the Crocker mine at the Quijotoas. It is stated that three days ago the men at work in one of the tunnels struck a seven-foot ledge of high-grade ore that assays from \$200 to \$250 per ton.

**GUNSLIGHT.**—These mines have been sold to Major H. F. Beebe and Missouri capitalists. They will erect a 20-stamp mill and furnace at once. The sum of \$300,000 has been raised for that purpose.

##### CALIFORNIA.

In the Menifee District, the plant for a large 40-stamp quartz-mill has been ordered, and the Menifee Mining Company is making extensive preparations to develop its mines. For the present, the Menifee ore will be crushed at the San Jacinto mill.

The new mill now erecting at Sweetwater by A. Sayers & Co. will probably be in running order some time in August. Mr. Kilpatrick, of the Bodie Foundry, has charge of the construction.

**GREEN MOUNTAIN.**—The company has started the last 30 stamps and the whole mine is now running smoothly and well. No. 2 rise has connected with No. 2 blind drift east, and stopes are started above No. 2 drift. The face of No. 2 is very hard, and the company has been running Burleigh drills since the 19th ult. The drift is now in about 110 feet, and will be continued as rapidly as possible until the east line of chute is reached, a distance of about 90 feet. No. 6 drift east from No. 1 rise is now in 80 feet, and the ground is favorable for good progress, and shows a fine face of good pay quartz. A rise will soon be started to connect with winze sunk from No. 5 tunnel, which will give a large quantity of good ore and facilitate handling of timbers for this part of the workings. Tracks are laying on the blind drifts and chutes putting in, and stopes opening. The company will soon be in shape to handle economically and quickly the ore broken.

**MARGUERITE.**—Four hundred feet west of the present shaft, they are engaged in grading a site for the new hoisting-works. A three-compartment shaft is also sinking at this point. In addition to sinking from the surface, the work is hurried up by rising from the third and second levels. It is expected to make the connections in about ten days. As soon as the new shaft is completed, the hoisting machinery will be removed there and the old works abandoned. The new pumps work satisfactorily and the work of opening out the fourth level is going rapidly ahead.

##### BODIE DISTRICT.

**BODIE CONSOLIDATED.**—There were 270 tons ore crushed during the week. The pulp assays were \$13.05, and the tailings \$1.80 per ton. The Bulwer-Standard mill finished crushing ore for the Bodie Company on the 19th at eleven A.M., and will finish clearing up. At the mine, the south drift from winze No. 4, 350-foot level, is in 56 feet, and the north drift from the same is in 126 feet. The north drift on Gildea ledge, 4th incline level, is in 15 feet. South drift, 55-foot level, is in 70 feet. Uprise below 300-foot level, on Fortuna, is up 35 feet. Uprise from 2d incline is up 9 feet. There is no change to report in the mine. Forty-one men were employed.

**STANDARD CONSOLIDATED.**—They extracted and shipped to the mill 552 tons of ore, received 900 ounces of crude bullion, and shipped to the company this day \$11,792.68. South drift No. 1, from south winze No. 2, 385-foot level, has gained 10 feet during the week, total length 146 feet, showing 2 feet of vein in the face. North drift No. 2 from main west cross-cut has been advanced 11 feet, and is in 240 feet; the vein is about 3 feet wide. South drift No. 4 from west cross-cut No. 2, has been run 10 feet; total length, 198 feet. The ore here is about 2 feet wide. Uprise from south drift No. 1, 500-foot level, has been raised 11 feet; total height, 148 feet, showing 2 feet of vein.

##### NEVADA COUNTY.

**IMPERIAL.**—At the annual meeting at Grass Valley, it was stated that the receipts for the year had been \$9026.32, and the disbursements \$8253.04.

**PEABODY.**—Twenty-two leads have been crushed and gold to the value of \$2395 has already been cleaned up, and a further cleaning from the same ore is to come. This success of the Peabody goes to show a very rich body of ground extending from the Scotia works to the southward. It is quite probable that the Scotia works can be put to work advantageously where they now stand.

##### SIERRA COUNTY.

**ALASKA.**—Two new boilers have been placed in the hoisting-works. A new Hooker pump, with pumping capacity of 1,000,000 gallons of water in twenty-four hours, arrived at the mine last Sunday, and will be planted at No. 3 station immediately. With the new machinery, there is never liable to occur any further difficulty in handling the water. It is expected to start up the mill early next month.

##### CANADA.

###### PROVINCE OF ONTARIO.

**COE HILL.**—This iron mine has now an outlet by rail, and the owners expect to make large importations into the United States of the product. The mine is near North Hastings, and there are other mines adjoining. There are 50,000 tons of ore in stock at the mine that it is said will run 66 per cent in metallic iron and 0.23 in phosphorus. The owners say they can place it on the docks in Cleveland for \$3.65 a ton.

##### COLORADO.

**MADONNA.**—A private letter from Marysville, says the Leadville *Herald*, written by a former manager of one of the leading properties in that section, contains the following opinion of the Madonna mine: I think the Madonna one of the best, if not the very best low-grade mine I ever saw. Since I have known it, something over two years, I don't think that it ever had less than 25,000 tons of ore in sight at any one time, and at times much more. They have been shipping regularly for the past eight or nine months—during the past four months over one hundred tons a day, and are now shipping from ten to fourteen car load

daily. The ore lies near the surface and is easily mined. It consists of sand and hard carbonates, mostly in pockets in the lime, though a contact between quartzite and lime is claimed. About one year ago, the ore ran, without sorting, from five to seven ounces in silver, trace to four tenths ounces in gold, and an average of forty per cent in lead. I have understood, as they go down the hill the ore improves in both silver and gold.

## CHAFFEE COUNTY.

QUINCY.—The Chaffee County *Times* states that this mine in Grizzly Gulch is worked by a force of ten men, under J. C. Fogg, lessee. Stopes have been started at the 125-foot level that show over a foot of high-grade ore. In the bottom of the shaft, a depth of 150 feet, an extremely fine body of beautiful ore has been encountered. The extraordinary amount of surface water that has been coming in during the melting of the snow caused a suspension of work in the shaft; but the water is now practically under control, and sinking will be resumed this week. Mr. Fogg expects to make another shipment this week. Noel & Co., bankers of St. Louis, are the new owners of the property, and have already been out looking the ground over with a view to systematic and extensive development. Among other things, a cross-cut tunnel over 1600 feet long, is contemplated, which will cut the entire Brittenstine group besides several other valuable lodes not developed on the surface. The result of certain work now in progress will probably determine the fate of the tunnel project. The owners are expected out again next month, when, if every thing makes a satisfactory showing, it is not unlikely that a concentrator will be built and an extensive hoisting plant erected on the Quincy shaft.

## FREMONT COUNTY.

ROCKY MOUNTAIN MINE DEVELOPING COMPANY.—The copper smelter of Cañon City was started up on the 11th inst., on a test-run of 160 tons of ore, of which 100 tons were from the company's Green Mountain mine, and 60 tons from the Sedalia mine, near Salida. The run, made under the direction of George H. Arlett, metallurgist, and I. H. Martin, engineer and fireman, was very satisfactorily concluded on the 18th, without any trouble in the starting or hitches in its progress, turning out from 50 to 60 per cent of matte, and practically barren slag. By this test, two things have been determined: First, the smelter is a success; and secondly, the ores from the company's mine can be profitably treated by the company. As this company has erected the first copper smelter, and owns the best developed copper mine in the State, its movements are closely watched; and as a result of this run many prospectors are preparing for active work on their copper claims in the Arkansas and Grape Creek valleys.

## LAKE COUNTY.

CHRYSOLITE.—The concentrator erected on the Chrysolite premises, some six weeks ago, has proved a marked success. The mill cost but \$425, and consists of four jigs operated by steam, the power being supplied from the sampling-mill. A long tom or riffled sluice is employed, through which the hutchings are passed, and the dolomite sand washed out. The concentrator last month produced 54 tons of concentrates, averaging 42 ounces in silver to the ton, and containing 15.6 per cent in lead. The cost of operating the mill, mining the ore, etc., amounted to \$19.50 a ton of concentrates. The concentration was carried on to the extent of eight and a third tons into one, and the tailings showed a value of only one per cent in lead and 6.9 ounces in silver to the ton. During the past week, assays of tailings have showed an average contents in lead of only six tenths of one per cent. The silver contained in the dolomite sand it has been found impossible to save.

ESTEY & HILL CONCENTRATOR.—The site of the Estey & Hill Concentrating Mill, recently destroyed by fire, in Big Evans Gulch, is being cleared of the encumbering debris, preparatory to the rebuilding of the structure. The new mill is to be double the capacity of the one burned, and is to be erected leisurely, it being too late now to secure the necessary machinery and get the mill in running order before the close of the present season. The insurance on the concentrator amounts to \$10,000, about one half the cost of the establishment.

LITTLE CHIEF.—The company has leased the south end of this property to miners employed in the Chief mine. The ground is considered quite valuable, and is believed by many to contain some fair pockets of mineral, which were passed over in the earlier days of the mine.

