

THE ENGINEERING AND MINING JOURNAL



Entered at the Post-Office of New York, N. Y., as Second-Class Matter.

VOL. XLII. JULY 17. NO. 3.

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Cable address: "Rothwell," New York.

Subscription Price, including postage for the United States and Canada, \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$5 = 20s. = 25 francs = 20 marks. All payments must be made in advance.

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THE SCIENTIFIC PUBLISHING CO., Publishers.

R. P. BOWEN, Pres. HENRY M. GEER, Sec. and General Manager,
P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

EDITORIALS:	PAGE.	COAL TRADE NOTES:	PAGE.
The Index for Volume XLI	37	Tennessee	47
Mr. J. Parke Channing	37	Washington	47
The Manufacture of Cannon	37	West Virginia	47
Corrigenda	37	GAS AND OIL NOTES:	
Rich Rubies in West Virginia	37	California	47
English and American Railroads Compared	37	Michigan	47
CORRESPONDENCE:		Pennsylvania	47
Dry Ore Concentrators	39	GENERAL MINING NEWS:	
Honduras Mines	39	Alaska	47
OFFICIAL STATEMENTS AND REPORTS:		Arizona	47
Richmond Consolidated Mining Company, Nevada	40	California	47
Clear Creek Colorado Notes—The Terrible Strike	40	Canada	48
Silicate-Aluminate Slags	40	Colorado	48
Source and Behavior of Fire-Gas in the Johnstown, Pa., Mines	42	Dakota	48
The New Zealand Volcanic Eruption	45	Mexico	48
Patents Granted by the United States Patent-Office	45	Michigan	48
Furnace, Mill, and Factory	46	Minnesota	48
Labor and Wages	46	Missouri	48
Transportation Notes	46	Montana	48
NOTES:		Nevada	49
European Nickel Market	44	New Mexico	49
The First Electric-Lighted City	44	Pennsylvania	49
The Proposed Copper Duties	45	Utah	49
The Peruvian Monetary Basis	45	Virginia	49
Ozokerite	45	Wisconsin	49
The Rights of Naturalized Foreigners in Mexico	45	MARKETS:	
Origin of Electricity in Storms	45	Silver, Copper, Tin, Lead, Spelter, etc.	49
Steel Rails for the West	45	Iron Market Review	50
German Steel Rail Prices	45	New York	50
Nobel's Explosives Company	45	Philadelphia	50
COAL TRADE NOTES:		Pittsburg	50
Illinois	46	Louisville	51
Kentucky	46	Coal Trade Review	51
Ohio	47	Statistics of Coal Production	51
Pennsylvania	47	New York	51
FREIGHTS:		Buffalo	51
FINANCIAL:		Boston	53
Mining Stocks	53	Pittsburg	53
Coal Stocks	54	ADVERTISERS' INDEX	
Advertisers' Index		XV	

THE index for Volume XLI, from January to July, 1886, accompanies this issue of the JOURNAL. Subscribers not receiving it will please inform us at once.

MR. J. PARKE CHANNING, mining engineer, has returned from Honduras, and has opened an office at Bessemer, Mich., the center of the new Gogebic iron range, which is now attracting so much attention.

"THE manufacture of cannon is an industry which will not grow without fostering, but it is so vital to the national security that it is worth while to break a few of the laws of a narrow political economy to rear it." This is the advice of that excellent authority, London *Engineering*, to the British government, which finds its great guns defective, and, owing to its policy of encouraging a monopoly, no other firms prepared to manufacture heavy ordnance. If this apply to Great Britain, how much

more is it true of this country, where we have not a single maker of heavy ordnance!

MR. HEARD desires the following corrections to be made in his article on "Dry Ore Concentration," which appeared in our issue of July 3d: Page 7, column 1, line 40, read, "as is also Paddock's machine of a machine devised by Chubb." And same page, column 2, line 29, and three following lines, should read thus:

- A. Of the stuff treated, the jigs returned, exclusive of dust—
- 48,151 pounds of ore, valued at \$1,288.12, yielded \$659.88, or 51.23 per cent of value of uncrushed ore = 72.5 per cent of value of material jigged.
- B. 31,823 pounds of ore, valued at \$339.69, yielded \$220.08, or 55.06 per cent of value of uncrushed ore = 72.9 per cent of value of material jigged.
- C. 102,228 pounds of ore, valued at \$4,260.42, yielded \$2,492.28, or 59.04 per cent of value of uncrushed ore = 89 per cent of value of material jigged.

THEY have struck it rich in West Virginia. A certain Professor FRANK BOSWORTH, "secured from Montana" (the report does not say specifically that he edited a Butte paper), has found "rubies, in a clearly defined vein of volcanic ashes, 30 feet thick, on the foot-wall of a 9-foot vein of copper ore, in a true fissure vein." These thirty feet of rubies are accompanied on the same property by "tin, silver, gold, copper, lead, and coal, in paying quantities;" in fact, the tin-stone in "nine different leads" yields from 1 to 24 per cent of tin, and there are "millions of tons" of it.

Not satisfied with all this richness, the prospecting and assaying professor from Montana "is still developing," and he "asserts that this section is as rich in minerals as the Rockies." The company is now "awaiting developments of the Cleveland Company, who have the new patent process for extracting metals by steam;" "and if the process is successful, we shall invite capitalists to put up a large smelter."

And yet these benefactors of the human race who have discovered the very crucible of nature's laboratory, where all the riches that can be imagined are collected and concentrated, had, as it were, to force their riches upon the unworthy and incredulous natives of Milton, West Va., "in the face of unfavorable local criticisms." Professional envy might perhaps account for the "adverse report of a professor of mineralogy and analytical chemist;" but that "local opposition" to the Montana professor shows that a prophet may be without honor out of his own country, high authority to the contrary notwithstanding.

If the professor will only designate the part of the "Rockies" that is as rich as this bonanza, he will confer a favor; for West Virginia can never accommodate all who will flock there from all parts of the world when this great discovery becomes known.

ENGLISH AND AMERICAN RAILROADS COMPARED.

We have several times referred to the remarkable facts demonstrated in Mr. E. B. DORSEY'S paper on this subject, read before the American Society of Civil Engineers. In this elaborate statistical summary, the superior economy of American roads and locomotives is shown in a manner so authoritative that not a single English engineer or English publication has thus far ventured to refute the fact, and we have reason to believe it has already induced the progressive head of the greatest of the English roads to secure the services of an engineer thoroughly familiar with American practice and qualified to appreciate its good points.

The subject of economy in transportation is one of such vital importance that we gladly devote some space to the subject, and reproduce Mr. DORSEY'S very valuable tabulated statement comparing the working expenses of the English and American roads.

MR. DORSEY shows, in a supplementary paper read last week, at the Denver meeting of the Society of Civil Engineers, that the cost of transporting one passenger or one ton per mile has remained practically the same on all roads in Great Britain during the past thirty years; while, on all New York roads, it has been decreased 51 per cent, and on the Pennsylvania Railroad 76 per cent, from 1855 to 1884. Comparing the London & Northwestern, the greatest of the English roads, with the Pennsylvania road, it is seen on the accompanying table that the cost of transporting one ton or one passenger one mile on the English road is about double what it is in this country.

If the English locomotives could be made to work as economically as American engines on the Pennsylvania Railroad, the saving in repairs and renewals of locomotives alone on the London & Northwestern road, with its 2476 locomotives, would amount to \$840,000 a year. But the English locomotives on this road make less than two thirds of the mileage, and haul only 36 per cent as much load as do the engines on the Pennsylvania Railroad. It appears, therefore, that 550 American locomotives on the Pennsylvania Railroad actually do the same amount of work as 2476 engines on the London & Northwestern Railroad.

These 550 locomotives would cost say \$5,500,000, which the company could borrow at 4 per cent, or for \$220,000 a year, while its saving in repairs and renewals would amount, as shown above, to \$884,000 annually. If, therefore, the work actually done on these roads be taken as a measure of the relative value of the two classes of locomotives, it is evident that the London & Northwestern Company could make a clear annual saving of \$620,000 by giving away or dumping into the sea its 2476 English engines

TABLE No. 45.

Comparing the Cost of Maintenance of Way, Repairs and Renewals of Locomotives, Motive Power, and Total Operating Expenses.

NAME OF RAILROAD.	YEAR.	Average Length of Line Operated.	Aggregate Daily Trains Over Entire Line.	Average Cost per Mile.	AVERAGE LOAD OF TRAIN.			TOTAL COST OF MAINTENANCE OF WAY.		TOTAL COST OF REPAIRS AND RENEWALS OF LOCOMOTIVES.		TOTAL COST OF MOTIVE POWER.		TOTAL COST OF OPERATING EXPENSES.	
					Tons.	Passengers.	Tons and Passengers.	Per Train Mile.	Per 1 Ton or 1 Passenger Moved 1 Mile.	Per Train Mile.	Per 1 Ton or 1 Passenger Moved 1 Mile.	Per Train Mile.	Per 1 Ton or 1 Passenger Moved 1 Mile.	Per Train Mile.	Per 1 Ton or 1 Passenger Moved 1 Mile.
					Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.			
UNITED KINGDOM. £ = \$4.80. d = 2 cents.															
Caledonian.....	1882	.....	.....	.....	.....	.....	.....	10.46	.....	.....	.....	15.26	.....	62.40	.....
	1883	877	43	.....	69	37	55	9.54	.174	5.06	.092	15.92	.290	63.64	1.16
	1884	878	46	.....	64	35	51	10.08	.198	5.22	.102	16.26	.303	60.26	1.18
Great Eastern.....	1882	.....	.....	.....	.....	.....	.....	10.48	.....	.....	.....	17.32	.....	64.42	.....
	1883	1 049	42	.....	69	45	55	10.30	.189	5.39	.096	17.88	.325	63.04	1.15
	1884	1 038	43	.....	68	46	55	9.96	.180	5.06	.092	17.12	.311	61.24	1.11
Great Northern.....	1882	.....	.....	.....	.....	.....	.....	9.64	.....	.....	.....	15.20	.....	59.68	.....
	1883	768	68	.....	61	35	48	9.50	.198	4.00	.083	15.50	.322	58.72	1.22
	1884	785	69	.....	60	34	47	9.20	.196	4.02	.086	15.24	.324	56.24	1.20
Great Western.....	1882	.....	.....	.....	.....	.....	.....	14.30	.....	.....	.....	15.14	.....	59.92	.....
	1883	2 268	42	.....	65	45	55	14.22	.259	5.80	.105	15.26	.277	60.04	1.09
	1884	2 301	42	.....	64	44	54	13.80	.255	.....	.....	15.38	.285	59.34	1.10
Great Southern and Western of Ireland...	1882	.....	.....	.....	.....	.....	.....	15.48	.....	.....	.....	18.66	.....	69.40	.....
	1883	478	19	.....	74	40	54	17.28	.320	6.00	.111	18.62	.345	68.94	1.28
	1884	496	19	.....	73	37	52	16.26	.313	5.96	.115	18.18	.350	67.30	1.30
Lancashire and Yorkshire.....	1882	.....	.....	.....	.....	.....	.....	12.56	.....	.....	.....	19.26	.....	77.32	.....
	1883	494	84	.....	99	42	66	12.78	.194	.....	.....	17.52	.267	75.12	1.14
	1884	496	88	.....	96	41	64	12.46	.195	.....	.....	16.20	.253	71.06	1.11
London and North Western.....	1882	.....	.....	.....	.....	.....	.....	12.40	.....	.....	.....	15.10	.....	66.54	.....
	1883	1 793	68	.....	78	39	59	11.90	.202	4.60	.078	15.40	.261	65.52	1.11
	1884	1 811	68	.....	78	38	58	12.14	.209	4.78	.082	15.72	.271	65.66	1.13
London and South Western.....	1882	.....	.....	.....	.....	.....	.....	13.60	.....	.....	.....	16.90	.....	73.28	.....
	1883	721	49	.....	71	51	56	12.78	.228	5.42	.097	16.66	.298	71.58	1.28
	1884	722	49	.....	69	51	56	13.06	.233	5.42	.097	19.38	.346	71.46	1.27
London, Brighton and South Coast.....	1882	.....	.....	.....	.....	.....	.....	9.82	.....	.....	.....	18.06	.....	66.82	.....
	1883	403	63	.....	91	56	63	9.96	.188	4.24	.07	18.20	.289	66.08	1.05
	1884	417	62	.....	83	55	61	9.80	.161	4.48	.073	17.91	.294	63.70	1.05
Manchester, Sheffield and Lincolnshire...	1882	.....	.....	.....	.....	.....	.....	9.26	.....	.....	.....	14.36	.....	64.18	.....
	1883	314	66	.....	77	35	62	8.92	.160	.....	.....	14.90	.248	65.48	1.06
	1884	316	69	.....	75	34	60	8.80	.147	.....	.....	14.26	.238	65.02	1.08
Midland.....	1882	.....	.....	.....	.....	.....	.....	10.18	.....	.....	.....	11.94	.....	56.18	.....
	1883	1 381	76	.....	61	33	50	9.59	.190	5.24	.105	15.50	.310	58.30	1.12
	1884	1 388	76	.....	61	33	50	8.96	.180	5.06	.101	15.34	.301	56.82	1.13
North Eastern.....	1882	.....	.....	.....	.....	.....	.....	12.78	.....	.....	.....	20.60	.....	69.14	.....
	1883	1 534	51	.....	78	37	62	12.36	.199	7.84	.126	21.24	.343	67.74	1.10
	1884	1 534	49	.....	76	35	59	12.38	.210	8.34	.141	21.50	.364	67.78	1.15
South Eastern.....	1882	.....	.....	.....	.....	.....	.....	11.08	.....	.....	.....	17.54	.....	74.44	.....
	1883	370	55	.....	85	66	71	10.78	.152	3.88	.075	18.02	.255	74.74	1.05
	1884	369	59	.....	82	62	66	9.94	.151	3.92	.060	17.22	.261	70.68	1.07
All the Railroads of the United Kingdom.	1882	18 457	.....	£41 605	.....	.....	.....	12.28	.....	.....	.....	16.42	.....	64.94	.....
	1883	18 681	46	42 417	73	43	57	12.02	.211	.....	.....	16.64	.291	64.34	1.13
	1884	18 864	46	42 486	71	42	55	11.64	.211	.....	.....	16.70	.304	63.18	1.15
All the Railroads of England and Wales ..	1882	.....	.....	.....	.....	.....	.....	12.12	.....	.....	.....	16.74	.....	65.68	.....
	1883	13 215	54	49 258	73	44	57	11.74	.206	.....	.....	16.96	.300	64.84	1.14
	1884	13 340	54	49 854	72	43	56	11.44	.204	.....	.....	17.04	.304	63.96	1.14
UNITED STATES.															
Pennsylvania Railroad Division.....	1883	1 314	52	.....	189	45	152	17.6	.116	7.1	.017	24.5	.161	86.	.56
	1884	1 471	45	.....	205	42	160	16.4	.103	7.	.044	23.8	.148	84.5	.53
	1885	1 518	46	.....	210	45	167	13.2	.080	6.2	.037	22.2	.133	78.2	.41
New York Central and Hudson River.....	1883	.....	.....	.....	205	71	160	21.7	.134	6.8	.042	31.3	.214	123.2	.77
	1884	993	53	.....	196	60	117	18.8	.128	5.2	.035	26.6	.180	108.5	.74
	1885	993	56	.....	195	70	150	15.1	.109	4.9	.033	24.8	.165	92.8	.63
Louisville and Nashville System, Main Stem.....	1883	185	21	\$85 405	149	40	109	13.15	.121	4.51	.041	20.60	.190	85.31	.783
	1884	185	23	86 373	145	59	112	10.46	.093	4.64	.041	20.57	.184	85.39	.762
	1885	185	21	86 804	149	58	114	10.96	.096	4.73	.036	18.67	.164	81.58	.716
Nashville and Decatur.....	1883	119	15	37 198	153	39	116	17.48	.151	4.57	.039	20.47	.176	103.94	.896
	1884	119	15	37 420	161	49	125	13.50	.109	4.68	.037	21.66	.169	97.21	.777
	1885	119	15	37 769	162	64	129	12.57	.098	4.16	.033	20.25	.159	91.39	.714
South and North Alabama.....	1883	189	17	55 357	129	34	103	21.18	.205	4.66	.045	19.67	.191	89.45	.869
	1884	189	18	55 521	124	45	107	15.32	.143	4.74	.044	19.48	.182	87.00	.813
	1885	189	19	55 818	117	57	101	10.99	.109	4.25	.042	18.57	.184	75.57	.748
Mobile and Montgomery.....	1883	179	12	36 059	137	43	105	23.12	.220	4.56	.043	19.07	.181	95.38	.908
	1884	179	13	36 119	129	52	104	28.34	.273	4.67	.045	19.42	.187	104.36	1.000
	1885	179	14	36 154	123	75	104	22.91	.229	4.09	.039	18.18	.175	92.42	.889
New Orleans, Mobile and Texas.....	1883	141	12	73 052	150	64	110	18.74	.170	4.34	.039	20.86	.190	99.08	.901
	1884	141	12	73 195	143	80	112	22.08	.197	4.54	.040	21.61	.193	107.	.955
	1885	141	12	73 241	138	93	114	16.05	.141	3.91	.034	20.78	.174	94.07	.843
Knoxville Branch.....	1883	171	4	28 200	134	43	91	50.78	.554	4.33	.048	21.55	.233	111.81	1.229
	1884	171	10	26 464	122	39	88	35.53	.404	4.60	.052	21.04	.239	93.94	1.069
	1885	171	11	26 624	126	31	91	22.16	.243	4.14	.045	19.11	.210	74.55	.819
Memphis Line.....	1883	258	10	35 667	100	32	69	24.26	.252	4.36	.063	18.65	.270	87.74	1.212
	1884	258	9	35 702	110	39	76	22.82	.300	4.53	.059	19.65	.259	84.58	1.113
	1885	258	9	35 710	126	34	81	21.84	.270	4.00	.049	19.44	.240	84.36	1.041
Henderson Division.....	1883	151	14	41 782	126	27	93	22.17	.278	4.77	.047	19.68	.212	82.76	.890
	1884	151	13	41 854	138	42	116	25.00	.246	4.75	.041	19.77	.170	93.77	.808
	1885	151	13	41 904	152	45	125	15.98	.128	4.25	.034	17.29	.138	80.60	.645
St. Louis Division.....	1883	208	8	33 108	109	32	74	34.08	.460	4.35	.060	16.45	.222	102.97	1.391
	1884	208	9	33 297	109	33	75	32.17	.429	4.54	.061	17.04	.217	101.41	1.352
	1885	208	9	33 372	122	32	82	25.32	.345	4.05	.049	15.86	.193	93.33	1.139
Cincinnati Division.....	1883	110	17	44 469	113	41	80	16.87	.201	4.34	.054	21.04	.263	107.81	1.348
	1884	110	18	44 689	125	51	92	15.75	.171						