## PARK COUNTY.

SOVEREIGN.—The tunnel is completed a distance of 630 feet, showing a strong vein over 18 inches in width, producing a fine grade of concentrating ore, which is increasing in value as the developments are gaining distance into the hill. It is believed by all experienced in this deposit that the lode will soon open up into a high-grade quality of smelting ore, which will correspond with that taken from the workings farther up the vein at the Chicago openings, where stoping has been commenced with flattering results. The mineral at this point contains a large amount of copper, and will probably be arranged as first and second-class grades, one capable of being shipped, while the other will be sought after as a first-class concentrating product, capable of being made valuable by reducing two or three times in bulk, in order to decrease the transportation and smelting charges, incurred by shipping the required distance.

U. P.—The concentrating mill at this mine is running.

## PITKIN COUNTY.

The principal mines on Aspen Mountain will convey ores to Hewitt's sampling-mill by means of tramway. A good mountain road has been built.

CAMP BIRD.—This mine, in Queen's Gulch, six miles south of Aspen, makes a daily shipment of 5 tons to the Arkansas Valley Smelting-Works, at Leadville, whose smelting charges are \$12 a ton.

EMMA.—This mine, on Aspen Mountain, has first-class ore, showing 400 ounce in mill returns. It employs 20 miners.

VALLEJO.—This mine is supplied with hoisting machinery, and employs 40 men. Its daily shipment is 10 tons.

MORNING STAR CONSOLIDATED.—The company is working sixty five men on its own pay-roll. These are divided on the Kitchen, the main Morning Star, Halfway, and Forsaken, with development-work on the upper contact from the McHarg shaft, where the work is done by contract. Toward the end of the month, the McHarg and Kitchen workings will probably be connected. Then all the ore opened up on the upper vein or deposit will pass through the McHarg. During this month, the Kitchen shaft has yielded and is still yielding rich chloride in iron, which is selected in two grades. This is company's account. There are about 20 tons of No. 1 stored; will run 500 ounces of silver. In the Halfway, there is no pay at present, but prospecting continues. Some pay iron has been shipped from it to the American. The company has made shipments of iron to Salt Lake with satisfactory results. From the McHarg lowest level, 400 feet, the workings east will be continued into virgin ground, and where it is rightly supposed that at least some of the Henrietta mineral will be found to continue into the Waterloo. The company shipped as the product of its own work 411 tons last month, which averaged about 25 ounces silver and 20 per cent lead. The Utah iron prices are \$1 an ounce for silver and \$2 for iron, if there is 45 per cent excess, and add or deduct 10 cents for each unit over or under. Freight, \$6 a ton. The lessees are at work on the upper and lower Waterloo portions exclusively, and they are shipping about five tons a day. In June, they shipped 149 tons of the net value of about \$3000. It was low in silver and over 30 per cent lead. These are mine leases. Several dumps are also worked under lease, being jigged right on the property. The product runs from 6 to 40 ounces in silver and from 15 to 51 per cent lead. They made in June 214 tons, which milled \$2300. The royalties vary from 20 to 25 per cent, according to conveniences in working the dump. The mine lessees pay for

low-grade 20 per cent and for better graduated up to 60, a dozen royalties for each lease. This is no smelter's, but a miner's regulation.

## SAN JUAN COUNTY.

MYSTERY.—The Mystery is probably sold to Cleveland parties. Some ore has been brought to Silverton this week. It is a massive gray copper of unusually solid character. This property was pointed out in July, 1879, as a very promising prospect, but the original locators abandoned the claim after taking out some very rich mineral from what they supposed to be a boulder only.

SAMPSON.—The Sampson is working twenty men at present, ten in the mine and ten on the mill and tramway. A large body of black sulphurets was struck recently in the shaft and the ore is taken out and sorted for shipment. There are now 250 tons of shipping ore on the dump, which could be moved down regularly were the roads in such condition that the necessary parts for the repair of the tramway could be got up to the terminal.

## SUMMIT COUNTY.

There is a good deal of excitement over reported rich gold finds in Gibson Gulch, near Breckenridge.

ASPEN SMELTER.—The Leadville *Democrat* has the following to say about the Aspen smelter. Aspen is so peculiarly situated with reference to obtaining cheap fuel and fluxes, and the cost of shipping ore to market, in Leadville or the valley towns, that it seems as though a smelter might be made successful there. The *Democrat* says: One of the greatest questions regarding Aspen's prosperity has been successfully solved by the present success of the Aspen smelter, under the management of Mr. Devereaux, to whom the same credit is due as to Messrs. J. B. Wheeler and H. B. Gillaspie for their faith in Aspen's mineral wealth and their persistent application toward its development and utilization. A series of unsuccessful experiments, which preceded the appointment of Mr. Devereaux, had left the impression with the people of Aspen, as well as other parts of the State, where the operations of the Aspen smelter were watched with an attentive eye, that the Aspen ores could not be reduced at home. This belief was unfounded, for several weeks' undisturbed run of the smelter since the first day of the blowing-in has proved it an undoubted success. The coke, manufactured from Mr. Wheeler's own coal, is excellent. The accumulation of several thousand tons of ore gave the opportunity of good ore beds; timber for charcoal is plenty. The Spar and Vallejo mines carry a not inconsiderable percentage of lead. Some carbonate is obtained from the Tam O'Shanter. The main difficulty in the treatment of Aspen Mountain ore is the baryta or heavy-spar. Good iron is obtained from Conundrum Gulch and other points. The works consist of one furnace, 30 tons capacity, and the necessary ore, flux, and fuel-sheds, and the office and assay-room of the concern. About 30 tons of ore are charged in twenty-four hours, yielding a little over four tons of bullion, and from five to seven per cent of matte. The expense of shipping ore from Aspen to the nearest railroad point is so large that the smelter can make profitable charges for treatment and still remain far below the cost of direct shipments. As it is hardly possible that much high-grade ore will leave Aspen for Denver or Leadville without being sampled in some way, and then has to be sacked, the expense from Aspen is about as follows:

Sampling and sacking	\$3.00
Freighting to Granite	25.00
Railroad freight to Denver	5.00
Freight on moisture 10 per cent	3.00
	\$36.00

LITTLE ANNIE.—The Annie Company at present is running sixty stamps, but it is putting twenty more in the mill, and will have them running in a short time. The Annie Company is moving the elevated tramway from the Annie tunnel to the old Ida tunnel and connecting it with the new mill. When this is completed, it will not touch the ore after shoveling it into the crusher, as it is handled automatically from there to the stamps. After leaving the plates, it is conveyed in a tube to the Frue vanner house, where sixteen Frue vanners are in operation. The addition of Frue vanners has proved a grand success. Mr. Cooper, president of the company, states that they could pay all expenses of the company from the product of the vanner house alone, leaving the returns of the batteries for a profit. What they are saving by the vanners is a clear gain to them now, as that used to go down-stream. The electric light has proved a great advantage to the company, as they experience no more difficulty in working at night than in the day with it, and the expense is no greater than oil, considering the safety and saving in insurance.

## DAKOTA.

FATHER DE SMET.—The report of the superintendent from July 14th to July 22d shows: Ore extracted from first level, 700 tons; ore extracted from second level, 1100 tons; ore extracted from third level, 230 tons; total, 2030 tons. Ore milled, 2000 tons. The tramway header was advanced 7 feet. It is now in 71 feet. The clean-up of the mine for the first half of July yielded \$20,451.54.

## GEORGIA.

HOOVER HILL.—Under the management of Mr. Frecheville, this company seems to be working out of its difficulties gradually. At the recent meeting of the company at London, it was shown that the product of bullion was \$4793, and the profit on stores \$536, while the total expenses were \$7307. At the present time, the mine is paying expenses, during a period of development-work.

## IDAHO.

The Muldoon smelter, on Little Wood River, has sent out its first shipment of 855 bars of bullion this season.

DICKENS.—This mine, in Yankee Fork, has been sold to J. E. Dooley, of Salt Lake, for a nominal consideration.

RELIEF.—H. E. Miller, on Tuesday, sold the Relief mine to the Minnie Moore Company for \$50,000. The Relief is the northwestern extension of the Minnie Moore, which is sufficient in itself to make the ground valuable, as all the ore-chutes in the Minnie pitch to the west. The company is already sinking an incline, and taking out first-class jigging ore.

## MEXICO.

SONORA.—The Sombrettillo Mining Company started up its 10-stamp mill again last week on good ore, with the prospect of running steadily. The Boston & Sonora Mining Company, whose machinery has just been repaired and overhauled, will start its 10 stamps next week. This property has been developed to quite a depth, and has good prospects for steady work for the mill for a long time. These two properties are located about 50 miles south of west from Nogales. About half-way between the above mines and Nogales, the Plomosa Mining Company is working 40 or 50 men, 25 of whom are miners in the strictest sense. This company has large quantities of low-grade ore, which is concentrated before reduction. It crushes the ore with the Cornish rolls, capable of crushing 50 tons daily. Frue concentrators are used. The 20-ton smelter will begin operations in the latter part of August or the first of September. This company also owns a very wide ledge of low-grade ore yet untouched, the value of which has not yet been estimated.

## MINNESOTA.

MINNESOTA IRON COMPANY.—The contest of R. D. Mallet, Chauncey Gibbs, Frank Rice, and John Rice for the iron lands owned by the Minnesota Company, in the Vermilion District, comes to an abrupt end by a decision by Commissioner McFarland adverse to the parties who made the application for contesting the entries. The decision is as follows: "The entries in question were patented May 20th, 1882, and the patents were transmitted to your office May 25th, 1882."