and substituting for them 550 American locomotives, and working them as they are worked on the Pennsylvania Railroad.

The surprising figures compiled by Mr. DORSEY from the official records and reports can not be dismissed with a mere expression of opinion or by ignorant assumptions, or answered with any thing but better records of actual work done.

In the face of these records, as well as in the light of every engineer's experience, how supremely absurd is the following statement, recently made in a discussion on "Economical Construction of Railroads," before the London Institution of Civil Engineers by Sir DOUGLAS FOX:

"His experience had been that, as long as the line was in a bad condition and in the hands of the contractor, no praise was thought too great for the American engine; but when it came into the hands of the company, and economy became the question, it was otherwise. . . . The result was that, on a roughly-laid permanent way, the American locomotive would keep on the road, while the English engine would soon find its way off. But the moment there was a good road to run upon, there was no comparison between the two engines in regard to cost of repairs."

A locomotive that will be durable and efficient on a rough road, but goes to pieces on a good road, is a mechanical curiosity worthy of note, and no less curious than such an opinion as this from an engineer.

And the following intelligent opinion expressed in the same discussion by Mr. R. H. BURNETT:

"The 'sole essential difference,' or the main difference, in the locomotives of the two countries consisted in the general inferiority in the design, details, and materials, as well as in the finish, of American engines. . . . American locomotives were much inferior, both in endurance and in economy in working, to English-made ones. . . .

"The boasted superiority of American locomotives, either as regarded efficiency, durability, or economy in working, was without any foundation in fact."

These gentlemen may profit by studying the official reports, summarized in the accompanying table, and other figures given by Mr. DORSEY, but for which we have not space.

CORRESPONDENCE.

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

Dry Ore Concentrators.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I notice an article in the last issue of the ENGINEERING AND MINING JOURNAL, from the pen of Mr. John Heard, Jr., on dry concentration of ores, which I think gives undue credit to the Krom jig. I am familiar with the machine in question, and know it to contain radical defects that will effectually prevent its making a close concentration, and saving, at the same time, a high percentage of value, without sacrificing capacity to an extent that will render it worthless in any place where water can be obtained. The principal defect to which I refer is the discharge, which is positive, and is effected by means of a grooved roller that withdraws a certain amount of concentrates at each revolution. I will admit that the motion given to the roller is adjustable, and that it can be approximately set to suit ores containing varying percentages of mineral. As, however, it is not automatic in its action, and as the percentage of mineral in any ore is not by any means constant, but varies with every shovelful thrown into the crusher, it follows that at one moment the roller, not finding a sufficient amount of clean mineral to fill the grooves, is compelled to take what ought to go into the tailings. At the next moment, the supply of mineral is too great, and a portion of it goes into the tailings and is lost. This action goes on continually, with the result that a large amount of worthless gangue passes into the concentrators, and valuable mineral is lost in the tailings.

I simply suggest this objection, as it might be of interest should there be any discussion of Mr. Heard's paper. The same objection would hold good against the Paddock machine, though in a less degree. H.

GEORGETOWN, COLO., July 6, 1886.

Honduras Mines.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of July 10th, you publish, with editorial indorsement, an alleged criticism on the mines and mining industry of Honduras by a correspondent who endeavors to conceal his identity behind the *nom de plume* "Clip."

As your JOURNAL is widely read in mining circles, and is justly looked upon as an authority in such matters, within its province it has the right to expose fraud and incompetent management. In endeavoring to do this, it sometimes happens that reputable organizations, honestly managed, suffer, and such is the case in the present instance.

As President of the Central American Syndicate Company, I am in a position to know that the criticism of the management of the mines at Yuscaran is utterly unwarranted. It is evident, from the tone of that communication, that your correspondent has never visited Yuscaran, and as your indorsement leads me to suppose that he is a man of repute in mining circles, it is evident that he has been grossly deceived as to the situation of affairs there—probably by discharged employes of some of the companies assailed, or others who have an "ax to grind" by abusing our enterprises.

The Central American Syndicate Company was organized in 1882, and

is the owner of valuable franchises granted by the Honduras government. Its capital is but \$78,000, and its stock is not upon the market. Its business is to advance the mining interests of Honduras, and it has aided in promoting a number of companies that are now actively engaged in reopening some of the old mines in the districts mentioned, which were abandoned, having previously been worked as far as it was possible to work them without pumping or ventilating machinery. Each of these companies owns distinct properties, and is an independent organization in its relations to the others, and each is in possession of ample funds to successfully carry it. Under the auspices of these companies, a wagon-road, as good as is usually found in new mining districts, was built from San Lorenzo on the Pacific coast, by way of Tegucigalpa, the capital, to Yuscaran, a distance of 114 miles. This road was completed June 3d. Your correspondent truthfully says that the rains have not benefited it; but the road is open, and the eight batteries of a 40-stamp mill, each weighing nearly 4000 pounds, which have been moved up from the coast as the road was completed, are now at Yuscaran, and are being placed in position. As to the time occupied in transporting some of our machinery, "Clip" has not given any surprise to our stockholders; but for general public information, he should have added that the delay was due to the fact that the wagons could only proceed as fast as the road was built. As to the relative cost of transportation between wagon and pack-mules (aside from the advantages of not having to cut up all machinery in 200-pound pieces), there can be no two opinions based upon facts; your correspondent is greatly in error, as he will find to his cost when he has experience. Besides, the road was absolutely necessary to take in the heavy machinery that will be required to successfully and economically work the mines of the district.

"Clip" also says: "Near Santa Lucia and the Valley of the Angels, properties have lately been incorporated as New York companies, but it behooves the public to scrutinize affairs closely before investing in the stocks." Scrutinize what? I fail to see what public benefit is conferred by such ambiguous insinuations. The Santa Lucia Mining and Milling Company owns twenty-five old mines in that district, and all the necessary capital to insure success has been subscribed for. The new road passes within two miles of the properties, and Major E. J. Phillips, late of the Draper Colliery, Gilberton, Pa., a gentleman of large experience in mining and mining machinery, is the superintendent.

The Animas mine of the Los Angeles Mining and Smelting Company, of the Valley of the Angels, has been a paying mine since the time of its discovery, and has been continuously worked by its native owners. This property is under the direction of Mr. Frank Robbins, late Superintendent of the Eureka Consolidated Works.

Now we come to the criticism of the Yuscaran management. Capt. J. P. Imboden, the manager, has been in charge of the property about one year, and in that time has certainly done very commendable and satisfactory work. He has supervised the building of the road from the coast, connected all the works about Yuscaran with good roads, is working the native mules to harness, and has all the properties under his charge in a favorable state of development. The amount of work done in that time would be satisfactory in this country, and is especially so when the physical difficulties of that country are taken into consideration.

The pulverizers so contemptuously spoken of are doing most excellent and satisfactory work upon the softer ores of the district. If there is sufficient water to wash away part of a flume (an accident not unfrequent), there is certainly enough water flowing through that flume to run the turbine. In Yuscaran, for nine months of the year, there is ample water to run the machinery. The calculation is, to add steam-power to all the plants, and in some instances this has already been done. Instead of trying to "hydraulic down a mountain of porphyry," the "Little Giant" is used as the most effective and economical means of clearing away *débris* on the Guayabillas mine. The shaft on this mine, which is located six hundred feet back of the crop of the vein, and which will cut all the veins in the set far below where they were worked by the old miners, is six by twelve feet, is well timbered, and is a good job. It is equipped with air-compressors for power drills, and a first-class hoisting and pumping plant, built by Mr. Robert Allison, of Port Carbon, Schuylkill County, Pa. An examination of the books of the company at this office, 140 Nassau street, will show that the cost of sinking this shaft has not exceeded the cost of similar work in this country. As regards the pumps and other mining machinery at Yuscaran, they are in charge of Mr. J. Garrigan, who has had large experience in the anthracite region, where the largest pumping and heaviest machinery is in use. The pumps of the "Quemazones" were lost not through negligence, but simply because they were too light for the work after a second lift was sunk in the shaft. At the time they were sent, they were as heavy as could be taken in before the completion of the road.

It would almost seem that your correspondent has a motive in decrying these enterprises, or he would hardly make gratuitous mention of the fact that General Streber has a claim of \$32,000 against one of these companies, and that, through this, it is likely to lose the mine. It is true that some three years ago General Streber loaned one of these companies money, but this matter was settled fully and amicably over a year ago.

The reduction plant at Yuscaran is in charge of Mr. William H. Rodda, assisted by Mr. Enoch Kenyon. Both of these gentlemen are well known on the Pacific coast, the former having an experience in mining and milling of over twenty-five years in California and Nevada.

These enterprises deservedly enjoy an excellent credit in Honduras. Their drafts are sought after as exchange, and are always promptly paid; and they will continue to be promptly paid, notwithstanding many later comers to Honduras hope they may not, that an opportunity may be offered for others to obtain control of the very valuable properties they represent.

I have before me the copy of an official document from the archives in Tegucigalpa, which is the report of the mine-owners of Yuscaran assembled in meeting on June 17th, 1799. They were making applications through the Captain-General of Guatemala to the crown of Spain for the appointment of a mayor for Tegucigalpa. They state that there are twenty-four "minerals" in the Department of Tegucigalpa, and that in the single "mineral" of Yuscaran, and within an area of one half-league of the town, there are twenty-five distinct veins of gold and silver that have been worked, and seventeen "ingenios," or native reduction-works, with sixty "arrasters." This old document says that the deepest of these

openings were under seven hundred feet, and that none of the veins or pay-chutes was exhausted. The American companies now operating at Yuscaran are putting machinery on the best of the properties.

In conclusion, let me say that we may have made some mistakes; but if so, they have caused no loss of money or time, and have involved no change of plans.

It is a matter of regret that your correspondent did not write from personal knowledge. Puerto Cortez, the point from which his letter is dated, is a port on the Atlantic coast over three hundred miles from Yuscaran, and information at that point regarding the works of our companies would be no more reliable than if obtained from some part of the United States.

Regretting the necessity that has caused me to ask for so much of your valuable space, I remain, sir, yours very respectfully,
THOMAS R. LOMBARD,
New York, July 14, 1886.

President of the Central American Syndicate Company.

[We can only add to this that we have always found our correspondent "Clip" trustworthy, and he has had a wide experience. We see nothing in his communication to indicate that our correspondent did not have "personal knowledge" of the matter of which he wrote. The mere fact that his communication is dated from Puerto Cortez certainly does not prove that he got his information there. No doubt in due time "Clip" will answer for himself.—ED. E. AND M. J.]

CLEAR CREEK, COLORADO, NOTES—THE TERRIBLE STRIKE.

Correspondence of the Engineering and Mining Journal.

A strike was made in the Terrible to-day, that enables Colonel Baldwin, the manager, to say, "I told you so." I am a little in doubt as to which causes most pleasure—the fact that his judgment has proved to be sound, or the richness of the ore-streak encountered.

From the surface to the thirteenth level, the main shaft followed a lode that dipped strongly to the north. A vein was then encountered that ran nearly in the course of the one on which the shaft was sunk, but which had far less dip. In sinking to the fourteenth level from this point, the shaft was made to follow the foot-wall, and consequently left the vein on which it had been sunk from the surface. Ore had been found in the fourteenth level; but neither quantity nor quality was satisfactory. After taking charge of the mine, Colonel Baldwin became satisfied that the shaft had left the main vein at the thirteenth level, and that it would be necessary to cross-cut to the north in order to recover it. Accordingly, a cross-cut was started, and has since been carried forward in the face of opposition, until to-day, at a distance of thirty-three feet, the main ore-vein was encountered, disclosing a solid streak of ore of very satisfactory size and appearance. No assays have yet been made.