Patents having been issued, the jurisdiction over the lands, covered thereby by this office, has ceased, and no action can be taken upon such application." The only way the matter can be pushed now is by the courts, and it is not likely any thing will be done. It is said that the contest was inspired by the owners of the Michigan iron mines, who hoped thereby to so injure the credit of the company and the Duluth & Iron Range Railroad Company that the latter company would not be able to secure money for the payment of this month's labor, and work thereby be stopped, for the present, at least. This was not successful, as the money was promptly forthcoming, and the road will be completed to the mines this week.

## MONTANA.

The *Inter-Mountain* says: A gentleman who arrived from Fort Benton gives an account of what looks like a fraudulent transaction on the part of the men who organized the Hudson Company at Neihart. The mine now worked by the concern has been made the subject of an elaborate report, and notwithstanding the fact that the shaft is less than 100 feet deep and that not a drift has been run, the promoters of the enterprise have succeeded in making arrangements with some innocent Boston parties for the erection of a 20-stamp mill. There is positively not the slightest justification for a mill in the present undeveloped condition of the mine. It is yet a mere prospect. Northern Mountain can not afford to have any more mining *fiascos*. A mill without a mine is absolutely worthless property, and before those innocent Bostonians put in any more money they would do well to make a personal and thorough investigation of the property they have purchased.

During the month of June, the ore-shipments from the Butte, Montana, depot of the Utah & Northern were 9,118,700 pounds and the matte shipments were 2,430,000 pounds. During April, May, and June, the ore and matte shipments from Butte, as per railroad statement, were a little over 35,000,000 pounds.

## LEWIS &amp; CLARKE COUNTY.

ALICE.—Ore extraction from the Alice is still chiefly confined to the south vein, which is producing ore that pays well and maintains the bullion shipments at a regular standard. The main ore supply, of course, comes from the Magna Charta, where explorations are progressing with customary activity.

BELL SMELTER.—For several months past, the Bell smelter has been doing good work. During the month of June, the amount of ore treated daily, only one furnace being in operation, averaged 37 tons, or a total of 1110 tons. This very considerable amount of ore was largely taken from the 400 foot east level of the mine, where it is understood a fine body of excellent ore was uncovered last spring. A considerable part of the ore worked in the smelter is first concentrated in the old Longmaid works, just south of the depot, and goes into the blast-furnace with very little gangue. Next month, it is in contemplation to run the two blast-furnaces, and the daily capacity will then be about 70 tons. The smelter contains two calcining-furnaces, each with a capacity of about eight tons. The rest of the ore worked in the blast is desulphurized by heap-roasting. At present, the smelter is closed down for repairs, after a long and continuous run. The amount of roasted ore on hand at present is not large, though it is stated that when operations are resumed in a few days, 1000 tons of calcined ore will be available for reduction.

CLARK'S COLUSA.—The erection of the Clark concentrator is rapidly proceeding. The shaft of the mine is about 250 feet deep and is making good headway toward the 360-foot station. The ore-product continues at about 40 tons of mixed grade, which will be doubled when the sinking shall be finished.

CLEAR GRIT.—The Clear Grit station, at a depth of 320 feet, is now being cut out, and cross-cutting will begin in a few days.

CONCENTRATION-WORKS IN TEN MILE.—The *Helena Independent* states the following: Prof. J. G. Murphy, who returned a few days ago from New York, succeeded while East in perfecting arrangements for putting up concentrating-works in the Ten Mile District. Professor Murphy has associated with himself Messrs. A. D. Churchill and Charles G. Buchanan, of New York, and the firm name will be Murphy, Churchill & Buchanan. The works to be erected will be of fifty tons daily capacity to begin with. The machinery is now constructing at the Union Foundry, Rockaway, New Jersey, and will be of the best in use. It will consist of high speed rolls, one set of 30-inch and one of 24-inch, for fine crushing; the Buchanan patent crusher, revolving screens for sizing, and Golden Gate concentrators, with power for a capacity of 100 tons daily, when it shall be found advisable to increase the works to that capacity. The location of the concentrator will be at the mouth of Beaver Creek, where it empties into Ten Mile, opposite the Lee Mountain mines. It will take about two weeks to manufacture the machinery, about three weeks more to bring it out here, and a month more, perhaps, to get it in position for starting up. Thus it will be about the 1st of October before the concentrating-works will be ready to commence operations. The company will operate the Lee Mountain and Latham groups of mines, and outside of the product of these will do custom work. They expect, we believe, to ultimately add smelters to their works.

LEXINGTON.—The face of the 650-foot south cross-cut of the Lexington is now 70 feet from the shaft and in hard rock. It is not considered likely that the ledge will be intersected for six weeks or two months. The upper levels are producing as usual fifty tons of good ore daily for treatment in the mill.

LIQUIDATOR.—The east and west drifts from the 300-foot cross-cut of the Liquidator are producing ore of three grades—100 tons per day. The first and second grades are shipped crude and the third-class ore is piled on the dump.

NORTH STAR.—The *Helena Independent* reports: Mr. A. Chadburn, of London the promoter of the sale of the great Drum Lummon mine, has completed arrangements with Mr. Thomas Cruse for the purchase from the latter of the North Star mine, an extension of the Drum Lummon. The price paid for the mine was a large one, but the lead is pretty well developed.

## NEVADA.

BELMONT.—The capacity of the leaching-works has been doubled and the capacity of the cooling-floor has been quadrupled.

NAVAJO.—Good progress is made with the work at all points, and the usual amount of ore is extracted and sent to the mill, some of it from the chambers in the foot-wall of the west vein and a part from the 250-foot level stopes on the east vein. Average battery assay for the past seven days, \$185.76. Workings, 92 per cent.

RICHMOND.—The *Sentinel* reports that the jury in the Albion-Richmond suit for damages brought in a unanimous verdict for the plaintiff, the Albion, for \$13,250. It seems that they were not much troubled in getting at this decision, as they reached their verdict on the second ballot. The result is almost a complete victory for the Richmond. It admitted having taken 2100 tons of ore from the disputed ground, and its estimate of the value of the same at the furnace was \$4 per ton—which makes \$8400. The jury, believing that the Richmond acted in good faith in extracting the ore from the disputed ground, assessed the same to it at the net, instead of the gross value; and, also, accepting the estimate of ore testified to by the witnesses for the Richmond, the jury seem to have agreed upon the minimum quantity. We are not informed as to the technical status of the case, now, except that the nominal damages granted the Albion will not be paid by the Richmond until the question of the title to the disputed ground shall have been determined by the Supreme Court of the United States, before which tribunal that issue was brought on appeal from the Supreme Court of Nevada. Whether it will have to pay or to receive damages remains to be seen. Manager Probert has given orders to have all needed repairs to the smelting-works made as speedily as possible. The entire works will probably be in full blast about the first of the coming month.

## COMSTOCK LODGE.

UNION CONSOLIDATED.—From the annual report we take the following: There have been extracted during the past year 323 900-2000 tons, making a total of 701 900-2000 tons, which has yielded \$6221.83, or at the rate of \$8.87 per ton. A large portion of this ore having come from the exploration of this company jointly with the Sierra Nevada Company, a proper apportionment of the net proceeds was made between said companies. There have also been extracted, during the same time, from the mine 7707 tons of waste rock. While no ore of any milling value has been exposed by the explorations during the past year, the cross-cutting and drilling have demonstrated that the Comstock vein has a width of at least 500 feet on the 3100 level, and carries mineralized material. The Mexican winze, down from the 3200 level, to which we are contributing one fourth of the expense of sinking, is situated near the east side of the vein, and is passing through what is evidently a large mass of clay and quartz of no value. The superintendent's statement for the fiscal year ended June 30th, 1884, is as follows:

RECEIPTS.	
Receipts.....	\$48.91
From sundry mines for labor.....	80,586.50
From San Francisco office drafts on President.....	255,101.26
Total.....	\$335,826.67
DISBURSEMENTS.	
General expenses, salaries, exchange, etc.....	\$4,989.73
Mine account, supplies, labor, etc.....	258,297.06
Legal expense.....	403.50
Taxes.....	61.57
Union shaft one third net expense.....	68,021.71
Milling.....	3,691.26
Sutro Tunnel royalty.....	350.72
Total.....	\$335,815.55
Balance cash on hand.....	11.12
	\$335,826.67

## NEW YORK.

Work at the Kirkland Iron Company's mine of Utica is suspended on account of overproduction.

## PENNSYLVANIA.

The *Easton Press* contains the following items: William Schwenck, of Mount Carmel, and Henry Clement and Jeremiah Savidge, of Sunbury, have organized a company with a capital of \$25,000 to mine "lead ore" on a tract of land six miles from Allentown. The ore will be shipped from Allentown to Sunbury for smelting. The mining, freightage, etc., will cost \$20 a ton. The ore assayed \$85 per ton.

## UTAH.

HORN-SILVER.—The Horn-Silver continues its output of about 140 tons of ore a day, and shows no signs of exhaustion. On the sixth level, in one place, the pay-ore is 200 feet wide or thick. The chimney promises to be longer below. The new hoisting-works are erecting and a new three compartment shaft is approaching 300 feet in depth. The machinery and every thing is designed to work to a depth of 2000 feet. Water is expected at the level of Beaver River, perhaps 1200 feet down the shaft. There is no known reason why such an ore-chimney should not go down indefinitely. At all events, the owners would not willingly leave it short of the 2000-foot level.

ONTARIO.—The Salt Lake *Tribune* says: Mr. Kerwin, long manager under Mr. Chambers, at the Ontario mine, has recently paid it a visit. He says it looks exceedingly well, everywhere, and especially in the face of the eighth level, going into the new west ground. He says at that point there is two or three feet thickness of 100-ounce ore, which is good enough. Mr. Kerwin thinks it probable that there is enough ore above the tenth level to keep the mill running four or five years. It depends, of course, on how the new ground west opens up. The eighth level, now 300 to 400 feet west of shaft No. 3, and the sixth, driven 200 or 300 feet farther, and an uprise from the sixth to the fifth, and a considerable opening on the fifth, comprise all the openings yet made in this new ground. They have been in ore, off and on, not, it is understood, as good as the old mine, but compared with any other mine we know of, very good indeed. Often, in this mine, a level will be in a tight or poor place, when a stope or two above, the vein will have its ordinary strength and richness. The flow of water struck in shaft No. 3, 9 feet below the tenth level, does not slack off much as yet. The ninth level is opening from shaft No. 2, and is said to hold up in strength and quality to what the eighth level was above the opening on the ninth.

The Salt Lake *Tribune* has the following: The Brooklyn property, Lead, and Yosemite are the heaviest producers in the camp, sending their ore down south of main Bingham, part of it by wagon, to the smelters. The Brooklyn Company lately purchased the Revere at something like \$20,000. It expects to get a bigger mine there than ever. The Tiawaukie is taking out ore 100 feet below the creek level, and has no water. Efforts are making to open a new mine under the Winnamuck, the old ground having been pretty well worked out, and the dump cleaned up. The mine turned out formerly fully \$1,200,000, and it is believed that such an ore-body has deep roots. It has never been worked below the water-level. An expenditure of \$25,000 would sink a new working-shaft to the vein from 300 to 400 feet below the creek, and demonstrate whether the vein at that depth carries paying ore. The new process of leaching at the Old Telegraph works claims to clean silver ores as by a fire assay, and very cheaply. It is expected a large plant will be put in there to work ores by this process, when some of the chief mining and metallurgical men of the company shall have been out and looked over the ground. They are to be in this country shortly. Bingham may yet see more prosperous days than ever. Professor Morton's mill is approaching completion. The Frisco Consolidated is putting up a small concentrating mill. There is talk of consolidating two or three miles of Lower Bingham Gulch, incorporating and raising on treasury stock \$15,000 or \$20,000 to run in a bed-rock ditch and enable the ground to be worked. It is estimated that the channel of the creek for a width of say 90 feet, and a length of 10,000 feet, contains on an average \$2 in gold dust, lying nearly on the bed-rock, for each square foot, equal to \$800,000. With a bed-rock ditch (tunnel) 3000 feet long, costing not to exceed \$5 per running foot, this could all be worked out to good advantage. All it requires is some one to take hold of it and do it. Enough has been done, enough gold taken out, in past years, and it is well enough known, it is believed, to enable the money to be raised on treasury stock here in Salt Lake and in Bingham. In many places, there is an old creek channel, at a higher level than the present one, and it is from this that most of the gold has been taken out, and the general opinion as to the yield of the creek channel formed.

## VERMONT.

ROOKS.—The Rooks Mining Company has constructed a dam across Gold Brook, immediately in front of its mill, adding greatly to the improvements of the property, and retaining an inexhaustible supply of water for the pumping engine supplying the mill and used for protection against fire. Driving of the adit to be the main working entrance of the mines is progressing two feet every twenty-four hours, and the winze is sinking one foot every twenty-four hours. The new hoisting-engine is working admirably. Mills and mine work both night and day, with two shifts each on ten hours. Weather has been very cool with little rain.

**FINANCIAL.**

**Gold and Silver Stocks.**

**NEW YORK, Friday Evening, August 1.**  
Business was quite active in the mining market this week, but the dealings were mostly confined to the Comstock shares. These stocks opened strong on Monday morning, but a decline set in and continued to the close to-day. The only exception was Suro Tunnel. This stock was very actively dealt in, and ruled at stronger prices, notwithstanding the decline in the Comstocks. There was but little interest in the transactions in the other stocks, except Horn-Silver, which was sold at very strong prices, having just declared a dividend. We give a complete summary of the market below. The total number of shares sold was 113,140, as against 83,085 last week.

The Comstock shares were actively dealt in at declining prices. California declined from 38@22c. under a small business. Consolidated Virginia was very actively dealt in at weak prices; it sold at from 55@33c. Sierra Nevada was also weak, declining from \$3.40@2.45, under a fair business. Union Consolidated records a small business at weak prices; it declined from \$3@2.05. Consolidated Imperial sold at 10c. Hale & Norcross sold on time sales at from \$6.75@8.25. Best & Belcher records a small sale at \$3. Suro Tunnel was very actively dealt in at strong prices; it sold at from 25@20@22c.

The Leadville stocks were quiet and steady. Amie was very actively dealt in at steady prices; it sold at from 6@8c. Chrysolite was very quiet and sold at 80c. Brecc records a small business at steady prices, selling at from 18@20c. Iron Silver was quiet and steady at \$1.10. Little Pittsburg sold at from 23@25c. under a small business.

The Bodie stocks were but moderately dealt in and ruled at steady prices. Bodie Consolidated was moderately dealt in at irregular prices, selling at from \$2.05 @ \$2.40 @ \$2.15. Standard records a small business at steady prices, selling at from \$1.15 @ \$1.10. Bulwer sold at from 62@60c., and was fairly dealt in. Consolidated Pacific was moderately active and sold at strong prices; it was quoted at from 42@55@53c.

The Tuscarora stocks were almost neglected. Belle Isle sold at 55c. Navajo records a fair business at weakening prices; it declined from \$4.05 @ \$3.80.

In the miscellaneous list, Alice ruled at strong prices with a fair business; it sold at from \$2.75 @ \$2.60. Eureka Consolidated sold at \$2.50, and was but moderately dealt in. Father de Smet sold at \$4.25. Horn-Silver was very strong and was actively dealt in; it sold at from \$5.75 @ \$6.50. Robinson was quiet and steady at 25c. Stormont sold at 6c.

Barcelona was very quiet at 16c. Oriental & Miller records an active business at steady prices, selling at from 9@13@12c. Rappahannock was quiet and steady at 15@16c. State Line Nos. 2 & 3 sold at from 3@5c. with a small business.

**MEETINGS.**

Santa Eulalia Silver Mining Company, No. 82 Broadway, New York City, annual meeting for the election of trustees, August 13th, at twelve m.

**DIVIDENDS.**

The Horn-Silver Mining Company, of Utah, has declared dividend No. 14 of \$300,000, being three per cent on its capital stock, payable on and after August 15th, at the office of the company, No. 44 Wall street, New York City.

**PIPE LINE CERTIFICATES.**

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

Monday morning, oil opened at 63 1/2c. and advanced with small reaction to 78 1/2c. to-day. The immediate cause of this sharp advance was the sudden decline of the yield of the new wells at Wardwell Ferry, whose first showing was so threatening. There had accumulated a heavy short interest, and it stampeded. This, together with good buying for long account, has made an excited bull market, with prospects of higher prices still.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
July 26	\$0.65	\$0.65 1/2	\$0.63 1/2	\$0.63 1/2	4,395,000
28	.63 1/2	.68	.63 1/2	.67 1/2	8,878,000
29	.68	.72 1/2	.68	.71 1/2	8,941,000
30	.71 1/2	.72 1/2	.69 1/2	.70	6,497,000
31	.69 1/2	.75 1/2	.66 1/2	.73 1/2	8,983,000
Aug. 1	.73 1/2	.78 1/2	.73 1/2	.77	8,410,000
<b>Total sales</b>					<b>46,104,000</b>

**Copper and Silver Stocks.**

[From our Special Correspondent.]

BOSTON, July 31.

While the market for copper stocks continues to rule dull, with but little doing, there is, nevertheless, a much more hopeful feeling, with quite an advance in prices, especially for Calumet & Hecla, and it would seem as if holders who sold out when the dividend was passed last May are now buyers in the market at the advanced price. Since our last report, on very small sales, it has jumped from \$144, ex dividend, to \$155, and to-day \$156 was bid without calling any of it out. It seems to be generally conceded that the company will be able to pay quarterly dividends on the present basis, and that \$160 is not high for it as an investment. Quincy has also sympathized with the rise in Calumet and advanced from \$38 1/2 @ \$39, with later sales at \$37 ex dividend, \$2.50 a share. There are no large lots of this stock to be had at these figures, and we look for higher prices. Osceola declined from \$12 @ \$11, with later sales, however, at \$11 1/2. Atlantic sold at \$7 1/2, same as last sale. Huron advanced from \$1 1/2 @ \$1 1/4. These comprise all the stocks dealt in the past week, the rest of the list being neglected; but we are inclined to the opinion that we shall have a much greater degree of activity in the whole list during the coming months.

The market for silver stocks continues depressed, and sales are few and far between. At the regular Board, there is no reported transaction for the week, and at the Mining Exchange, there is no improvement to note either in activity or prices, with one exception, Dunkin is in better demand, and has advanced from 18@21c., sales and bid. There is some talk of a dividend on this stock in the near future. Bowman is dull with sales at 9@10c., assessment 5 cents paid. Empire, neglected, and the rest of the list unchanged.