It is worthy of note that to-day's mail brought from London orders to discontinue work in the cross-cut. Had the orders arrived one day earlier, or had the distance between the veins been one foot greater than it was, it is doubtful whether the ore would ever have been discovered—another fact that will help to prove the correctness of my theory, that the superintendent at the mine is a better judge of its requirements in the way of development-work than a board of directors, thousands of miles away, possibly can be.

I am informed by the superintendent that the mine is now paying something more than the expense of working. He also informs me that when he first took charge, the expenses exceeded the revenue by about thirty-five hundred dollars a month.

A large amount of ore is mined in this locality, and the output for the current year bids fair to be the largest in the history of Clear Creek County.

GEORGETOWN, COLORADO, July 8.

H. F.

OFFICIAL STATEMENTS AND REPORTS.

Richmond Consolidated Mining Company, Nevada.

At the recent annual meeting of this company in London, the report for the year ended February 28th, 1886, was presented and discussed. Few of the English-managed mining companies give that detailed information to their stockholders that is, according to our view, their right to have, and which, when given, effectually promotes economy in the work. The English papers do not publish the report of the Richmond Company in full, but from what is given we learn the following facts:

The company smelted of Richmond ore 7459 tons, assay value \$63.25 per ton of 2000 pounds; of purchased ore, 7493 tons, assay value \$72.50 per ton; total, 14,952 tons, average value said to be \$66.83 per ton. [These figures would make \$67.23 per ton.] The average yield per ton was \$59.35, or a loss of \$7.48 per ton, equal to 11.2 per cent, which was very heavy. The average yield was \$7.58 per ton greater than in the year before.

The cost of mining was \$9.03 per ton, as compared with \$11.75 per ton the preceding year; and the cost of smelting was reduced to \$10.07, from \$10.89 per ton in 1885.

The amount paid for the purchased ore was £40,838, or say an average of \$27 a ton, which after deducting the loss in treatment and cost of smelting, stated to have averaged \$10.07 per ton, would have left about \$200,000 profit. This is evidently the most profitable part of the company's business.

The total product of the year's business was 13,163 ounces gold, 444,368 ounces silver, and 2045 net tons lead, of the total value of £149,253 15s. 1d., the total cost of producing which is given at £101,928 3s. 7d. for mining, smelting, etc. This would leave an apparent mining profit given at £47,278, or only a little more than the profit on the ore purchased. The profit for the year's business is stated to have been £40,278.

The company obtained from "other receipts," details not given, £47,435 19s. 6d. The company had on hand at the commencement of its fiscal year about 11,644 tons of lead, which, added to the year's production, made a total of 13,689 tons. Of this, during the year the company sold 7538 net tons at prices varying from 3.65 to 4.75 cents per pound in New York, and had on hand March 1st 6151 tons.

The total cash received during the year for gold, silver, and lead was £221,367 8s. 3d.

The value of the bullion in treatment and at the works, after allowing for refining and marketing charges, is placed at £153,472 10s. 2d., or say \$750,000. As the stock of lead on hand—6151 tons—would be worth, after refining and paying freight to New York, not more than \$250,000, the remaining \$500,000 must be made up of silver and gold.

The dead-work, said to be much greater than the preceding year, amounted to 584 feet of drifting, costing nearly \$15 a foot, which was certainly not cheap for the Richmond rock.

No large ore-bodies were opened during the year.

During the year, the Richmond Company compromised with the Albion Company, paying that company \$85,000.

The company paid in freight on lead during the year no less than £54,283, or probably about 2 cents a pound on the lead marketed.

The company paid in dividends during the year \$67,500, bringing the total dividends to date up to \$4,177,587, counted at \$5 = £1.

The figures given are not sufficiently detailed to permit of much useful analysis; but in a general way it would appear that the general management is improving. The cost of mining appears to be high, the cost of smelting fair or low, the losses in smelting very heavy, and there appears to have been very little profit on the business of mining and smelting the company's own ores, but a very large profit on the purchase of ores.

The company paid out of its profit of £40,278: In settlement of Albion suit, £17,000; legal expenses, £2497; dividend in May, 1886, £18,500, and has carried forward about £20,000.

The reserve fund is stated to be £75,000; but this represents bullion on hand and not cash in the treasury, and the price at which the bullion is valued is not stated.

SILICATE-ALUMINATE SLAGS.

Experiences and Remarks on the Role of Alumina in Lead, Copper, and Similar Slags.

Written for the Engineering and Mining Journal by Carl Henrich, M.E.

Generally, in smelting lead ores or copper ores in blast-furnaces, the metallurgist is not called on to bother much about the rôle that alumina plays in the constitution of the slag that he has to produce in his furnace. In most cases, alumina occupies only a subordinate if not insignificant place among the materials that enter into the slag. Whether alumina is an acid or a base, will frequently only slightly affect the character of the slag or the amount of flux that is used.

Sometimes, however, the metallurgist has to deal with an ore in which alumina is one of the main constituents. But even then, there is generally more than one kind of ore available for the smelting mixture. In making up his smelting charge in such cases, the metallurgist will usually be able to keep the percentage of alumina in his slag below the orthodox 15 per cent, the limit that Kerl gives in his Hand-Book of Metallurgy, beyond which it would be unsafe to increase the percentage of this base, as, after this point was overstepped, the heretofore friendly alumina might desert the camp of the bases, and, becoming allied to the enemy, silica, form those unknown, dangerous, and unexplored quantities, the aluminate slags.

So far, I have had to deal only twice, in smelting, with ores carrying a larger amount of alumina. The first time was in Morenci, Arizona, while smelting the copper ores of the Detroit Copper Company. Some of the ores of that place carried a high percentage of alumina. But most of them contained a sufficiently low percentage of that ingredient to make it possible, in making the smelting charges, to keep the percentage of alumina in the slags quite a distance below the above-mentioned 15 per cent, as the following analysis of an average slag, given in Dr. Peters's treatise on Modern Copper Smelting, will show:

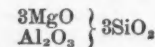
SiO ₂	= 34.34 O	..... = 18.3	MnO	= 6.24 O	..... = 1.4
Al ₂ O ₃	= 11.80 O	..... = 5.6	CaO	= 10.13 O	..... = 2.9
FeO	= 32.27 O	..... = 7.2	MgO	= 2.30 O	..... = 0.9

Considering alumina as a base, this represents a monosilicate, the ratio of the oxygen of the acid to that of the bases being as 18.3:18.0. I always, then, considered alumina as a base, and endeavored, while doing so, to produce a monosilicate slag. In this I was, as a rule, successful, the furnace running very satisfactorily. Occasional troubles ensued, as they are liable to occur in any furnace practice. The main troubles were frequent scaffolding, caused either by a gradual thickening of the crust next the jacket, or more frequently by a prolongation of the tuyere-noses, or until they met and formed an arch across the furnace. But as the amount of very fine ore that had to be smelted without "bricking" was rather excessive, these irregularities of the furnace were mostly charged to that cause, and although they occurred almost regularly, when certain ores containing more alumina had to be smelted in larger quantities than usual, the friable character of these ores, and the consequently larger proportion of fines, only confirmed the supposition that our troubles were attributable to the excess of "fines." In any case, the troubles were not serious enough to force a close investigation, and I had my hands too full to attempt doing so, without being forced to it.

I shall, farther on, revert to my "Morenci" experience and to "Morenci" slags.

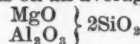
The second time I had to smelt ores with a high percentage of alumina was at the works of the Champion Copper Mining Company of New Zealand, near Nelson, New Zealand. The only ore in that place that had to be smelted came from the two mines of that company, was essentially all of the same character, and no other ores were obtainable to mix with it in smelting. The ore itself was chalcopyrites mixed with massive common pyrites, impregnated and distributed in fine veins in an eruptive rock, locally called "serpentine."

The country "serpentine" in which the lodes are located is a monosilicate of alumina and magnesia, of approximately the following composition:



The "serpentine" of the lode itself, occurring with the ore, has lost

some of the magnesia and silica, removed probably by the action of the sulphatized waters, engendered by the decomposition of the pyrites of the lode. This serpentine is on an average of the composition :



These formulæ are based on the analysis of samples of large quantities of rock, and they represent the average constitution of the rock and not any of the rare crystals of the minerals contained in the rock.

The lode "serpentine" sometimes contains more silica than is given in the above formulæ, but frequently also less, and then more, alumina. On an average, there is about as much alumina as silica in the ores.

Having always regarded alumina as a base, and not being able to find any precedent for the smelting of ores containing such an abnormal amount of alumina, I resolved trying to produce a slag coming as near a monosilicate as possible, or rather being about midway between a monosilicate (2RO+SiO₂) and a subsilicate (4RO+SiO₂) somewhere near (3RO+SiO₂), relying on the iron of the roasted ore to flux the rock.

Sufficient ore for a trial run having been roasted, the furnace was blown in. No slag being obtainable for this purpose, calcareous slate and brown hematite were used as the first charges. This answered the purpose perfectly; and a good start was made. A fusible thin slag resulted, and the furnace ran well and got hot. But soon after the regular charge arrived at the tuyeres, over-fire and scaffolding began, the tuyere-noses began to grow, the slag thickened. Constant breaking down the scaffold by use of a long stout bar became necessary, and the slag got too thick to allow the proper separation and settling of the matte. Addition of limestone and iron ore to the charge seemed only to increase the evil, by a reduction of metallic iron and the formation of an iron sow in the crucible. It soon became necessary to "blow down" the furnace and to draw the charge. Slag samples of the first stage of smelting the regular charge had been taken. This slag, on cooling, had much the appearance of the gray "dolerite" of the country, which takes the place of the "serpentine" frequently in the large eruptive dike traversing the country in which the mines are located.

The analysis of this slag gave :

SLAG NO. 1.			
SiO ₂ = 36.4 O	= 19.4	CaO = 1.5 O	= 0.4
Al ₂ O ₃ = 27.8 O	= 13.1	FeO = 14.2 O	= 3.1
MgO = 18.4 O	= 7.4		

Counting alumina as a base, the oxygen ratio between acid and bases was as 19.4 : 24.

The ore had been badly roasted. The resulting matte had a rather low-grade appearance. The main fault seemed to be in the circumstance of the earthy character of the resulting slag, that the iron, instead of entering the slag, had entered the matte. By a more thorough roasting of the ore, it was hoped that a more metallic slag might be produced. This might make the slag fusible enough for our style of furnace—one of Fraser & Chalmers's 36-inch water-jacketed copper cupolas.

Acting hereon, the ore was put back into the roasting-stalls and a more thorough roasting of the ore effected. Iron ore (brown hematite) was also procured in larger quantity, and the best available limestone (not very good) was crushed to allow of a greater variation in the smelting charge. By this time, and indeed even before the first trial run, I had no doubt about the serious difficulty I should have to overcome in smelting such an ore. I had hunted in every available metallurgical treatise at my command for information and precedents on the treatment of such large quantities of alumina and magnesia silicates as I had to deal with. The only advice I could find was, that either of them, when present in large quantity, was certain to "toughen" the slag and to cause trouble, and that they ought therefore to be avoided in the composition of a slag. This was indeed good advice, when the rock that you had to smelt consisted of nothing else but these two very ingredients you were told to avoid. Even Kerl's advice, to keep the alumina below 15 per cent in the slag, obviously could not be followed in this case.

Before making the second trial run, I had all the roasted ore picked, rejecting all the barren rock and making two classes of ore, one consisting of the more solid pyrites, the other of the pyrites impregnated in the "serpentine." This, with the hematite and limestone on hand, allowed of a greater variety in the smelting charge.

The second trial run was even shorter than the first one. Scaffolding commenced soon again, and it soon formed a crust above the tuyeres too hard for breaking with the bar. The furnace was blown out a second time.

Slag samples were taken during this run. Slag No. 2 during the first and only period that scaffolding was comparatively slight, and the matte separated well from the slag; slag No. 3, from the chilled scaffold around and above the tuyeres; slag No. 4, from the gluey, sticky slag, too thick to run out of the tap-hole, and forming a sow, with iron, matte, and copper in the crucible.

The analyses of these slags were as follows :

No. 1 from first run.				No. 2.		No. 3.		No. 4.	
SiO ₂	O.	O.	O.	O.	O.	O.	O.	O.	O.
36.4	19.4	34.6	18.4	39.1	21.3	21.8	11.6		
27.8	13.1	26.4	12.4	22.9	10.8	31.2	14.7		
14.2	3.2	32.2	7.2	29.6	6.6	31.5	7.0		
18.4	7.3	6.8	2.7	8.4	3.4	15.5	6.2		
1.5	0.4	trace.		trace.		trace.			
98.3		100.0		100.0		100.0			

Counting alumina as a base, the oxygen ratios of acid and bases in these four slags were :

1. 19.4 : 24.0
2. 18.4 : 22.3
3. 21.3 : 20.7
4. 11.6 : 27.9

Counting alumina as an acid, the oxygen ratios were :

1. 32.5 : 10.9
2. 30.6 : 9.9
3. 32.1 : 9.9
4. 26.3 : 13.2

The first way of looking at the composition of these slags threw no light whatever on their behavior in the furnace. It made the worst of all, the scaffold slag No. 3, a correct monosilicate, while the crucible slag No. 4, which had separated from the other slag, would have a composition more basic even than a subsilicate, and the two better slags Nos. 1 and 2 were slightly basic monosilicates. This way of looking at their composition surely did not seem rational.

But looking at their composition in the other way, it was found that the two better slags, No. 1 and No. 2, were very nearly correct trisili-

cate-aluminates, while the unmeltable scaffold slag, No. 3, was more acid still than a trisilicate-aluminate, and the crucible slag, No. 4, which had separated and settled in the crucible, being too thick to run out of the slag-hole, although melted, was a correct bisilicate-aluminate. This looked, surely, much more rational, and led to the following consideration :

A trisilicate-aluminate of the composition of slags No. 1 and No. 2 could be made to answer the purpose of melting the ores. But in doing so, there would be constant danger from a slight variation of the trisilicate-aluminate, either to a more acid slag, making it infusible and causing scaffolding, or to a more basic bisilicate-aluminate, too thick to allow the matte and copper to settle. Besides, there would be the constant danger or possibility of a trisilicate-aluminate splitting into a still more acid silicate-aluminate, and a more basic bisilicate-aluminate, thus producing both troubles at the same time. The only slag that I had not tried so far was a monosilicate-aluminate and a sesquisilicate-aluminate. Being almost convinced, by this time, that alumina, certainly in this case, played the same rôle in the composition of slags as silica, I resolved to try the monosilicate-aluminate and the sesquisilicate-aluminate. Besides, there was not much choice left. If these ores were to be smelted at all in our furnace, this seemed the only way left to accomplish it.

MONO AND SESQUISILICATE-ALUMINATE SLAGS.

In calculating the charge mixture, 34 pounds of alumina were considered equal to 30 pounds of silica, or 2Al₂O₃ = 3SiO₂, considering the value of oxygen in either as equal, and both strictly as the acid part of the slag.