3 P. M.—At the afternoon Board, Calumet sold at \$160, and Atlantic at \$8. Quincy, \$37 bid. Franklin, \$7 bid, \$8 asked. Osceola, \$12 asked. Calumet & Hecla closed at \$160 1/2 bid, none offered. For Pewabic 50c. is bid. For Huron, \$1.25.

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

NAME OF COMPANY.	CLOSING QUOTATIONS.					
	July 25.	July 26.	July 28.	July 29.	July 30.	July 31.
Albion						
Alpha						
Alta	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
Argenta						
Bechtel						
Belcher	.95	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Belle Isle						
Best & Belcher	3 1/2	3 1/2	3 1/2	3 1/2	2 1/2	2 1/2
Bodie	1 1/2	1 1/2	1 1/2	2 1/2	2 1/2	2 1/2
Bullion						
Bulwer						
California	.30	.35	.30	.20	.25	.25
Chollar	4 1/2	4 1/2	4 1/2	4	3 1/2	2 1/2
Con. Pacific	.45	.45	.50	.50	.50	.50
Con. Virginia	.40	.50	.45	.45	.40	.35
Crown Point	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Day						
Elko Cons.						
Eureka Cons.						
Exchequer		2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
Gould & Curry	2 1/2	3 1/2	3 1/2	3 1/2	2 1/2	2 1/2
Grand Prize						
Hale & Norcross	6 1/2	7 1/2	6 1/2	6 1/2	4 1/2	3 1/2
Independence						
Martin White			.25	.20		
Mexican	2 1/2	3	3	3 1/2	2 1/2	2 1/2
Mono						
Mount Diablo						
Navajo	4 1/2	4 1/2	4 1/2	4	3 1/2	3 1/2
Northern Belle						
North Belle Isle						
Ophir	1 1/2	2 1/2	2 1/2	2 1/2	1 1/2	1 1/2
Overman						
Potosi	2 1/2	2 1/2	2 1/2	1 1/2	1 1/2	1 1/2
Savage	1 1/2	2 1/2	2 1/2	2 1/2	1 1/2	1 1/2
Scorpion						
Sierra Nevada	2 1/2	3 1/2	3	3 1/2	2 1/2	2 1/2
Silver King						
Tip Top						
Union Cons.	2	2 1/2	2 1/2	2 1/2	2 1/2	2
Utah	1 1/2	2 1/2	2 1/2	2 1/2	2	1 1/2
Wales Cons.						
Yellow Jacket	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2

**BULLION MARKET.**

NEW YORK, Friday Evening, August 1.

DATE.	LONDON.		DATE.	N. Y.	
	Pence.	Cents.		Pence.	Cents.
July 26	50 1/2	110 1/4	July 30	50 1/2	110 1/2
28	50 13-16	110 3/4	31	50 1/2	110 1/4
29	50 1/2	110 3/4	Aug. 1	50 1/2	110 1/2

**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 2 per cent. During the week,

the bank lost £194,291 bullion, and the proportion of its reserve to its liabilities was reduced from 44 1/2% to 44 1/4%, against 44 1/2% per cent at this date last year. The weekly statement of the Bank of France shows a loss of 450,000 francs gold and an increase of 143,000 francs silver.

**BULLION PRODUCTION FOR 1884.**

MINES.	States.	Month of June.		Year from Jan. 1st, 1884.
		\$	oz.	
*Alice, g. s.	Mont.	†		520,843
*Belmont	Mont.			8,081
Bodie, g.	Cal.	61,755		363,612
*Bonanza King, s.	Cal.			191,539
*Boston & Montana, g.	Mont.	30,774		239,779
*Chrysolite, s. L.	Colo.	14,572		85,365
*Consolidated Bobtail, g.	Colo.	7,626		47,280
*Contention, s. g.	Ariz.			293,607
*Deadwood-Terra, g.	Dak.	50,949		260,923
*Derbec Blue Gravel, g. s.	Colo.	14,973		73,617
*Father de Smet, g.	Dak.	40,733		223,938
Grand Prize, s.	Nev.			25,000
*Hecla Cons., g. s. L. C.	Mont.	†		320,052
Helena, s. L.	Mont.			164,000
*Homestake, g.	Dak.	98,631		607,988
*Hope, s.	Mont.			17,980
Horn-Silver, s. L.	Utah	225,000		1,194,087
*Iron Silver, s. L.	Colo.	65,706		381,356
*Kentuck, g. s.	Nev.	2,013		18,860
*Lexington, g. s.	Mont.	98,594		612,686
*Little Pittsburg, s.	Colo.	6,983		52,949
*Moulton, g. s.	Mont.	**53,007		370,906
*Mount Diablo, s.	Nev.			24,820
*Navajo, g. s.	Nev.	16,374		172,530
*Ontario, s. L.	Utah	206,443		1,021,841
*Original, s. C.	Mont.			29,724
*Oxford, g.	N. S.	2,375		45,164
*Paradise Valley, s. g.	Nev.			45,164
*Plymouth Consolidated, g.	Vt.	76,830		532,356
*Rooks, g.	Vt.	6,265		22,333
*South Yuba, g.	Cal.			15,615
*Syndicate, g. s.	Mont.	14,714		76,408
*Tombstone, s. L.	Ariz.			302,692
United Gregory, g.	Colo.			7,174
Total amount of shipments to date				\$8,280,682

\* Official. † Assay value. ‡ Not including value of lead and copper. \*\* Silver valued at \$1.05 an ounce. G. Gold; S. Silver; L. Lead; C. Copper. — No bullion produced.

**United States Assay-Office at New York.**—Statement of business for the month ended July 31st, 1884:

Deposits of gold:	
Foreign coin	\$183,000
Foreign bullion	126,000
United States bullion	475,000
United States bullion (re-deposits)	133,000
Jewelers' bars	135,000
Refined gold	200,000—\$1,252,000
Deposits of silver:	
Jewelers' bars	21,000
Foreign coin	7,200
Foreign bullion	66,000
United States bullion (contained in gold)	17,600
United States bullion, Arizona	1,400
Colorado	1,000
Lake Superior	1,500
Montana	158,400
New Mexico	7,800
Pennsylvania	2,000
Utah	187,600
Refined silver	12,500— 484,000
Total deposits	\$1,736,000
Gold bars stamped	\$1,423,071
Silver bars stamped	397,552— 1,820,623

**METALS.**

NEW YORK, Friday Evening, August 1.

**Copper.**—Business has been very quiet, Lake copper selling at 14c. Manufacturers, who at the late sale had not bought quite as heavily as usual, and therefore probably expected to come into the market for odd lots later, find their supplies quite ample; an indication that the consumptive demand thus far has not been quite up to expectations. On the other hand, there has been little or no selling by them of Lake copper, to be replaced by other kinds, possibly because they have been prevented from doing so by a clause in their contract. In other brands, there do not appear to be any more of the stray small lots that have been sold below 13c. occasionally within the past few weeks. We quote 13@13 1/2c., according to quality.

London cables £55 for Chili Bars to-day, an advance of £1 10s. for the week, possibly due to the report of the appearance of cholera in Spain, which would tend to counteract the effect of the disturbance of business in France from the same cause. Best Selected is £60.

**Tin.**—The market has been fairly active at 18 5/5 @ 18 6/5c. for Straits spot. London cables £83.

**Lead.**—The market has assumed a firm aspect, and transactions aggregating from 600 to 700 tons have

been closed during the week, a good deal of it Corroding lead, at 3 65@3 70, the bulk being at the latter figure. It would be difficult to obtain Common lead for less than 3 65.

Messrs. John Wahl & Co. telegraph to us as follows to-day from St. Louis :

It appears to be generally conceded that the market has touched bottom. There has been more doing, and there is a better feeling. Sales will aggregate 500 tons at 3 40@3 42½@3 45.c. Our consumers' stocks are light, and they are beginning to look around for some lead, while holders are not disposed to force sales. Receipts during the week foot up to 650 tons.

Messrs. Everett & Post, of Chicago, send us the following dispatch :

There has been considerably more inquiry for both hard and soft lead, and in consequence sellers have been asking a little more. Only a moderate amount of business has been done, however, sales during the week footing up to about 600 tons at 3 40@3 45c., principally for shipment East. Offerings are very light, several refiners being out of the market entirely.

London cables £10 10s. for Soft Spanish.

**Spelter.**—The Western producers have formed a combination, and are asking 4½c. The past history of such combinations is not likely to inspire the trade with much confidence in this last effort in that direction. Outside lots have sold here this week for 4 52½c. London cables £14 5s. for Silesian.

**Antimony.**—This metal has been moderately active.

### IRON MARKET REVIEW.

NEW YORK, Friday Evening, August 1.

**American Pig.**—So far as new business is concerned, the market has been quiet, though some report an increase of and greater urgency in inquiries, which, however, continue to cover small lots only. Consumers do not anticipate any notable rise, and therefore adhere to their policy of taking only for immediate needs.

We quote standard brands : No. 1 Foundry, \$20@ \$20.50 ; No. 2, \$18.50@ \$19 ; and Gray Forge, \$17.50@ \$18.50, with outside brands from 50c. @ \$1 lower. Foreign Bessemer is nominally \$19@ \$19.50. Spiegeleisen is nominally \$28 for 20 per cent, some business having been done during the week.

**Scotch Pig.**—The market continues dull, though inquiries are a little more numerous.

We quote ex ship and to arrive : Coltness, \$21.50 ; Langloan, \$21.50 ; Summerlee, \$20.75 ; Dalmellington, \$20 ; Gartsherrie, \$21 ; Eglinton, \$19.25@ \$19.50 ; and Glengarnock, \$20@ \$20.50.