The sampling and making up of the ore-beds, in the different bins on the charge-floor, had been done by men who, with the exception of the foreman, had never worked in any smelting-works before. The duties of the foreman precluded too close attention to the matter. Consequently, great irregularity in the actual composition of the charges ensued, and a consequently rather irregular run and behavior of the furnace. While this necessitated constant watchfulness on the part of the writer, to remedy the occurring irregularities, it gave him, on the other hand, an opportunity, altogether disproportionate to the actual length of the campaign, of taking slag samples during varying conditions prevailing in the furnace. This run was a complete metallurgical success.

Altogether, five different kinds of slag were obtained, and afterward analyzed. The blast pressure during the whole run was maintained at from 9 to 10 ounces.

The slag samples taken were as follows :

Slag No. 5, from the best stage of the run, furnace running quickly and freely; capacity, 45 tons in twenty-four hours; tuyeres bright; slag fluid and hot; matte and slag taps easily; crucible perfectly clean; matte and copper hot; no scaffolding nor crust whatever.

Slag No. 6, from first start, thicker than No. 5; not running as freely; separating well from matte; changed to No. 5 by addition of magnesian limestone of rather poor quality.

Slag No. 7, still a good, homogeneous slag; no cavities on cooling; inclination to form crust and noses at tuyeres; melting much slower than No. 5; capacity of furnace about 27 tons in twenty-four hours; no reduction of metallic iron; some formation of the gluey, sticky slag, like No. 4; fairly good separation from matte.

Slags Nos. 8 and 9, thick slags; scaffolding; constant use of bar needed; large reduction of metallic iron; formation of much of the gluey, sticky slag No. 4; decided growth of tuyere-noses; slag and matte taps very hard; these slags would soon "freeze" the furnace.

The analyses of these slags were as follows :

	No. 5.	O.	No. 6.	O.	No. 7.	O.	No. 8.	O.	No. 9.	O.
SiO ₂	19.7	10.5	18.4	9.8	22.6	12.0	24.2	12.9	23.9	12.7
Al ₂ O ₃	18.5	8.7	20.8	9.8	22.5	10.6	26.2	12.3	26.8	12.6
FeO	28.5	6.3	35.9	7.9	32.7	7.3	32.1	7.1	33.5	7.4
CaO	15.0	4.3	10.0	2.9	5.1	1.4	8.0	2.3	6.4	1.8
MgO	18.3	7.3	14.3	5.7	16.2	6.5	9.2	3.7	9.4	3.8
Oxygen ratio	19.2	17.9	19.6	16.5	22.6	15.2	25.2	13.1	25.3	13.0

For comparison, two other good slags, containing much alumina, and made in copper smelting in Arizona, are given as published in Dr. Peters's treatise on Modern Methods of Smelting Copper, in the ENGINEERING AND MINING JOURNAL. The one, No. 10, is the Copper Queen slag, made by Mr. Williams; and the other, No. 11, is a well-working slag, made by the writer in Morenci, and analyzed by Mr. S. James, Jr. To those two slags is added a third slag analysis (No. 12), hitherto unpublished. This slag was also made by the writer at Morenci; but it is not as well-working a slag as No. 11, although calculated on the same supposition and under the same circumstances as No. 11, namely, on the consideration of alumina as a base, and in smelting the same ores, as when No. 11 was made and worked well. While making slag No. 12, the writer had the same trouble, although in a less and more easily remedied manner, as at the Champion Company's works in New Zealand—scaffolding and formation of iron sows. This trouble at Morenci used to occur whenever a certain ore had to be smelted in a larger proportion than usual. And so pronounced was this circumstance that even the men working at the furnace grew apprehensive whenever larger quantities of that kind of ore had to be smelted.

	No. 10.	O.	No. 11.	O.	No. 12.	O.
SiO ₂	26.6	14.2	34.3	18.3	38.1	20.3
Al ₂ O ₃	15.4	7.2	11.8	5.5	16.9	7.9
Fe (Mn) O	42.6	9.5	38.5	8.6	33.1	7.4
CaO	9.5	2.7	10.1	2.9	8.0	2.3
MgO	0.2	0.1	2.3	0.9	2.2	0.9
Oxygen ratio	14.2	19.5	18.3	17.9	20.3	18.5
Al ₂ O ₃ acid	21.4	12.3	23.8	12.4	28.2	13.6

If alumina is a base in the above slags, then No. 10 is a very basic monosilicate; No. 11 is a correct monosilicate; and No. 12 would be a slightly acid monosilicate, such a one as would melt very well with any other of the bases, even the badly reputed magnesia, substituted for alumina.

But if we consider alumina in the character of an acid, they at once reveal their true character.

The most fusible Copper Queen slag (No. 10) stands between a monosilicate-aluminate and a bisilicate-aluminate.

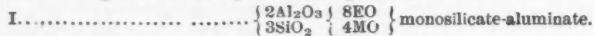
The Morenci slag (No. 11) is a true bisilicate-aluminate, with enough metallic bases to render it sufficiently fluid.

The scaffolding, iron-reducing Morenci slag (No. 12) is a pronounced trisilicate-aluminate, the same as the slags from the first runs of the

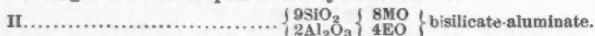
Champion furnace, only kept somewhat more fusible by the larger amount of metallic bases present in it.

In comparing the above-cited slag analyses, and dividing them according to their fusibility and desirability into two classes, such as can be used in smelting in the common lead and copper cupolas, and in such as are too infusible for that kind of furnace, we have, as the fusible slags, Nos. 5, 6, 10, and 11, while Nos. 1, 2, 4, 8, 9, 12, and 13 are the infusible slags, and No. 7 occupies a doubtful position.

Designating with MO the metallic bases, and with EO the earthy bases, we find that slag No. 5 corresponds nearly to the formula :



And that slag No. 11 corresponds nearly to formula :



The theoretical composition of both slags being :

	I.	II.
SiO ₂	16.1	35.0
Al ₂ O ₃	18.2	13.2
FeO	25.7	37.3
CaO	40.0	14.5

From my own experience with the above-cited two slags, I have no doubt in saying, that these slags (Nos. 5 and 11), although sagood slags as are obtained in practice, would be all the better for a still closer approach to the slag types I. and II.

Regarding slag type I., we find that, when the proportion of alumina to silica is as large as, or approaches, 3SiO₂ : 2Al₂O₃, we shall be compelled to make a monosilicate-aluminate, or a slag approaching such in its composition, but that, in doing so, we may increase the ratio of earthy bases to metallic bases to 2EO : 1MO.

Regarding slag type II. in conjunction with slag No. 10, we shall be justified in saying that, as long as the ratio of alumina to silica does not exceed 1Al₂O₃ to 3SiO₂ (slag No. 10), we shall be able to get a sufficiently fluid slag by making a bisilicate-aluminate, but that, in such case, the ratio of earthy bases to metallic bases should not exceed 1EO : 2MO.

By a combination of these two slag types, it will be possible to meet all cases in practice, when alumina occurs in any excess.

I have no doubt from the experience gained in smelting, that, counting alumina always as an acid, we shall be justified, in ordinary cases, when alumina does not occur in excess, and when the metallic bases generally preponderate over the earthy bases in the slag, to always aim at making a bisilicate-aluminate, whenever the siliceous character of the ore calls for a saving in flux.

I have also no doubt that alumina, at least in all slags possible to be melted in common lead and copper cupolas, plays really the rôle of an acid, the same as silica, and that in many cases the hitherto unexplained behavior of certain charges, calculated on the same basis as other successful smelting mixtures, may be explained by simply regarding alumina in the character of an acid, in whatever percentage it may be present in the slag.

That this has been often unwittingly recognized by metallurgists, is proved by the simple fact that it is the usage in many smelting laboratories to call the residue of the ore sample, after treatment with aqua regia and perhaps thereafter with citrate of ammonia, silica; while, as a rule, this residue is really silica and alumina. The rest of the bases, if any are contained in this residue, may be taken to counteract the soluble alumina.

I may further cite here the remark of Dr. Iles in his article on Lead Slags in the ENGINEERING AND MINING JOURNAL :

"If the percentage of silica is low, alumina plays the rôle of an acid, and hence increases the fusibility; if, however, the percentage of silica be high, then alumina acts as a base, and hence lowers the fusing-point of slags. This statement has been arrived at after many long and extensive experiments, involving the smelting of many thousand tons of ore."

I should think that, in assuming alumina to play different rôles in the composition of the slags, it would be more rational to suppose that it would either remain a base as long as there was sufficient silica to form a subsilicate (4RO+SiO₂), or, as I have tried to show to be the case, assign it permanently the rôle of an acid. The statement of Dr. Iles is in any case an indefinite one, as it is left entirely to the individual view of the reader what constitutes a high and what a low percentage of silica. It is also left as unimportant whether there be any large or small amount of alumina. Since reading the above-cited statement of Dr. Iles—whose article I have read, as I suppose like most metallurgists interested in lead smelting, with much attention and appreciation—that, by providing in the one case for bases to satisfy the acid character of the alumina in his slags, he probably increased their fusibility, while, on the other hand, by not only not providing for the alumina nor for that portion of silica considered to be provided for by the alumina itself, he probably made a much more acid slag than he intended. However, this is only a supposition. As I do not advance my theory that alumina acts always as an acid, unless forced by absolute want of other bases into the rôle of a base itself, I shall be very glad if any body else will shed more light on this question, and help to define definitely the real character of alumina in slags.

Slag No. 12 shows strikingly that, even with a comparatively high silica percentage—38.1 per cent—and a comparatively low alumina percentage—16.9 per cent—and a comparative scarcity of other bases—33.1FeO, 8.0CaO, 2.2MgO—the alumina still played the rôle of an acid; for only on that assumption can the entirely different behavior of this slag from slag Nos. 10 and 11 be explained.

While I do not ask the profession to consider these experiences of mine, and my remarks and conclusions thereon, as definite, I certainly consider them well worth their attention and investigation. A few experiments or a consideration of their slag analyses, in the light of alumina as a base, may convince them of the correctness of this view. I have no doubt that this will do away, in a large degree, with the close adherence to certain slag types that have hitherto been considered all but infallible, but which have nevertheless been found wanting very frequently, so that a slag type like 30SiO₂, 48FeO, 13CaO might work very well in one place, while it might not work at all in another place; and this, I have no doubt, has been found true of nearly every slag type that did not take alumina into account.

NELSON, NEW ZEALAND, May 17, 1886.

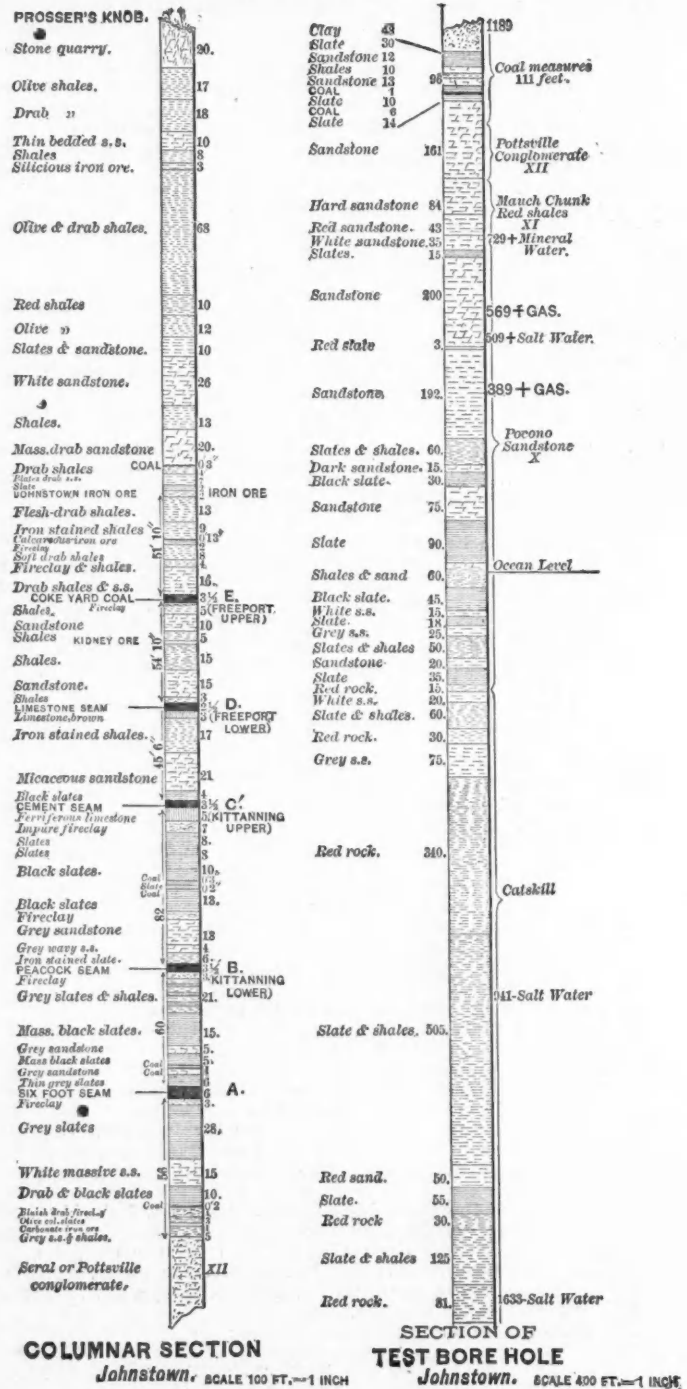
SOURCE AND BEHAVIOR OF FIRE-GAS IN THE JOHNSTOWN, PA., MINES.*

By John Fulton, Johnstown, Pa.

Johnstown is the site of the extensive iron, steel, and wire-works of the Cambria Iron Company. It is situated at the western base of the Alleghany Mountain, 275 miles from Philadelphia, and 78 miles from Pittsburg. The valley in which the town and its iron-works are located has an average elevation of 1160 feet above tide-water.

The site of Johnstown is in a cutting through the lower productive coal measures, 500 ± feet deep, with steep slopes along the valley limits, exposing, in sharp-cut terraces, the outcrops of the coal and iron ore beds; the whole surmounted by the shales and sandstones of the barren measures.

The Cambria Iron Company was organized in 1852. From its charter



until 1855, it struggled under efforts to construct furnaces and rolling-mill. At the latter date, having suspended, the works were leased to Messrs. Wood, Morrell & Co., who had become creditors of the old company. Under the new management, the furnaces, rolling-mill, and other works were completed, coal and iron ore mines were opened, and a vigorous and progressive policy was initiated. In 1862, on the termination of the lease, the Cambria Iron Company was reorganized, and the business has since been conducted in its name.

The accompanying map will show the topographical and other features of Johnstown and its works.

Six coal mines and the iron ore mine are all above the valley water-level from 10 to 200 feet. Only one mine, now closed, has been operated under water-level. This (the blast-furnace mine) was opened by a slope 50 feet under water-level. Fire-gas was found in this mine in small quantities, generally in the advanced workings. The mine was closed in 1879. Its coal is 3 feet thick. It is the second workable bed of the Lower

* Extracts from a paper in the Transactions of the American Institute of Mining Engineers.



**COAL & IRON ORE MINES
OF
CAMBRIA IRON CO.**

JOHNSTOWN, PA. 1885.

Horizontal Scale : 1800 ft. - 1 Inch. Contours 30 ft. apart vertically.

COAL MINES [shaded area] **IRON ORE MINES** [hatched area] **BORE HOLE** [circle]

Elevations above tide given in figures.