At the Metal Exchange, the following cable quotations have been received : Coltness, 57s. ; Langloan, 58s. 3d. ; Summerlee, 50s. 3d. ; Gartsherrie, 51s. 6d. ; Glengarnock, at Ardrossan, 49s. 6d. ; Dalmellington, 47s. ; and Eglinton, 44s. Warrants, 41s. 7d.

**Steel Rails.**—Late last week, 11,500 tons of rails were placed for delivery at Boston, at the unprecedentedly low figure of \$28 at mill, and since then 8000 tons in addition have been sold at the same price. It is almost useless to say that only those concerns which have their own iron and coal mines, and are exceptionally well placed, can meet such a figure without direct and heavy loss. We quote \$28 at mill.

**Old Rails.**—With greater activity, the lots pressing on the market have been cleared away, and \$18@ \$18.50 is now asked.

**Philadelphia.** July 31.

[From our Special Correspondent.]

**Fig-Iron.**—The transactions in crude iron for the past few days have fallen below the usual average. The only activity, if the business done can be called active, has been in the movement of forge irons, resulting from the resumption of so many of the merchant iron mills throughout the State. Stocks of anthracite iron are low, and there seems to be no disposition on the part of the companies having furnaces out of blast to increase the supply. It is impossible to find evidences of any coming activity. The brokers are doing their best to make some sales for future delivery, but scarcely any thing has been done in that way, the sales which were made having been at such low prices as to frighten off all the holders of desirable brands of iron. It is not likely that any very large amount will be moved during August. Mill men and founders will

wait until some more active demand sets in, knowing that they can secure even better terms later on, than by anticipating requirements now. The foundries are not working full time hereabouts, and in the interior the same inactivity is reported. The average figure for good No. 1 Foundry Iron is \$20, though there is plenty to be had at 50c. or even \$1 less. Very little No. 2 is moving ; \$18.50 is the average price. Several lots of Gray Forge, ranging from 50 to 100 tons, have been sold at \$17.50, for which \$18 was asked a short time ago. Some brands are still held at \$18. Prices seem still to be sagging downward.

**Merchant-Bars.**—Prices are unchanged at 1 90@ 2c. for Best Refined, and 1 65@ 1 80c for Common. A good deal of iron is selling, but is in small lots. Mills are rather short of orders, and the chances for better prices are not very encouraging.

**Structural Iron.**—Small lots are selling freely at the usual prices, namely, 2 10@ 2 20c. for Angles, 2 25c. for Bridge Plates, 3 50c. nominally for Beams and Channels, and 2 70@ 2 75c for tees.

**Plate and Tank-Iron.**—The active demand for plates has resulted in an improvement in prices, one tenth more being asked this week than two weeks ago, and paid. Manufacturers are in good spirits in consequence.

**Nails.**—Large lots of nails would be sold at \$2.20 ; but the orders coming in are mostly small, and are filled at from \$2.25@ \$2.35.

**Muck-Bars.**—Quotations are nominally \$30@ \$31, with some makes held 50 cents higher, but sales have been made at less than \$30.

**Steel Rails.**—Prices seem to be declining still further ; \$28 has been shaded on some good orders, and still further concessions are demanded by some buyers, and will probably be obtained. A good many rails, both standard and light sections, have sold during the week, and there are several large orders in sight that are likely to be taken care of within a week or two, at lower prices than have ever been known.

**Old Rails.**—A 600-ton lot of Bullhead rails was offered here at \$20 ; the best offers received were at \$18.50 ; Double-Heads are quoted at \$21.

**Scrap-Iron.**—One hundred tons of long piling scrap sold at \$19 ; there is very little demand, except for trifling lots.

### COAL TRADE REVIEW.

NEW YORK, Friday Evening, August 1.

#### Anthracite.

There is very little change to report in the anthracite coal trade. It continues very quiet so far as new business is concerned ; and as a natural result, there are evidences of growing accumulation in some quarters, especially with those having no Western outlet. The anxiety on the part of some of the companies to keep on working full-time is evidently causing procrastination in arriving at some decision as to what will be done concerning restriction in August. When the situation becomes intolerable, and not until then, it appears, will the necessity of at least one week's stoppage be conceded by all.

#### Bituminous.

The freshet in the Cumberland region, while it has delayed the work of some mines for only a short time, has seriously interfered with the work of others, and may cause stoppage of shipments for some time. It has even now forced some of the companies to appeal to others for assistance in filling contracts, and may bring about a stiffening of the market for Cumberland coal.

**Philadelphia.** July 30.

[From our Special Correspondent.]

Vessels are now loading at Port Richmond with orders for 40,000 tons of coal. Stocks according to the latest stock reports were only 21,194 tons. Thus stocks are practically nothing. The supply of vessels is large, and they are loaded directly from the car to the vessel. Rates of freight to Boston have declined to \$1, and it was said to-day that even lower rates had been accepted. Freights are more abundant now than they have been for a long time past, and shipments are going forward more rapidly. The mines will run full-time for an indefinite period. The Reading people are not anxious for any more suspensions, and it is said to-day on the street that the New York people who were anxious two weeks ago for a suspension are now less concerned about it because of

the turn that demand has taken and the favorable increase in orders, and the growth of business both in local and outside markets. A decidedly better feeling is exhibited to-day in the trade. It is less likely now than before that there will be an August suspension. But of course predictions of this character are worth very little, as the companies themselves do not pretend to make them, or in fact to express any opinion whatever as to trade possibilities. The fact is recognized, however, that there is a demand for all the coal that can be delivered at present, and stocks are very low at all shipping points. The New England markets will take a great deal of coal during the next thirty days, and this fact will likely postpone the necessity for any restriction until September ; that is to say, if there is to be any restriction, it will likely take place in that month, and in the mean time a great many things may happen that may prevent the necessity for any stoppage at all. There has been no formal discussion as to restriction as yet, and the Reading people will not be the first to propose it, nor, on the other hand, will those great producers hang back if the coal interests should seem to require it. In point of fact, a much stronger feeling is shown, and shipments have been stimulated by low freights. The local and line demand is quiet just at present. Some few yards are well stocked up, but most of them are light in stocks. A heavy demand is expected for domestic requirements during August, and the yard men are making terms and preparing to fill up for the trade that is near at hand. The demand from the larger manufacturers is still held in abeyance. The line trade buyers are in no hurry whatever. The shading of prices continues to be a matter of some comment, but it is restricted more generally to inferior coals. Pea sizes have been selling very well. Stove sizes will be in active demand later in the month. The furnace consumption is lighter than ever. The Western Anthracite Association, representing over 60 members, has been taking its holiday, and debated the price of coal in the West with a good deal of interest. The purpose of the meeting was to have a talk with the operators and railroad companies, and a committee of fifteen agreed to advance the prices 10c. on Grate and Egg and 20c. on Stove and Chestnut, which makes the prices \$4.75 and \$5.20, respectively, at Buffalo as a distributing point. The expressions at the meeting were satisfactory in regard to trade prospects, and there is an evidently decreasing tendency to slash prices.

The bituminous operators are in a chronic state of nothing to say. No large contracts are heard of, and the only business admitted to be transacted is such as is not deserving of special reference. The production of the Clearfield region for the week is 57,584 tons, as against 66,427 tons for the corresponding week last year. The total product thus far is 1,741,521 tons, as against 1,611,521 tons in the same time for 1883, an excess of 130,000 tons. With all this increase, there is no small amount of complaining made by the Clearfield operators, but this is partly due to the fact that a good deal of territory has been opened in that region, and there is not enough work for all. The figures from the Cumberland region for the week are 42,013 tons, as against 34,351 tons for the same week in 1883, an excess of 7662 tons. The total production for the year thus far is 1,006,614 tons, as against 866,916 tons for the same time last year, an excess of 139,698 tons. The two regions are holding their own, although on the Pennsylvania field a great deal more territory is opening than in the Maryland fields, because of the greater coal area of this State.

**Buffalo.** July 31.

[From our Special Correspondent.]

The coal market is nearly bare of incidents, and trade continues without changes of consequence. The stock of anthracite coal is reported to be very light, and vessel men complain not only of poor rates of freight, but of the difficulty of obtaining their promised cargoes.