Jno. Fulton, Jan. 1885.

Coal Measures, called locally the Miller seam. In the Second Geological Survey, it is called bed B, or Kittanning lower coal.

The Rolling-Mill mine is the most extensive of the mines of this company at Johnstown. It supplies to the rolling-mills and their auxiliary works from 500 to 800 tons of coal a day, delivered in these works in the mine-cars. The mine is opened into the third workable seam of the measures, from 3½ to 4 feet thick, called the Cement seam, from the presence of a bed of ferriferous limestone, 5 feet thick, immediately under the fire-clay floor of this coal. The main way of this mine is over two miles in length, and the connected workings are extensive. It was opened in 1856. It is 1223 feet above tide-level, and 77 feet above the ordinary level of the water in Stony Creek. It has a covering of the upper coal-beds and barren measures, of from 400 to 500 feet.

From the opening of this mine, fire-gas, in small quantity, was found. This large mine was ventilated by furnace up to 1879, at which time a Murphy fan was introduced, affording 60,000 cubic feet of air per minute. Mine-locomotives were also used at the same time in this mine, for underground as well as outside haulage.

From 1874 to 1884, occasional flashes of gas were noticed, but not in magnitude to excite alarm until March, 1884, when an explosion of fire-gas occurred, burning, rather severely, four miners, near the end of a double heading in the southwest section of the mine.

Another slight explosion occurred, January 6th, 1885, in the middle southwest section of the mine, where pillars were being drawn.

The fire-gas comes up through the floor of the coal-bed and follows the working-places of the mine. It is found in the advanced new workings and is readily ignited along the "undercutting" or "bearing in" at these places, giving along this strip a series of jets of blue flames. As it comes up through the floor, it makes a gurgling, droning sound, which is the only indication the miner receives of its presence. So far as has been discovered in this or the other mines, the supply of this fire-gas becomes exhausted soon after being opened by the first direct mining workings, and rarely has it been found in old workings or in the goaf. It is only encountered in certain localities of the mines, where cracks or fissures occur in the floor. This mine has always been quite dry.

The Cushon mine is opened into coal-bed E, the Upper Freeport of Professor Lesley's State Geological Survey, and called locally the Lemon or Coke-yard seam. This is the topmost bed of the lower coal measures at this place. It is 3½ feet thick. The mine is 1367 feet above ocean-level and 197 feet above the Little Conemaugh River. It is the driest mine of all. It is dust-dry. It has been worked since January, 1880, and was opened to supply the neighboring large steel and wire-works of the Gautier Department of the Cambria Iron Company.

Only one well-authenticated "flash" of fire-gas has been known in this mine. This, however, clearly indicated the presence of gas; but as the mine is well ventilated and is worked under the double-heading system, no explosion of gas has occurred in it yet. The mine has a covering of 200 feet, more or less. I may note here that its exemption from gas is also due to the cutting off of the gas by two mines, the Lower Gautier and the Woodvale, which are worked under a large portion of the Cushon mine.

The dust in this mine is several inches thick at places; but careful investigation has failed to disclose any "flashing" from blasting in this mine.]

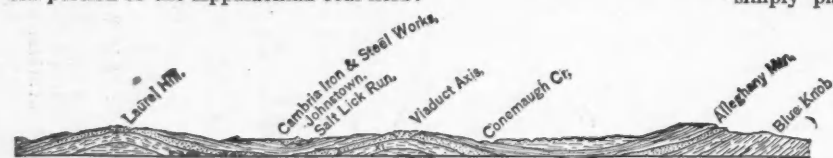
The iron ore mines of this company occupy a horizon 50 feet above the highest workable coal-bed, F (Upper Freeport).

The ore is the carbonate of the Coal Measures, in two benches, together from 18 inches to 2 feet thick. The mining of this ore continued from about 1851 to 1883. The ore-bed has a soft roof of drab-colored shales, and its floor is composed of soft siliceous shales. The mines in this ore-deposit are all muddy, as the inclosing shales disintegrate readily in contact with air. In working these mines, the occasional presence of fire-gas was well known. In 1865, a violent explosion occurred in the old workings at Prospect, killing two men and injuring severely four others. The mining of iron ore at this portion of the mine had been finished, and these men were sent into the exhausted workings to remove mine-rails. They exploded the gas collected in these workings, with the results above stated. The fire-gas came up from below at this place because of the disturbance of the floor of the mine by the fall of the roof of an exhausted coal mine 50 feet beneath the iron ore mine.

It will be noted that three of these mines, the Rolling-Mill, Cushon, and Woodvale, are dry mines with considerable coal-dust in their main ways. Four mines, the Blast-Furnace (now closed), Lower Gautier, Conemaugh, and the Iron Ore mine, are all rather wet. The most destructive explosions so far have occurred in the wet mines.

The coal of these mines carries on an average about 1.15 moisture and from 16 to 21 per cent volatile combustible matter.

The following cross-section shows the geological structure of the eastern portion of the Appalachian coal-field:



Section of Coal-Measures from Laurel Hill to Alleghany Mountain.

(First Pennsylvania Geological Survey.)

The source of fire-gas, causing these flashings and explosions in mines, has not received as careful consideration as its importance seems to demand.

From the fact that it has been found in all the coal-beds mined into at Johnstown, it has been inferred that each coal-bed, with its associated rich bituminous shales, has produced the gas met with in the respective mine-workings.

Three objections seem to overwhelm this assumption.

First. Where one coal-bed has been mined in part or entirely under another, the workings on the upper coal-bed are entirely free from gas.

Second. If the coal-beds are the sources of fire-gas in this portion of the Alleghany field, then all the mines eastward in the same field should pro-

duce fire-gas. But no gas has yet been found in the large number of mines east of Johnstown, and the absence of fire-gas distinguishes the mines of the Clearfield region. In the mines of the Broad Top field, fire-gas is unknown. These mines have been extensively worked, above and below water-level, during the past twenty-five years, without the least evidence of its presence. The same can be said of the absence of gas in the Cumberland coal-field. The coal of the beds in these localities is quite similar in quality to that of the Johnstown beds. As a general rule, they hold a little more volatile matter than the coal in the beds of the Johnstown sub-basin.

Third. The discoveries of natural gas, the fire-gas of the mines, during the past year, in such large quantities under the Lower Coal Measures in Western Pennsylvania, beginning at Johnstown and increasing westward to Pittsburg, afford a definite indication, in this portion of the Appalachian field at least, of the true source of natural gas or mine fire-gas.

During the general interest in the discovery of natural gas, which occupied the latter portion of 1884, the Cambria Iron Company had a test-well sunk on its grounds a short distance north of the Pennsylvania Railroad passenger station, at Johnstown. The top of this test-well is 1189 feet above ocean level, and 12 feet under the Cement coal-bed, the third workable bed of the Lower Coal Measures.

The accompanying columnar section shows the character of the measures traversed by this five-inch drill-hole, and the elements discovered during the progress of the work.

At a depth of 640 feet in the well, or 549 feet above tide, natural gas was reached, extending down 40 feet—beginning in slate, and continuing in hard sand-rock until salt water was reached. This gas was ignited at the top of the drill-hole, affording a flame 3 feet high. The supply, however, soon showed signs of weakening, indicating very decidedly the moderate volume of gas at this level.

At 800 feet below the top of the well, a second gas-horizon was reached, 389 feet above tide. This was found less productive than the upper one. No more gas was found in this test-well below this second horizon.

Salt water was reached at 680 feet below the top of the well, or 509 feet above tide. A second large supply of salt water was struck 2130 feet below the top of the well (941 feet below tide-level), which continued until the boring ceased at 2800 feet (1611 feet below tide).

Partial analysis of these saline waters showed from 2 to 3 per cent of salt.

This test bore-hole indicated very clearly the location or the source of the gas met with in these coal and iron mines of the Cambria Iron Company. The gas has evidently ascended through the cracks, cleavage planes, openings, and fissures of the intervening rocks reaching the coal and iron ore beds above. This is corroborated by the fact that all issues of gas yet discovered have been found in portions of the mines where the strata of underlying rocks have been bent and broken, affording opening for the upward movement of the gas. The rapid exhaustion of these jets of fire-gas in the disturbed places in the floor of the mines is in harmony with the rapid exhaustion of the source of it in the test-well. As this drill-hole is on the border of the old Blast-Furnace mine, it is possible that a portion of the natural gas in this locality may have been dissipated in those workings.

It is difficult to establish the exact place of the gas in the rocks here, and decide whether the horizons in which the gas was found have been its normal home or secondary reservoirs; it seems reasonable to infer that it had its source in the Pocono sandstone (X), the equivalent of the Butler, Clarion, and Venango oil sands, and also near the horizon of the proto-carboniferous measures of Eastern Pennsylvania and Virginia.

Of the flashes and explosions of fire-gas in these mines, the gas itself has always been the originating cause. The fine dry dust has not been observed to contribute materially to the energy of the explosions. If very dry fine coal-dust alone could produce flashes or explosions, then the two or three dry and dusty mines of this company would have been "dark and bloody ground" indeed.

European Nickel Market.—The *Ironmonger* says: Under the influence chiefly of French competition, the price of nickel has dropped lately about 20 per cent, to 2s. a pound, and as the underselling continues, there is no knowing how much lower the price may yet go. The French Nickel Company, which uses the New Caledonia ores, has never succeeded yet in paying a dividend; but it hopes apparently to achieve that end by constantly lowering the price of nickel—thus far, unfortunately, without stimulating the demand. The English nickel-refiners have remonstrated in vain against the suicidal policy that they are compelled to follow for the protection of their trade connection, and they are now simply playing a waiting game, hoping to tire out their French competitors, and to compensate themselves by raising prices to a more remunerative level by and by when the contest is over.

The complication lately caused in the trade by the invasion of American nickel at almost nominal prices is now at an end, the American nickel-king, Mr. Wharton, who is now in this country, having withdrawn his agents and declined further English orders. His only motive for entering the market here was to retaliate upon the French Nickel Company for offering their metal in the States under the market price, and his object has now been accomplished. The use of nickel and nickel alloys in this country does not progress so rapidly as refiners and mine-owners could desire, and there can be no question that the metal is better appreciated in America and in France than it is with us; but the consumption of nickel is, nevertheless, steadily growing from year to year, not only in the form of German silver for plating purposes, but in the shape of white casting metal, nickel bronze, silveroid, and other special alloys, which combine cheapness with hardness, durability, and silvery purity of color. The most recent application of the metal is for tube-drawing, for which it is peculiarly well adapted, and tubes drawn from this metal are now coming into general use for bar-fittings, gasaliers, metallic bedsteads, etc., for which it is used in lieu of brass with excellent artistic effect.

The First Electric-Lighted City.—The first city in Europe where electricity has been entirely substituted for gas for street lighting is Hernosand, in Sweden.

THE NEW ZEALAND VOLCANIC ERUPTION.

The terrible volcanic eruption and earthquakes reported as occurring in New Zealand June 9th, are among the most destructive in the world's history. The first reports of volcanic disturbances came from Tauranga, in the Auckland Lake District. The natives of that village were sharply awakened from sleep at two o'clock A.M. by repeated vivid flashes of lightning, which continued at rapid intervals up to four o'clock, when a tremendous earthquake occurred, followed quickly by others. The shocks were so violent that the people jumped from their beds and, paralyzed with terror, fled for their lives, making no effort to save or take any thing with them except their children. The earthquakes continued to follow one another in quick succession up to seven A.M., when a leaden-colored cloud was observed advancing from the south, spreading out until it covered the sky. While still moving, it burst with the sound of thunder, and shortly after showers of fine dust began falling. Accounts from other points state that Mount Taramera was the first volcano to break forth, and hardly were flames seen issuing from its crater before the entire Paersa range of mountains belched forth in sympathy, hurling flames and burning lava and stones over the surrounding country.

For the first time in tradition, the extinct volcano of Ruapeha was awakened into activity. The entire country over an extent of 120 miles long by 20 in breadth was nothing but a mass of flame and hot crumbling soil, which in places rose to the height of 4000 feet, capped at the highest point by the Tekopha Geysers, said to have been the grandest in the world. During all this time, showers of dust continued to fall, until it became so dense as to make day as dark as night; and not until the second day did the dust cease falling. It was noticed that the dust emitted a strong sulphurous smell. Numerous small native villages were totally destroyed. Wairoa was covered to the depth of ten feet with dust and ashes. Rahtomahana was completely engulfed, as were also some other small villages. Twenty-one persons are known to have lost their lives, among whom were several English residents. The loss of cattle starved to death from the destruction of pasture by dust is very great, and great distress exists throughout all the Auckland Lake District. One old Maori chief at Ratarua was dug out alive after having been buried in ashes 104 hours. Every effort was made to save the lives of others, but in most cases where bodies were found, they were dead.

Further details state that the most violent disturbances were felt in the neighborhood of Rotona. The severity of the shocks led many of the people to believe that the island would sink into the sea. The sensation experienced is said to have been fearful beyond description. Immediately after the first shock, the inhabitants rushed frantically in all directions. When the second shock came, the entire country for miles around was lit up by the glare from the volcano, which had suddenly burst into activity.

The scene was as grand as it was awful. Huge volumes of smoke illuminated with flames simultaneously burst forth from a range of mountains over sixty miles in length, and above the smoke could be seen huge masses of fire resembling meteors rushing through the sky. The natives who had escaped death gathered in groups, and, filled with abject terror, held religious services; but when another shock would cause the earth to tremble, they would fall with their faces to the ground, quivering with fear.

As soon as the news of the fearful occurrence was received at Auckland, a government agent made immediate preparations to go to the relief of the sufferers. Wagons were chartered and filled with provisions and clothes. Mr. Johnson, the government agent, on his arrival at Rotona, sent back the following account:

"The scene among the mountains as viewed from the Wairoa road is terribly grand. Flashes of lightning, peals of thunder, and shocks of earthquake are incessant, while dust is falling in heavy showers. In addition to these inconveniences, the roads throughout the entire country are covered with several feet of blue clay mud ejected from the volcanoes. All vegetation is destroyed, and the aspect of the country is entirely changed. Blue Lake and Lake Rotakokahi have been transformed into mud baths. The outlet of the latter lake is blocked up, and the bridges that cross the lower end are covered with mud. Nearly all the buildings that I have noticed are crushed in by falling mud."

The captain of the steamship Southern Cross, which arrived at Auckland on June 18th, reports having felt at sea the effect of the disturbances. On the morning of June 10th, the day following the earthquakes, his vessel was in a shower of dust. From five to ten A.M., there was complete darkness, and balls of fire were continually playing around the mast-heads. A gale suddenly sprang up, and carried all his canvas away. The men were unable to stand the blinding showers of dust, and the vessel was put about and stood away to the north; but it was not until eleven o'clock of the day following that the dust was left behind.

The reports show that earthquakes generally prevailed at all points in New Zealand during the same period.

The Proposed Copper Duties.—The committee of the Association for the Protection of the Industrial Interests of Rhineland and Westphalia has unanimously decided to recommend the association to oppose the placing of a duty on copper.

The Peruvian Monetary Basis.—In consequence of the depreciation and fluctuations of the silver currency in circulation in Peru, it has been decided, according to despatches, to use the American gold dollar as the basis of all monetary transactions, using the silver dollar at a value of 80 cents, gold, for all fractions under a quarter of an eagle. It is thought that the government will ask Congress to give the matter consideration.