The principal topic has been the newspaper reports of the difficulty between a Buffalo buyer and a dealer. Here are the items. The *Courier* says: "The anthracite coal men of Buffalo are very much interested in a contest which has begun between the jobbers and the Western Anthracite Coal Association. The regulations of the association, as promulgated by the local board, forbid any jobber from selling coal at less than circular price, on pain of having his supply summarily cut

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.
	July 26.		July 28.		July 29.		July 30.		July 31.		Aug. 1.				July 26.		July 28.		July 29.		July 30.		July 31.		Aug. 1.		
	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.	2.75				2.60				2.60	2.40															1,250		
Ame. Con., Co.	.07	.06	.08	.08	.07	.06	.07	.06	.08																15,200		
Argenta																									500		
Bastick, Co.																											
Belle Isle, Ne.																											
Bodie Cons., Ca.								2.80	2.05	2.40															10		
Breece, Co.								.18																			
Bulwer, Ca.																											
California, Ne.			.38	.32	.31																						
Cal. & Hecla, Mich.																											
Castle Creek																											
Chollar																											
Chrysolite Co.																											
Cons. Va., Ne.	.43	.41	.55	.49	.50			.48	.40																10,250		
Copper Queen																											
Dunkin, Co.																									100		
Eureka Cons., Ne.	2.5																								100		
Father de Smet, Dk.								4.25																	100		
Finsley, Ga.																											
Gold Stripe, Ca.																											
Gould & Curry, Ne.																											
Grand Prize, Ne.																											
Green Mountain, Ca.																											
Hale & Adcross, Ne.	6.75		8.25																						300		
Hall & Anderson, N. S.																											
Honestake, Dk.								9.50																	100		
Horn-Silver, Ut.	5.88		6.00	5.88	5.75		5.68		5.88	5.75	6.50	6.38													2,610		
Independence, Ne.																											
Iron Silver, Co.			1.10																						500		
Leadville C. Co.																											
Little Chief, Co.																											
Little Pittsburg, Co.								.25	.28																250		
Martin White, Ne.																											
Navajo, Ne.			4.05							4.05	3.80														4,400		
Northern Belle																											
North Belle Isle, Ne.																											
Ontario, Ut.																											
Ophir, Ne.																											
Quicksilver Pref., Ca.	26.00	25.00																							200		
Robinson Cons., Co.								.25																	500		
Savage, Ne.																											
Serra Nevada, Ne.	2.35	2.25	3.4					2.65		2.50	2.45														635		
Silver King, Ar.																											
Spring Valley, Ca.																											
Standard, Ca.			1.10				1.15		1.10		1.10														770		
Sorrento, Ut.	.06																								100		
Tip Top, Ar.																											
Vizina, Ar.																											
Yellow Jacket																											

Full tables giving the total amount of dividends, capital, etc., will be printed the first week of each month. Dividend shares sold, 42,365. Non-dividend shares sold, 70,775.

off. For some time, the board has been watching the workings of the firm of Thomas Loomis & Co., among the most extensive dealers in the city. Loomis & Co. have a contract for 50,000 tons of supply coal with J. Langdon & Co. They took the school contract in this city, amounting to between 2000 and 2500 tons, and looked to Langdon & Co. to fill the contract. The latter firm were so sorely pressed by the local board that at the last meeting they were obliged to shut off Loomis & Co. altogether, to save themselves. Now Loomis & Co. have sued J. Langdon & Co. for damages for refusing to fill the contract. It is also well understood that they are to begin legal proceedings against the representatives of the several coal companies who voted to have their supply of coal cut off. The action of these gentlemen is interpreted by able lawyers as conspiracy, and it is proposed, on the part of the opposition, to make a trial, and find out whether or not the Anthracite Association can cut off all supplies."

The proprietor of the Express sent a reporter to interview Messrs. J. Langdon & Co., and he saw a representative of that firm, who said substantially: "The Committee of Fifteen, representing the coal producers of the country, at a recent meeting compared the cost of production, condition of supply, and the state of the market, and issued their usual circular to retail dealers. That circular fixed the lowest rates to be charged to consumers. According to its provisions, the municipality of the city was to be regarded as an individual, practically, and all contracts made with the city government were to be kept within circular rates. The violation of these rates causes the supply of the retail dealer to be cut off from the producer. Messrs. J. Langdon & Co. represent the producers, and supplied Messrs. Loomis & Co. with coal.

"When tenders were put up for bids for coal for the public schools, all retail dealers bid within the circular prices: but Loomis & Co., by bidding under the rates, got the contract. At the last meeting of the Committee of Fifteen, the matter came up, and it was decided to cut off the supply of Messrs. Loomis & Co., which our firm, in compliance, was compelled to do. The violation of the circular rates by Loomis & Co. must be settled with the Coal Association, but the contract trouble between the two firms must be settled by the courts. It will be an important case, and will es-

tablish a precedent. As the matter now stands, I do not know how Loomis & Co. can buy a pound of coal from any producer."

On the 25th of July, the Express published the following local item: "At the office of Messrs. Marshall, Clinton & Wilson, it was learned yesterday that that firm has commenced a suit for \$5000 damages, in behalf of Messrs. Loomis & Co., against Messrs. J. Langdon & Co., coal dealers. This action is brought to compel the latter firm to furnish coal to the plaintiffs in accordance with a contract made about May 1st between the two firms, by which J. Langdon & Co. were to deliver a large quantity of coal throughout the year. The suit arises from the refusal of Langdon & Co. to deliver coal to Loomis & Co. to enable the latter firm to carry out another contract for furnishing the public schools. It was stated that Langdon & Co. are willing to furnish the coal as per contract, but that the combination represented by its agent in Buffalo last week requested them not to do so. The complaint was served yesterday morning."

I have the best authority for stating that the whole matter has been arranged to the satisfaction of all concerned. Further, that the trouble originated in a misunderstanding.

The President of the Merchants' Exchange, Mr. Hedstrom, was interviewed by a reporter a day or two since, and made the following statement: "In the coal trade, buyers are purchasing moderately. Anthracite is bought up in the West almost entirely for domestic purposes, and the consumption does not come until cold weather." He did not take a "rose-colored view of the general business outlook."

The bituminous coal trade is unchanged. No changes in coke. Trade is moderate.

Lake freights on coal hence Westward continue at the low rates named last week. The stock was very light, and several vessels had to go to more than one dock for a load; many were not so fortunate, and are still in port waiting for their promised cargoes. The following are the rates paid since my last letter: To Chicago, Milwaukee, Green Bay, Duluth, Superior City, and Escanaba, 60c.; to Marquette, 65c.; to Detroit, 25c.; to Racine, Kenosha, and Houghton, 70c.; to Port Arthur, \$1; to Pequaming, 75c.; to Manitowoc, 65c., and Amherstberg, 30c. Closing strong with a tendency to higher rates. Vessel-owners are tired of the low freights that have ruled this

season; 2c. per bushel for wheat from Chicago to Buffalo and 60c. per ton for coal for return cargo are not adequate terms for services rendered.

Shipments by lake from July 25th to 31st, both dates inclusive, 42,910 tons, namely, 17,010 to Chicago, 8100 to Milwaukee, 550 to Racine, 5150 to Duluth, 1000 to Detroit, 2530 to Marquette, 840 to Kenosha, 2790 to Port Arthur, 900 to Houghton, 200 to Port Dalhousie, 1000 to Manitowoc, 300 to Amherstberg, 340 to Pequaming, 800 to Green Bay, 1100 to Superior City.

Receipts by Lake Shore & Michigan Southern Railroad for the week, none. By lake, none.

The charters by canal of coal for the week ended to-day were: 1 load to Port Jackson, 85c. net ton; 1 load to Schenectady, 85c. net ton; 2 loads coal-dust to Syracuse, 65c. gross ton. Captain to pay unloading in all cases. Nominal rate to New York, \$1.30 net ton, and to Albany, 95c. net ton. Captain to pay unloading.

"The production of anthracite coal to August 1st," says the New York Mail and Express, "will be about 15,250,000 tons, against 16,626,000 tons last year. There was idleness at the mines last week, and reliable reports pronounce the trade quiet. There seems to be a pause of the buyers and consumers to see whether the companies will so work as to keep up prices. So far, the probabilities are, that they will, in spite of facts which alone should lead to different results. Certain coals are offered at lower prices than the net circulars, and many parties who have large amounts of coal sold are complaining that their customers do not order its shipment, as the future still looks to them uncertain. Bituminous coal continues quiet, and there is the usual range of prices and qualities. The preceding shows the general situation. In regard to the local situation, at Buffalo a firm market and little coal coming to hand describes the state of the trade. At Chicago, anthracite is firm, and gains strength on every assurance for harmony in the coal combination. At Cincinnati, there is moderate demand for coal, and at San Francisco the transactions have been few. The Philadelphia market is quiet, and at Pittsburg the coal trade is in a condition of unchanged dullness." This item gives quite a comprehensive view of the present situation of the coal trade.

Tenders for constructing a break-water to protect the harbor at Port Arthur, the present eastern ter-



BOSTON MINING STOCKS.

Table with columns for dates (July 25, 26, 28, 29, 30, 31) and sales, listing various mining stocks like Amie, Atlantic, Bonanza D., etc.

PHILADELPHIA MINING STOCKS.

Table with columns for dates (July 25, 26, 28, 29, 30, 31) and sales, listing various mining stocks like Argent, Cincinnati, Compton's, etc.

minus of the Canadian Pacific Railroad on Lake Superior, have been advertised for. This may be considered to be equivalent to fixing the fact that Port Arthur is to be the permanent Lake Superior port of the Canadian Pacific Railroad system.

Receipts of coal at Duluth for the week ended last Saturday were 12,890 tons; total thus far this season, 149,979 tons.

Boston. July 31.

[From our Special Correspondent.]

The coal market at this port continues "right side up," and is certainly handled with care by all concerned. As was to be expected, the companies wisely made no nominal circular advance in anthracite coal for August, but decided to let the market take its own course.

As for Philadelphia coal, it may be said to be hardly in the market for new business, the Philadelphia & Reading Company having less than 5000 tons at Port Richmond the other day.

Quotations are still mostly nominal, as follows: At New York, Stove, \$4.25; Broken and Egg, \$3.65; individual coals, \$4.15@4.20 for Stove, \$3.50 for Broken and Egg.

But while there has been little coal selling, the market has been busily occupied in caring for deliveries. The down freights have brought a large fleet into port in the past few weeks.