Origin of Electricity in Storms.—M. Colladon, in a paper to the Academie des Sciences, suggests that the electricity so vividly illustrated by thunder-storms is generated principally by friction of air and water vapor. During a thunder-storm, the rain-drops formed in the storm-cloud descend vertically to the earth, causing a partial vacuum, which is replaced by air drawn in laterally and from upper layers. The friction caused by this movement is the principal cause of the generation of electricity.

Steel Rails for the West.—Five ship-loads of railroad iron arrived in Duluth, Minn., July 13th, with 6500 tons of rails, and seven more cargoes are near. Steel rails enough to build 700 miles of railroad will be landed at the head of Lake Superior during the navigable season of 1886. Among the railroads receiving the rails are the St. Paul, Minneapolis & Manitoba, 27,000 tons; Northern Pacific and its branches, 23,000 tons; Duluth & Manitoba, 13,000 tons; Minneapolis & Pacific, 6000 tons; Duluth & Iron Range, 4000 tons; Sault Ste. Marie & Minneapolis (to Washburn), 8000 tons.

German Steel Rail Prices.—Kuhlow's says that the dissolution of the international rail convention has caused a fall of from 25 to 30 marks in the price of rails in the open market. For large contracts, the price is now from 70 to 72 marks per ton free at works. For many works, this price means an actual loss of 15 or 20 marks a ton, so that the production price must be from 87 to 90 marks. The home prices are much higher. For the recent steel rail contract of the Right Rhine Railroad at Cologne, the firm of Krupp, of Essen, sent in the lowest tender at 125 marks, and for the Bromberg contract the lowest tenders varied from 119 to 121 marks.

The Rights of Naturalized Foreigners in Mexico.—The Mexican law relating to foreigners and naturalization was approved by the Mexican President May 28th, 1886. Article 31 reads as follows:

In the acquirement of waste and government lands, of real estate and ships, foreigners are not obliged to reside in the republic, but are subject to the restrictions imposed by the laws now in force, with the understanding that all leases of real estate made to a foreigner shall be considered as sales if the term of the contract exceeds ten years.

Article 39 repeals all former statutes respecting matriculation. Its text is as follows:

The laws establishing the matriculation of foreigners are repealed. The Department of Foreign Affairs alone can issue certificates of determined nationality to foreigners soliciting the same. These certificates constitute a legal presumption of foreign citizenship, but proofs to the contrary are not barred. The definite proof of determined nationality is presented before the competent courts and by the means established by laws or treaties.

Nobel's Explosives Company.—At a special meeting of the shareholders of this company, confirmatory assent was given to the scheme of union with the following German manufacturing companies, namely: (1) Dynamit Actien-Gesellschaft (formerly Alfred Nobel & Co.), Hamburg; (2) Rheinische Dynamit-Fabrik, Opladen, near Cologne; (3) Deutsche Sprengstoff Actien-Gesellschaft, Hamburg; (4) Dresdner Dynamit-Fabrik, Dresden—these four companies being themselves already associated in a trading alliance known as the German Union. While the paid-up capital of Nobel's is £240,000, the aggregate paid-up capital of the German Union amounts to £408,250. The scheme proposed is briefly this: A trust company to be formed and registered in London, with a capital of £1,750,000, divided into 175,000 shares of £10 each, to be deemed as fully paid up. In a statement that was also issued dealing with the finances of the several companies, it is shown that in the past thirteen years Nobel's Explosives Company has divided 145 per cent among its shareholders; the Dynamit Actien-Gesellschaft in thirteen years, 100 ⁷/₁₀th per cent; the Rheinische Dynamit-Fabrik in thirteen years, 142 per cent; the Deutsche Sprengstoff, 46 per cent in all; and the Dresdner Dynamit-Fabrik, 10 per cent for one year. The great and strongly favorable feature in the arrangement is the enormous saving that will be effected in the operating expenses, especially in the cost of distribution, an item that, in some cases, it is said, amounts to as much as £30 a ton. Under this head alone, a calculation puts the gain to the companies at 5 per cent on the capital. The allotment of trust capital to Nobel's Company is equal to £25 for each existing share.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

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

GRANTED JULY 6TH, 1886.

- 344,813. Method of Constructing Water-Works. Richard H Bull, New York, and Hayden H. Hall, New Hamburg, New York.
- 344,831. Compound Metal Bar or Plate. Charles B. Heady, Philadelphia, Pa.
- 344,849. Oil-Well Casing. Robert W. Miller, Alleghany City, and Joseph McConnell, Pittsburg, Pa.
- 344,863. Steam-Muffler. George W. Richardson, Medford, Mass., Assignor to the Consolidated Safety-Valve Company, Hartford, Conn.
- 344,862, 344,864, 344,865, 344,866. Safety-Valve. George W. Richardson, Medford, Mass., Assignor to the Consolidated Safety-Valve Company, Hartford, Conn.
- 344,881. Valve for Engines. John Thom, Barrow-in-Furness, County of Lancaster, England.
- 344,892. Rock-Drill. Charles O. Barlow, San Francisco, Cal.
- 344,906. Rock-Drill. Simon Ingersoll, Glenbrook, Conn., Assignor to Pond, West & Simons, Port Chester, New York.
- 344,907. Rock-Drilling Machine. Simon Ingersoll, Glenbrook, Conn., Assignor to Pond, West & Simons, Port Chester, New York.
- 344,908. Rod and Piston Packing. Charles C. Jerome, Chicago, Ill.
- 344,925. Automatic Boiler-Cleaner. Henry Sims, Erie, Pa.
- 344,956. Miner's Can. Joseph H. Enich, Mahanoy City, Pa.
- 344,976. Boring-Machine. George W. Montgomery, Grangeville, West Va.
- 344,985. Nail-Making Machine. Freeborn F. Raymond, 2d, Newton, Mass.
- 344,989, 344,990. Gas-Regulator. William C. Rossney, Hyde Park, Assignor to Charles A. Shaw, Boston, Mass.
- 345,019. Mechanism for Burning Fine Fuel. Willis A. Barnes, New York City.
- 345,046. Construction of Tunnels. Charles C. Gilman, Eldora, Iowa.
- 345,047. Porous Earthenware Gravel for Bedding Ties in Bridge-Work, etc. Charles C. Gilman, Eldora, Iowa.
- 345,096. Amalgamator. Joseph Wilkins, Baltimore, Md.
- 345,114. Ore-Concentrator. R. Neilson Clark and Norris H. Cone, Leadville, Colo.
- 345,131. Process of Manufacturing Charcoal. Leven S. Goodrich, Warner, Tenn.
- 345,132. Apparatus for Purifying Gases. Leven S. Goodrich, Warner, Tenn.
- 345,140. Process of Making Sulphuric Acid. John Hughes, Stapleton, New York.
- 345,168. Method of Making Lead-Lined Boilers. George R. Noble, Buckhurst Hill, County of Essex, England.
- 345,181. Well-Drilling Machine. William C. Shear, Port Crane, New York.
- 345,217. Artificial Fuel. Frank S. Dimon, Fort Scott, Kan., Assignor of one half to Benjamin F. Hepler, same place.

FURNACE, MILL, AND FACTORY.

Thomas M. Carnegie, executor of William Coleman, on the 9th inst., issued executions against the Atlas Works, Limited, at Pittsburg, Pa., upon confessed judgments amounting to \$15,000.

At the adjourned annual meeting of the Oregon Iron and Steel Company, whose mines and furnaces are situated near Portland, Oregon, held at that place recently, the following officers were elected: Elijah Smith, President; W. S. Ladd, Vice-President; William M. Ladd, Secretary. Mr. Elijah Smith, the new President, represents a very large interest in the Oregon & Transcontinental Company, in the Iron Company, and Mr. W. S. Ladd, the new Vice-President, is a large stockholder. It is thought the new management will greatly aid to get the company's affairs on a sound basis.

The Illinois Malleable Iron-Works, situated near Chicago, Ill., on the 13th inst., caught fire and the buildings were burned to the ground. The loss on buildings, stock, and machinery is estimated at \$40,000.

Nuttall Brothers, Alleghany, Pa., are making a perforated steel piston $9\frac{1}{2}$ feet long, for the hydraulic press used by the Standard Underground Cable Company in its operations at Pittsburg, Pa. This piston is to be made from a solid bar of hammered steel, prepared by the Crescent Steel Company, Pittsburg. According to the *American Manufacturer*, it is to be $2\frac{1}{2}$ inches outside measurement, and the bore the entire length is to be $1\frac{1}{2}$ inches, to be bored from each end, the drills to meet without shoulder at the center. This is the second piston made by this shop of this length, besides a shorter one of $6\frac{1}{2}$ feet. This work has been refused by several shops, and has been pronounced an impossible job. The strength of the solid steel piston is necessary for the heavy work of the press. Lapweld iron pistons have been found entirely incapable of withstanding the intense strain to be sustained.

The Baldwin Locomotive-Works, of Philadelphia, Pa., have just completed and shipped engine numbered 8000. The first locomotive built at these works was turned out in December, 1832, and it took twenty years, until November, 1852, to build 500 engines. The second 500 engines were built in eight years, number 1000 being finished in February, 1860. The next six years saw the third 500 built, number 1500 leaving the shop July, 1866. The fourth 500 were built in three years, by October 30th, 1869; the fifth 500 in two years; and the sixth and seventh 500 each in one year, engine number 3500 leaving November 20th, 1873. Business then slackened, three years being required to build the next 500, and two years the following 500, engine number 4500 leaving December 17th, 1878. Then trade improved, 500 engines being built in fifteen months and 1000 more engines in twenty-two months, while 500 more engines were finished in ten months, number 6500 leaving December 6th, 1882, and marking a half-century for the works. The next eight months saw 500 more built, and before the close of 1884 number 7500 was turned out. Work has again slackened, and nineteen months were required for the final 500 locomotives, number 8000 having just left the establishment. It is noteworthy that one half the whole number, and these by far the heaviest and most elaborate engines that have been built, were turned out within the last ten years, the first 4000 requiring forty-four years to build.

The Puget Sound Iron Company, of Ironton, Washington Territory, is preparing to blow in its furnace, and proposes also to erect a steel plant in connection with its works. The intention is to manufacture sheet-steel. The company uses Texada ore, which is reported to be specially suitable for the manufacture of Bessemer steel.

J. P. Witherow, of Pittsburg, Pa., has contracted with the Bellefonte Iron-Works, of Bellefonte, Pa., for the erection of a large modern blast-furnace, to be built at once.

Messrs. Gordon, Strobel & Laureau, of Philadelphia, Pa., have closed a contract with the Belleville Nail Company, of Belleville, Ill., for a complete Bessemer steel plant, to consist of two 3-ton converters, with all engines, cranes, pumps, buildings, etc. It will have a capacity of 200 tons a day, and work on it will begin at once.

The York Iron Company, of Minneapolis, Minnesota, has completed the erection of a charcoal blast-furnace, named Minneapolis, at Black River Falls, Wisconsin,

and will blow it in about the 20th inst. It will be operated on local red hematite and magnetic ores, and will have a daily capacity of about 60 tons. The iron will be known as the Minneapolis Lake Superior charcoal. The officers of the company are as follows: Samuel C. Gale, President; James E. York, Vice-President; J. Hyde Monroe, Secretary; Otis A. Pray, Treasurer. Horace E. Burt is Manager at Black River Falls. Messrs. Forsyth, Hyde & Co., pig-iron merchants at Chicago, have been appointed sales-agents.

At the regular monthly meeting of the Western Nail Association, held at Pittsburg, Pa., on the 14th inst., the card rate on nails was reaffirmed. Trade was reported fair and stocks light.

The nail factory of Brown, Bonnell & Co., at Youngstown, Ohio, which has been idle for thirteen months past, has resumed operations.

The Sterling Steel Company, of Demmler, Pa., will shut down its works on July 23d for the erection of a new crucible steel furnace of 24 pots. At the same time, the works, which have hitherto been run by artificial gas made at the works, will have natural gas connections made.

William Hainsworth, Superintendent of the Pittsburg Steel Casting Company's works, Pittsburg, Pa., has gone to Europe to inquire into the subject of hydraulic forging as practiced there, and will perfect plans for a 7500-ton vertical heating-furnace and horizontal hydraulic forging-press, to be erected at the company's works.

LABOR AND WAGES.

A meeting of the district executive board, Knights of Labor, and the Miners' and Coke Drawers' Amalgamated Association, held at Scottsdale, Pa., on the 10th inst., decided to notify the coke-producers that they would insist upon the fulfillment of the terms agreed to between them at a meeting of the representatives of both sides last August, and which, the miners claim, they have not received. The operators agreed to advance the price of mining and coke-drawing 5 per cent, and laborers' wages to 15 cents an hour. Notice has been sent the syndicate and the Producers' Association to meet them as soon as possible.

The Indiana State Federated Association of Miners will meet at Terre Haute, July 20th. The nickel-plate miners, who have been contending for a special graded scale for some months past, have appealed from the adverse decision of the district committee of arbitrators to the State committee, which will be in session on that date.

The manager of the National Tube-Works at McKeesport, Pa., has ordered that work be suspended on 28 new puddling-furnaces in course of erection pending the result of the difficulty between the company and the employes over the action of the latter in joining the Amalgamated Association. The manager will not employ an amalgamated member, and says he will turn the new furnaces into steel furnaces.

The importation of negroes by the Grape Creek Coal Company at Grape Creek, Ill., to take the places of the striking miners, has caused considerable trouble, and the strikers did not allow the new men to work. The sheriff of Vermilion County, with forty special deputies, was on the ground, and did all in his power to maintain order. There were over a thousand strikers when the present strike began, but the number is now reduced to 700 or 800. All are destitute. The strikers have been out most of the time for sixteen months. Late last fall, they accepted the company's rate, and even underbid each other for work, there not being employment for all on account of the company's business having greatly fallen off in consequence of the long-continued strike. As soon as spring opened, they renewed their demand for the Pittsburg rate of seventy-five cents a ton, and went out on May 1st. They have since been evicted from the company's houses, and are subsisting in the woods on percentages from the union and the charity of the surrounding country.

The convicts employed at the Dade coal mines, twenty miles from Chattanooga, Tenn., owned by Senator Brown & Co., have refused to work. The governor has ordered the Gate City Guards and an artillery company from Rome to the mines. The cause of the uprising is said to be bad treatment and too hard work.

Some of the heaters and helpers at the Troy Steel and Iron Company's rail mills at Troy, New York, struck for an advance of from 35 to 55 per cent. The

managers prefer a shut-down to a labor struggle, and have decided to close the works for an indefinite period on the 17th inst.

The managers of the Edgar Thomson Steel-Works Company, at Pittsburg, Pa., have announced that they will not sign the furnacemen's scale allowing an advance of 20 per cent in wages, because, in January last, their men signed contracts for one year at the present scale.

The men employed in the quarries of the Chicago & Lemont Stone Company and Brodenschulz & Earnshand, at Lemont, Ill., have struck because of a 25 per cent reduction of their wages.

TRANSPORTATION NOTES.

The Denver & Rio Grande property was sold at Denver, Colo., on the 12th inst., for \$15,000,000 nominally, the road being bought for the benefit of bondholders and stockholders, who come in under the plan for reorganization. The property will be at once reorganized as the Denver & Rio Grande Railroad Company, with the receiver, William J. Jackson, as the first president.