Present rates of freight are even below what most bituminous contractors reckoned upon, and they are being helped out of a tight place by them, in some cases, just as they were last year.

There is no improvement for the skippers in the freight market. Low prices rule as previously noted, and barges still come at net rates which are said to be from 5 to 10 cents below vessel rates.

There is a fair retail movement at our previous

quotations. Dealers have only moderate stocks. We quote:

Table listing prices for White ash, furnace, and egg; Red ash, egg; Lorberrry, egg and stove; Franklin, egg and stove; Lehigh, furnace, egg and stove.

Wharf quotations: \$4.35, Broken; \$4.75, Stove. Chicago. July 30.

[From our Special Correspondent.]

As was expected, the Western shippers of anthracite at their meeting yesterday decided to advance the price of egg and grate sizes 10 cents and nut and stove 20 cents per ton. The information was received by the trade here with satisfaction, it being the general expression that the advance was advisable and that it will be maintained.

Lake receipts of anthracite are light, according to the reports furnished by the press; but, inasmuch as these reports thus far during the season have proved very unreliable, we can not put much faith in them now, and, as the statistics of the Anthracite Coal Association have been carefully kept from reporters' eyes, it has become a quite difficult matter to give any very accurate information on this point.

Stocks at Buffalo for shipment are very light, and freights are weak at 60 cents per ton to Chicago. Rail receipts are light, and freights are unchanged.

In the market for soft coals, there is no change to report, the dull and lifeless feeling of the past few months still prevailing. Quotations are only an indication of selling prices, cutting being almost general.

Coke is in ample supply but light demand. The trade is almost wholly made up of small orders, little or nothing doing in contracts ahead. Prices are a little weak. Charcoal is inactive and unchanged.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended July 26th, and year from January 1st:

Table showing coal production statistics for 1884 and 1883, categorized by region (Wyoming, Lehigh, Schuylkill, Sullivan) and total production.

\* Included in tonnage of the Philadelphia & Reading Railroad.

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.

Table showing total same time in 1879, 1880, 1881, and 1882.

Comparative Statement of the Transportation of Coke over the Pennsylvania Railroad for the week ended July 26th, and year from January 1st:

Table showing transportation of coke statistics for 1884 and 1883, categorized by region (Gallitzin & Mountain, West Penn. RR., Southwest Penn. RR., etc.).

**FREIGHTS.**

**Coastwise Freights.**

Per ton of 2240 lbs.

Representing the latest actual charters to July 31st.

Ports	From Philadelphia.	From Baltimore.	From Elizabethport, Fort Johnson, South Amboy, Hooken, and Weehawken.
Alexandria.....	.65@.80		
Annapolis.....			
Albany.....			
Baltimore.....	.58§		
Bangor.....	1.20	1.25@1.30	
Bath, Me.....	1.10@1.15	1.15	1.00
Beverly.....	1.10@1.15		1.00
Boston, Mass.....	1.10@1.15	1.10@1.15	.90@.95
Bristol.....	1.05		
Bridgeport, Conn.....		1.10	.50
Brooklyn.....		1.00	
Cambridge, Mass.....	1.10@1.20‡		.95‡
Cambridgeport.....	1.10@1.20‡		.95‡
Charleston, S. C.....	.70	.70@.75	
Charlestown.....	1.20		
Chelsea.....	1.10		.95
City Point.....			.95
Com. Pt., Mass.....	1.25		.95
E. Boston.....	1.10		.95
East Cambridge.....	1.10@1.20‡		
E. Greenwich, B. I.....	1.10		
Fall River.....	1.05		.70@.75
Galveston.....			
Gardiner, Me.....	1.30		
Georgetown, D. C.....	.65@.75		
Gloucester.....	1.15@1.20		
Hartford.....			
Hackensack.....			
Hudson.....			
Lynn.....	1.20@1.30		
Marblehead.....	1.15		
Medford.....			
Millville, N. J.....			
Milton.....			
Newark, N. J.....			
New Bedford.....	1.00@1.20	1.05@1.10	.80
Newburyport.....		1.20@1.25	1.10
New Haven.....		1.10	.50
New London.....			.70
New-Berne.....			
Newport.....	1.10		
New York.....		.97½@1.00	
Norfolk, Va.....	.80		.10
Norwich.....			
Norwalk, Conn.....			
Pawtucket.....			
Philadelphia.....			
Portland, Me.....	.85*	1.15	
Portsmouth, Va.....	.55@.60		
Portsmouth, N. H.....	1.25	1.25	1.10
Providence.....	1.00@1.05	1.05@1.10	.70@.75
Quincy Point.....			
Richmond, Va.....	.80@.85		
Rockland, Me.....			
Rockport.....			
Roxbury, Mass.....	1.10‡		
Saco.....			
Sag Harbor.....			
Salem, Mass.....	1.10@1.30		1.00
Saugus.....		.95@1.00	
Savannah.....			
Somerset.....	1.05		
Staten Island.....			
Trenton.....			
Troy.....		1.35	
Wareham.....			
Washington.....	.65@.80		
Weymouth.....			
Williamsbg, N. Y.....			
Wilmington, Del.....			
Wilmington, N. C.....			
St. Thomas, W. I.....			

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

**Belvidere-Delaware Railroad Report for the week ended July 26th :**

	Week.	Year. 1884.	Year. 1883.
Coal for shipment at Coal Port (Trenton).....	4,641	46,384	56,666
Coal for shipment at South Amboy.....	15,232	322,353	386,814
Coal for distribution.....	17,343	416,674	439,115
Coal for company's use.....	4,157	99,759	85,299
Total.....	41,373	885,170	967,894
Increase.....			
Decrease.....		82,274	

The increase in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 139,698 tons, as compared with the corresponding period in 1883.

**Comparative Statement of the Production of Bituminous Coal for the week ended July 26th, and year from January 1st :**

Tons of 2000 pounds, unless otherwise designated.

	1884.		1883.	
	Week.	Year.	Week.	Year.
<b>Cumberland Region, Md.</b>				
Tons of 2240 lbs.....	65,836	1,535,528	...	1,316,363
<b>Barclay Region, Pa.</b>				
Barclay RR., tons of 2240 lbs.....	3,534	178,367	...	177,021
<b>Broad Top Region, Pa.</b>				
Huntington & Broad Top RR., of 2240 lbs.....	3,124	106,474	...	106,663
East Broad Top.....	...	...	...	25,049
<b>Clearfield Region, Pa.</b>				
Snow Shoe.....	3,061	103,773	...	134,507
Karthauss (Keating).....	1,144	18,688	...	...
Tyrone & Clearfield.....	57,655	1,737,426	...	1,599,503
<b>Allegheny Region, Pa.</b>				
Gallitzin & Mountain.....	7,336	215,713	...	249,129
<b>Pittsburg Region, Pa.</b>				
West Penn RR.....	4,148	159,658	...	246,644
Southwest Penn RR.....	1,850	81,116	...	61,130
Pennsylvania RR.....	5,187	159,855	...	305,115
<b>Westmoreland Region, Pa.</b>				
Pennsylvania RR.....	30,857	707,521	...	774,872
<b>Monongahela Region, Pa.</b>				
Pennsylvania RR.....	1,645	86,120	...	...
Total.....	185,377	5,090,179	...	4,995,966
Increase.....	...	94,183	...	...

**AN OLD ASSAYING BUSINESS, WITH** Fixtures, Tools, Good-Will, Signs, etc., \$600. A good chance for a smart American, who may be taught in a few weeks. Apply, first, to X. CUPEL, 1 Bridge Street, New York.

**CONCENTRATORS FOR SALE CHEAP.** Two Rittinger Tables, almost new, complete with Frames, Foundation Timbers, Rubber Covers for Tables, etc., complete, ready to go in. VERY CHEAP. Apply to RITTINGER, Care of ENGINEERING AND MINING JOURNAL, P. O. Box 1833, New York.

**ASSAYERS' SUPPLIES.** (Established 1848.) Balances and Weights, Furnaces, Scorifiers, Cupels Crucibles, Tonges, etc.

**A LARGE STOCK. Also, CHEMICAL APPARATUS OF ALL KINDS.** Trial orders solicited. E. B. BENJAMIN, 6 Barclay and 12 Vesey Sts., New York.

**DIVIDENDS.** HORN-SILVER MINING COMPANY, 44 WALL STREET, NEW YORK. DIVIDEND NO. 14.

A dividend of \$300,000, being three per cent on the capital stock will be payable to stockholders of record on and after August 15th at the office of the company. Transfer-books will close on Thursday, August 7th, and reopen Saturday, August 16th. CHARLES G. FRANCKLYN, President.

**BOOKS ON COAL.**

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- ATKINSON, J. J. A Practical Treatise on the Gases met with in Coal Mines. 16mo. boards. N. Y. 1875. 50 cents.
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- HIGSON, JOHN, F. G. S. Explosions in Coal Mines. 8vo, cloth, plates. Manchester, 1878. \$5.
- HUNT, T. STERRY, LL.D. Coal and Iron in Southern Ohio. 8vo, paper. Boston, 1881. 75 cents.
- HYSLOP, JONATHAN, C. E. and M. E. Colliery Management. Second Edition. With Atlas of 17 Plates. Lond. 1876. \$9.
- MATHER, JAMES. The Coal Mines, their Dangers and Means of Safety. Lond. 1868. \$10.

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