The Idaho Central Railroad Company has been incorporated with a capital stock of \$1,000,000. It is the intention of this company to build a railroad north from Nampa station, a point on the Oregon Short Line, via Boise City, Idaho, through the extensive timber country on the head of the Boise River and rich mineral lands, to connect at a convenient point with the Northern Pacific, and southwest from Nampa through Southern Oregon via the most practical route to the ocean.

The St. Louis Coal Railroad was sold July 13th, in the United States District Court under foreclosure of a mortgage for \$25,000, to the bondholders. The St. Louis Central Railroad was purchased for \$75,000 by the same parties.

It is stated that money has been secured in this city to complete the Mobile & Grand Trunk road to Birmingham, Ala., work beginning soon. Sixty miles of the road next to Mobile were built some years ago. For the rest of the way, it will be located so as to make it the shortest possible line from the coal-fields to the gulf.

The Savannah, Dublin & Birmingham Railroad a Scotch syndicate proposes to build for hauling the products of the mineral region around Birmingham, Ala., to the Atlantic coast by the most direct route possible.

Two enterprising capitalists in Mexico have decided on building a line about 70 miles in length, to connect the Mexican Central Railroad with the iron mines around Zimapan.

COAL TRADE NOTES.

The Greenock Coal Company, consisting of J. H. Dewees, John Shields, Thomas Painter, William Ratcliff, Robert Jack, and George Kraft, has been dissolved. J. H. Dewees, of McKeesport, Pa., will settle claims.

ILLINOIS.

The Consolidated Coal Company of St. Louis, capital stock \$5,000,000, to which we referred last week, has been granted a license.

The Coal and Coke Company at Du Quoin has increased its capital stock from \$550 to \$6000, and changed its name to the Sun Coal and Coke Company.

The Chicago Diamond Drill Company, which has been boring for coal at Clinton, for several weeks, on the 10th inst. passed through a vein twenty-seven inches thick, the drift immediately afterward going into a ledge of slate rock. This is the second time coal has been discovered, but both veins were too small to be paying ones. Boring will be continued until a larger vein is found.

The Salem Coal and Mining Company, which has been sinking a shaft at Salem for the last fourteen months, struck a paying vein of coal at 878 feet. This is said to be the deepest shaft in the State, excepting the one at Mattoon, which has reached a depth of 904 feet.

KENTUCKY.

In our issue of the 10th inst., we referred to the Clinton Coal Company. It should be the Clifton Coal Company. Official advices state that a plant consisting of from 50 to 60 ovens and three Stutz washers is now erecting. The coal, when washed, makes a good strong coke, equal to Pittsburg, and from

experiments that were made, fully capable of sustaining any burden.

OHIO.

A company has been organized at Columbus with a capital stock of \$500,000. Judge Stevenson Burke, of Cleveland, has been elected President and Q. D. Jackson, of Columbus, Manager. The company has bought five thousand acres of coal land in Athens County. One mine is already in operation, and others will be opened at once.

A terrible explosion occurred on the 11th inst., at the Pittsburg mine, at Buchtel, resulting in the death of one man and the fatal injury of several others. While trying to repair a leak in the compressed air-receiver that furnishes the motive power, the men neglected to turn off the pressure, and upon attempting to stop up the leak, the end of the receiver burst into fragments, knocking the machinery about and tearing up things generally.

PENNSYLVANIA.
ANTHRACITE.

It is stated that parties prospecting for coal in the vicinity of Ashland and at Centralia have struck the mammoth vein, which is thirty-five feet in thickness, and is the largest vein in the anthracite region.

The Lehigh Coal and Navigation Company is building a coal dock at Duluth, Minn., that will cover 1000 by 300 feet, and will have a storage capacity of 150,000 tons of coal. There will be eight hoists or elevators, so that the unloading and storing capacity is put at 3500 tons daily. The C. W. Hunt Company has the contracts for the machinery necessary.

James E. Roderick, of Hazleton, has been reappointed Inspector of Mines for the Fourth Anthracite District.

Otto Colliery, at Branchdale, which is undergoing improvements on a large scale, will, it is said, be in operation about August 1st. The shipments will be largely increased.

The colliery at Flowery Field, which Captain Johnson & Co. attempted to open and operate, has been abandoned because of the impossibility of taking out the large body of water it contains. A large amount of money has been expended in the effort to clear the place.

BITUMINOUS.

A. W. Mellon, of Pittsburg, has purchased in Westmoreland County tracts of coal underlying property in Mount Pleasant and Unity townships, embracing 1,008,813 acres, for \$105,903. The Big Sewickley Coal and Coke Company has leased to him 236 acres of coal lands, in the same townships, for \$10,000.

COKE.

Dr. Hostetter, Ralph Bagaley, and associates have completed surveys of their coal lands near Mount Pleasant and will shortly locate a mine not far from that of J. W. Moore & Co., and build 500 ovens. J. W. Moore & Co. will in a month have another 100 ovens added to the 300 now in operation at Mammoth, and will continue building until by December 1st their plant will count 1000 ovens.

TENNESSEE.

A syndicate headed by E. R. Chapman, of New York, with a capital of about \$2,000,000, has purchased 500,000 acres of the best coal lands in East Tennessee, embracing the Coal Creek and Poplar Creek mines. The syndicate is said to be the same controlling the East Tennessee, Virginia & Georgia Railroad, and Brunswick, Ga., it is said, will be the leading coaling station of the Southern coast steamers.

WASHINGTON TERRITORY.

The shipments of coal from Puget Sound for the twelve months ended June, 1886, were from Tacoma, 71 vessels, with 170,895 tons coal, valued at \$581,553. From Seattle, 111 vessels, with 174,653 tons coal, valued at \$622,807.

WEST VIRGINIA.

The Mount Carbon Company, Limited, Mount Carbon, is constructing one hundred bee-hive coke-ovens, a part of which are already in operation.

GAS AND OIL NOTES.

Exports of refined, crude, and naphtha from the following ports, from January 1st to July 10th:

	1886.	1885.
	Gallons.	Gallons.
From Boston.....	2,884,370	4,862,655
Philadelphia.....	72,923,774	71,284,702
Baltimore.....	7,988,900	5,431,106
Perth Amboy.....	1,593,770	.....
New York.....	199,388,438	189,417,051
Total exports....	284,779,252	270,995,514

The Chief of the Bureau of Statistics reports the total values of the exports of mineral oils from the United States for the month of June, 1886, and during the twelve months ended June 30th, 1886, as compared with similar exports during the corresponding periods of the preceding year as follows: June, 1886, \$4,568,436; June, 1885, \$4,635,985; twelve months ended June 30th, 1886, \$49,478,649; twelve months ended June 30th, 1885, \$49,861,950. These exports comprise about 99 per cent of the total exports in mineral oils.

CALIFORNIA.

Very little is known about the petroleum wells in this State, because the localities where petroleum has been found are isolated, and those who are interested in the sinking of wells and the refining of petroleum decline to make public any information about them. While scattering wells have been sunk in several counties, it is in Ventura and Los Angeles that the most work has been done. The valley of the Santa Clara River, extending through the northern portion of Los Angeles, and across Ventura County to the Pacific, has been the scene of the principal operations up to the present year. About Newhall, on the Southern Pacific Railroad, several wells have been successfully sunk, and a refinery has been established. There is another refinery at Alameda, across the bay from San Francisco, both being under the same control, and both consuming the entire petroleum output of the State. This company declines to give any information concerning the extent of its operations. It has a monopoly of the coast trade, its only competitor being the Standard Oil Company. None of the wells is of any great depth, and none is a very heavy yielder. Most of them require to be pumped. At Puente, in Los Angeles County, the other day, a genuine "gusher" was struck at a depth of about five hundred feet. The oil and gas rose higher than the top of the derrick, carrying with it the boring tools, and wasting hundreds of barrels of oil. The entire number of wells now in operation is less than 100. The oil-bearing belt is said to be hundreds of miles in length and of considerable width.

MICHIGAN.

The Fort Pitt Developing Company, mostly composed of Pittsburg capitalists, to which we referred some time ago, is carrying on operations near Detroit, and 6500 acres about ten miles west of that city have been leased. Parties interested in this company have just returned from a prospecting tour on the property.

PENNSYLVANIA.

Parties from Renovo have leased several thousand acres of land at Drury's Run, and will put down a test well for natural gas.

The Scottdale Natural Gas Company has struck a small flow of gas at its well near Painterville, at a depth of 700 feet.

The Philadelphia Natural Gas Company, of Pittsburg, is arranging to pipe gas into the yards of the Pennsylvania Railroad Company into a big reservoir that is to be put up there, to supply the tanks of engines that are to be built to be run by natural gas. "The scheme is perfectly practicable," said an officer of the Philadelphia Company recently. "It has been said the gas is so volatile that no tank can be constructed that will hold it. This is all nonsense. We shall demonstrate not only the practicability of confining the gas, but the fact that it may be used as a fuel aboard engines so cheaply that in a short time not a locomotive running into or out of Pittsburg will use coal. Engines will of course have to be furnished with tanks. These will be so arranged with compressors as to contain very large quantities of the gas, so that no accident or unexpected delay will be sufficient to so diminish the supply as to embarrass the movements of the engine. The experiments will be made this summer or early in the fall. Engines on this division are only run as far as Altoona."

A company, composed of a number of the largest stockholders in the Philadelphia Company and outside capitalists, has been organized in Pittsburg, to introduce natural gas burners for illuminating purposes. It has secured control of the patents owned by the Siemens-Lungren Regenerative Lamp Company, of Philadelphia, and it is understood that the effort to introduce them will be made at once. Those interested claim that as a result of these trials it was found that natural gas under a pressure of 1½ pounds burned without smoke; that by positive test 100-candle illumination has been produced with a consumption of only eight feet per hour of natural gas; that lamps of

50-candle power will consume on the average only four feet an hour; that 500-candle power is assured from a consumption of 50 feet of gas an hour; that the heat generated by the consumption of natural gas is little if any greater than that thrown out by artificial gas; and that the calorific generated by a 500-candle burner will not exceed that from two ordinary argand burners.

In the United States Circuit Court at Pittsburg, on the 15th inst., the Philadelphia Natural Gas Company filed a bill in equity to restrain the Chartiers Company from using the patent joints for gas mains, and also the system for carrying off leaking gas. The Chartiers and the other companies all use these devices, but as the claim of Mr. Westinghouse has been sustained, suits were instituted. The suit involves more than the mere royalty on the patents; it means a renewal of the war on rates inaugurated some months since, but which was checked by a proposed pool of all the companies doing business in the city.

The Bryan well of the Baden Gas Company, about one mile back of Baden, on the Fort Wayne road, took fire on the 14th inst., burning the rigging and machinery and injuring two men who were at work on it at the time.

The Suburban Gas Company, which has been laying pipe in the southern part of the county for several months past, has been absorbed by the Pennsylvania Gas Company, which thus becomes the owner of another important link in its chain of pipe lines. The Suburban Gas Company was chartered about six months ago. It has now got its mains and service pipes in the streets of Crafton, Mansfield, and several other towns along the Panhandle Railroad. The company was not the possessor of any gas territory, as the Pennsylvania Company had the contract for supplying fuel for its pipes.

The owners of the gas well at White Oak Level, near McKeesport, have it down about 1300 feet, and have decided to drill it to the Gordon sand, though it had been intended to let it rest at 1300 feet, where a small vein of gas was found.

At a meeting of the Washington Natural Gas Company it was decided to lay a second line across the Ohio River from the West End to Alleghany, an addition to the line on which the work of dredging is now progressing rapidly.

GENERAL MINING NEWS.

ALASKA.

Governor A. P. Swineford will soon return with a large colony of Michigan and Minnesota people to Sitka, where they expect to live. It is stated that he has organized a big syndicate of New York and Boston men to develop the rich mineral deposits of Alaska.

The Douglas Island mine is sending down from \$75,000 to \$95,000 a month in gold. It is attracting considerable attention. D. O. Mills, the capitalist, is now examining the mine personally.

ARIZONA.

COCHISE COUNTY—TOMBSTONE DISTRICT.

TOMBSTONE MILL AND MINING COMPANY.—Official advices show that the product for June was 308 ounces of gold; 56,274 ounces of silver; and 104,719 pounds of lead.

CALIFORNIA.

NEVADA CONSOLS, LIMITED.—This company has been organized in London with a capital of £400,000, in 400,000 shares of £1 each. The company proposes to purchase and work an extensive series of gold and silver-bearing lodes situated on the eastern slope of the Sierra Nevada Mountains, near the mining town of Monitor, 45 miles south of the Comstock mines in Nevada, four miles south of the State line dividing Nevada from California, and twenty-four hours' journey by rail and road from San Francisco. There are three groups of mines, namely, the Colorado & Advance, the Sauquet, and the Marian. The Colorado & Advance group comprises eight, the Sauquet ten, and the Marian three mines, together forming a total of nearly five miles of gold and silver-bearing lodes. On the Colorado No. 2, the principal work has been done. The mine for some time is reported to have been under the charge of Mr. Ottokar Hofmann, who reports the average value of the concentrates during the time he was in charge: Gold, \$230.84; silver, \$333.19; total, \$564.03 per ton. The work was continued by Mr. P. Curtz, whose report, it is said, showed the same result. A twenty-stamp mill is on the ground.

NEVADA COUNTY.

NORTH BLOOMFIELD GRAVEL MINING COMPANY.—It has been decided to make thorough experiments toward working the mine by the "elevator process." The property has been closed down by reason of adverse decisions of the courts with regard to the *débris* question. Should they succeed—as seems probable—in raising the gravel to the great height proposed by the hydraulic elevators, their success, says the *Mining and Scientific Press*, will go far toward furnishing a solution to the *débris* question, since they will only work bottom gravel and can impound the comparatively small amount of tailings they will make.

YUBA COUNTY.

EXCELSIOR WATER AND MINING COMPANY.—H. B. Wheaton, the president of the company, is at Smartsville making a careful examination of the company's property, with the view of greatly improving the same by resuming mining, depositing the *débris* in the abandoned mines, thereby strictly observing Judge Sawyer's decision; also, by constructing a number of irrigating canals, and distributing the water on the plains for a distance of twenty miles. If the contemplated improvements are made, the property will, no doubt, greatly increase in value.

CANADA.

VILLENEUVE.—This mica mine, on the River Lièvre, is turning out large quantities of mica. The company is now shipping to New York a fine quantity of feldspar, found associated with the mica. Traces of kaolin (China clay) have been discovered in the same locality.

Mr. Shirley, the manager of the Villeneuve mica mine, has also commenced opening up one of the celebrated graphite mines on the west side of the Lièvre River, some five miles from Buckingham. The new pulp-mill at Buckingham has not resumed operations since the disastrous smash that occurred to its machinery shortly after it was opened. It is expected to resume soon.

PROVINCE OF NOVA SCOTIA.

EASTERN DEVELOPMENT COMPANY.—Up to June 27th, the new north vein of the Coxheath copper mine had been drifted 55 feet to the west, and the ore averages seven feet in width, being part purple and part yellow ore. A sample of 30 tons, after a slight hand-picking, averaged 6½ per cent copper. Over 500 tons of ore have been taken from the drifts in the new vein. Thirty feet more to the west will bring the new vein opposite to the main shaft and 70 feet distance from the same. It is then proposed to cut for it from the shaft, both on the 120 and 190-foot levels, and to begin to stope ore.

COLORADO.

CHAFFEE COUNTY.

DENVER & RIO GRANDE ENGINEERS' MINING COMPANY.—The new mill now erecting at Winfield is nearing completion. It contains, in addition to the Hooper slimer, an amalgamating and leaching process. This will enable them to treat all of the different kinds of ores found in the district.

CLEAR CREEK COUNTY.

The Diamond Prince, Eureka, Little Daisy, Minnie Warren, Jim Fisk, Cardiff Giant, Georgia Bennett, Kansas, Puritan, and Stonewall lodes, also the New York and Ohio tunnel, were sold at Georgetown, at sheriff's sale, on the 8th inst. for \$1536.05.

BENTON.—This mine, at North Empire, owned by Mr. John M. Dumont, is coming to the front as a large gold producer. Recent reports by experts estimate over 35,000 tons of ore in sight, the average value of which is \$16 a ton in gold and some small value in silver. The main shaft is down about 500 feet. An important strike of rich gold ore has been made. This ore has a value outside of the gold it contains for fluxing other ores, and is always in demand by the smelters.

RED ELEPHANT.—It is stated that this property will be sold to satisfy an execution amounting to \$29,300.

LAKE COUNTY.

From the Leadville *Herald-Democrat* we take the following:

There are now seventeen furnaces in blast in Leadville, handling about 600 tons a day.

CORA BELLE.—The first lot of ore from this shaft, on East Fryer Hill, has been settled for, and returned \$60 a ton above smelting charges. The shaft is producing a load or more a day, which is broken in advancing the shaft. The ore shows a marked improvement with depth.

DOUGLAS, WARREN & FOSTER.—This concentrat-

ing mill in California Gulch has been started up. It is equipped with jigs and a slimer.

IRON SILVER.—The contract for the ore production during the next six months has been let to the Arkansas Valley and American smelters jointly. It represents about 20,000 tons.

LA PLATA MINING AND SMELTING COMPANY.—At a meeting of debenture-holders in London, a resolution sanctioning the scheme of reconstruction, as proposed by the directors, was passed unanimously.

LEADVILLE TUNNELING, MINING, AND DRAINAGE COMPANY.—The work of sinking a deep shaft on East Sixth street, a few blocks above Harrison avenue, Leadville, is making good headway. The shaft is timbered to a depth of 214 feet, and is sinking at the rate of three and a half feet a day. The flow of water is not nearly as great as in the beginning, and very little water is made by the shaft beyond the upper seventy-five feet. So far, all the work has been through glacial *débris* or boulder wash. The shaft will meet the approximate line of the proposed great tunnel at a depth of 470 feet.

LITTLE PITTSBURG CONSOLIDATED.—Work is to be resumed in sinking the New Discovery No. 6 shaft, on Yankee Hill. The shaft already has a depth of 275 feet, and it is proposed to sink from 300 to 400 feet deeper if necessary.

SMALL HOPES.—The large new mining plant for the Emmet shaft of this mine is to be in place by August 20th. As soon as this is done, the machinery at present in use will be released, and placed on what is known as the Jumpers shaft. This shaft, by sinking a little deeper, will open a large body of marketable iron ore.

WARD CONSOLIDATED.—Steps have been taken toward the immediate and rapid exploration of this property, which is to be opened by the sinking of the Olive Branch shaft, which is already down about 300 feet. The large hoisting machinery on the lower Waterloo shaft, on Carbonate Hill, will be moved over at once, and other measures adopted to facilitate operations. The property of the company embraces a number of claims situated just east of the Tip Top and Forepaugh mines.

LA PLATA COUNTY.

C. H. C.—Operations on this mine will not be commenced until the Princeton tunnel is connected with the old working of the mine, when it may be expected to resume its old-time shipments of high-grade ore.

SAN JUAN & NEW YORK SMELTING COMPANY.—During the past few months, extensive improvements have been made in this establishment at Durango. Two systems of dust-chambers, one connected with the roasters and the other with the blast-furnaces, have been constructed for the purpose of saving the fine particles of gold, silver, and lead that have heretofore passed away in fumes. These result in a material saving. Another stack, 125 feet high, connected with the dust-chambers of the blast-furnaces, will at once be built. A stone foundation is being placed under the main and line shafting, and a patent lime extractor and heater have been added to the engine-room. The cost of these improvements is about \$14,000. All the roasters are in operation, and the furnaces, which were blown out in order to make connection with the dust-chambers, will be started up shortly. There is an accumulation of about 1400 tons of choice smelting ore in the works.

PITKIN COUNTY.

CAMP BIRD.—An important strike is reported. **KANSAS CITY & ASPEN MINING COMPANY.**—This company has been organized by B. Shobe, W. D. Steele, and Angus Snedaker. The capital stock is \$300,000.

SAN JUAN COUNTY.

GREEN MOUNTAIN.—The Howardsville Concentrator Works have been purchased by this company, and will be put in operation immediately upon the concentrating ore produced by the Green Mountain mine. The capacity of the works is twenty-five tons a day. They will run to their full capacity.

DAKOTA.

LAWRENCE COUNTY.

CALEDONIA.—Official reports dated the 5th inst. show that the drift from the bottom of the winze advanced 5 feet, making a total of 43 feet. A cross-cut has been started in this drift 32 feet from the winze. Of ore, 1240 tons were extracted from the mine in this week, and for the last half of June the bullion product was about 425 ounces, or about \$6886.07.

IRON HILL.—Ten additional stamps for this mill are now on the way to the mines. The company's smelter is reported to be working satisfactorily.

MEXICO.

The Mexican *Financier* reports the following: By a treasury decree, no duties will be charged on silver alloy in lead for exportation, unless there shall be silver to the proportion of more than three one thousandths, and by a recent decision, the product of iron mines in the republic, consisting of bars, beams, pigs, plates, etc., are exempted from all taxes.

Negotiations are going on in Boston and St. Louis looking to the purchase, for \$600,000, of a rich silver mine near the Batopilas mines. The mine is at present operated, and, with only a ten-stamp mill, is yielding \$150,000 yearly.

MICHIGAN.

COPPER MINES.

The following statement gives the products of the mines mentioned for June, and for six months, and a comparison with the outputs of the same mines in the two preceding years:

	June.			Jan. 1 to June 30.		
	1886.	1885.	1884.	1886.	1885.	1884.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Calumet & Hecla	2,692	2,670	2,179	15,160	14,869	12,816
Quincy	276	270	282	1,373	1,292	1,409
Franklin	201	190	175	1,215	1,113	1,052
Tamarack	200	...	...	1,151	...	...
Oscoda	165	...	...	1,094	1,194	1,078
Atlantic	198	212	187	975	890	1,252
Huron	90	115	108	663	682	468

* Mill shut down from May 17th to November 17th, 1885.

COPPER FALLS.—This company is curtailing its product to 70 or 80 tons a month, on account of the low price of copper. It has facilities for an immediate increase whenever the price of copper will enable the company to stamp at a profit.

KEARSARGE.—Work is progressing quite rapidly, the cribbing of No. 1 shaft having been finished. No. 2 shaft is down 15 feet, and the rock is looking very well. According to the *Calumet News*, few mines have the chance of being opened out so expeditiously and cheaply as this. Pipes from the Wolverine compressors convey air to the small hoisting-engine, and to the drills now used for No. 2 shaft, and will do the same to the No. 1, when they begin to sink this week. Preparations are making for the foundation of the engine-house, which will be east of No. 2 shaft.

TAMARACK.—It is said that, as the shaft deepens, the lode continues to look well, and the development of the mine is meeting all expectations.

IRON MINES.

The following statement, given by the *Marquette Mining Journal*, shows the amount of iron ore shipped from the ports of this district for the season of 1886, up to and including Wednesday, July 9th:

	Tons.
Marquette—Marquette District	308,054
St. Ignace	18,956
Escanaba—Marquette District	203,973
Menominee District	314,956
Grand total of lake shipments	845,939
Shipments of Pig-Iron.	
Pioneer furnace	780
Deer Lake furnace	300
Vulcan	5,769
	6,849

The gain over the shipments from the above ports during the same period in 1885 is 138,777 gross tons.

MINNESOTA.

ST. LOUIS COUNTY.

MINNESOTA IRON COMPANY.—During the season of 1886 and for the week ended July 7th, there were shipped from Two Harbors 86,073 tons of ore, from this company's mines.

MISSOURI.

BONNE TERRE COUNTY.

DESLOGE LEAD MINING COMPANY.—At a meeting held in St. Louis this week, the old board was re-elected to wind up the business of the company and turn it over to the St. Joe. The capital stock of the St. Joe will be raised to \$1,500,000. For the real estate of Desloge they will give \$100,000. The personal property will be paid for on an appraised valuation.

MONTANA.

BEAVERHEAD COUNTY.

NEW YORK PLACER MINING COMPANY.—Surveys are making for a large ditch to carry water from the Lemhi River, near Sharkey's, up over the bars in Kirtly Creek, seven miles below. This company is the prime mover in the project. It will be an expensive undertaking, but the richness of the ground will

warrant, it is thought, the immense outlay required for proper construction of the big ditch.

DEER LODGE COUNTY.

GOLD HILL.—This company has been organized at St. Louis, with a capital stock of \$10,000,000, in 400,000 shares of \$25 each. The company proposes to work mines in the Pioneer Mining District. The business of the company is to be conducted in St. Louis, the following being the Board of Trustees: C. Clark, C. D. McLure, L. M. Rumsey, Moses Rumsey, Paul Fusz, A. B. Ewing, John N. Bofinger, and A. Lambeth.

GRANITE MOUNTAIN.—During the week ended the 9th inst., there were shipped 29 bars of bullion, worth (figured at 97 cents an ounce for silver) \$30,200.

LEWIS & CLARKE COUNTY.

ELKHORN.—A blast in one of the lower levels recently broke into a body of water that in a short time flooded the lower workings of the mine. It is stated that the water was up to the 450-foot level, which would make it about 200 feet deep, and that in the mean time the men would all be put to work in the upper levels, which have not been worked much and have never been stoped, the company having hitherto given its attention to the opening up of new ground. The water drowned out the pumps, and the company at once prepared to get new ones to pump the mine dry, which it is thought would be done in a week.

MEAGHER COUNTY.

The auction sale of the estate of the late Wallace R. Bell, consisting of the following property in Neihart Mining District, occurred at Helena on the 8th inst. An undivided 325 feet of the Montana Bell, an undivided 750 feet of the Maud S., an undivided 750 feet of the Minnehaha, and an undivided 325 feet of the Dickens lode. The property was bought by A. J. Steele, of Helena, for \$12,000 cash. It is understood that St. Paul parties are interested in the purchase.

SILVER BOW COUNTY.

AMY & SILVERSMITH CONSOLIDATED.—The capital of this excellent silver mine consists of 341,419 shares, which private advices state have been bought up and are at present controlled entirely by Marcus Daly and Judge George Irvin. Last month, a dividend of 10 cents a share was declared, and we understand there are two more dividends of the same amount in the treasury, besides a fair amount for developing the property further. The depth of the mine at present is 400 feet. The length of the lode is 1470 feet. The middle ledge yields ore averaging 100 ounces in silver and one ounce of gold to the ton. Some of the ores assay up to 250 ounces in silver. Most of the ores go to the Puebla Reduction-Works. They pay 90 per cent of the actual value of silver and gold, and charge \$19 treatment a ton.

MOUNTAIN CHIEF.—In the west drift, at a depth of 350 feet, it is said an important development of high-grade ore has been made recently.

NEVADA.

ESMERALDA COUNTY.

HOLMES.—The mine is looking well throughout, and from many places rich ore is produced. Mill No. 1 is running half-time on Mount Diablo ore. Mill No. 2 is running half-time on Holmes ore. On the 26th inst., there were shipped 5 bars of bullion, valued at \$8567.43. Both mills are in good order and doing good work.

STOREY COUNTY—COMSTOCK LODE.

The Virginia City *Chronicle* reports the following:

CHOLLAR.—No further excavating has been done in the west end of the station on the 3200 level in this mine since the suspension of operations at that point after striking ore, pending instructions from the directors. A north drift to connect with the south drift from the bottom of the deep winze in Hale & Norcross is sent from the station. This drift will be pushed ahead as speedily as practicable for the purpose of supplying air to enable the men in the latter mine to open up the 3200 level.

CONSOLIDATED CALIFORNIA & VIRGINIA.—During the week ended the 3d inst., 1114 tons of ore were shipped to the Morgan mill, and 1766 tons to the Eureka mill. The average value of the ore milled during the week, according to assays from battery samples, was \$16.63 a ton for that crushed at the Morgan mill, and \$15 for that crushed at the Eureka mill. The statement for June shows that 11,983 tons of ore were worked, and the assay value of the bullion produced, subject to discount on silver, was \$105,116.27, against 12,040 tons worked in May, yielding

bullion of the assay value of \$147,161.27. Although about the same quantity of ore was worked in June as in May, the bullion product was \$42,045 less. This was on account of the low grade of the ore. The yield in bullion of the ore worked at the Morgan mill in June averaged \$10.27 a ton, against an average battery assay of \$13.47 a ton, the balance of the precious metals passing off in the tailings. The yield of bullion from ore worked at the Eureka mill averaged \$7.79 a ton, against an average battery assay of \$11.25, the difference, or \$3.46 a ton, passing off in the tailings. The expenses of the corporation in May, when 12,040 tons of ore were mined and milled, were about \$140,000; therefore in June, with 11,983 tons of ore mined and milled, they could not have been much less. If the \$105,116.27 in bullion produced in June were sold, with silver at its present rate of discount, it would net the company \$91,451.16 in gold coin, and if the expenses in June have been as large as those of May when about the same number of tons of ore were worked, there would be a loss to the company of \$48,549 for mining and milling ores in June. The sworn statement of the financial condition of the company, filed in the office at San Francisco, shows \$23,951.76 in cash and \$66,607.12 in unsold bullion, subject to the discount in silver.

OSBISTON SHAFT.—The completion of draining the water from this shaft to the 2319 or bottom level, was accomplished on the 2d inst. When the main pump was started last January, there was a vertical depth of over 500 feet of water in the shaft, besides a length of nearly 5000 feet of submerged drifts. This vast body has been lifted to the Sutro tunnel level in a little over five months. A bulkhead will be constructed in the north drift to shut off the flow of water that proceeds from that quarter. Sinking to the 3000 level will begin immediately after the bulkhead is finished. The bottom of the Osbiston shaft (2319 level) corresponds with the 2500 of the Combination. It will, therefore, require to be sent down nearly 700 feet to connect with the 3200 level. This depth will be attained in about nine months. The draining of this shaft was undertaken by the Gould & Curry and Best & Belcher companies.

WHITE PINE COUNTY.

SWEETWATER.—All the workings in connection with this company, at Hamilton, are reported to be running smoothly. Some two weeks ago, a bullion shipment was made, and since then a bar valued at \$972.20 was shipped. The principal mine, the Stafford, is looking well, and is keeping up its regular output of ore. The Wheeler tunnel looks flattering.

NEW MEXICO.

GRANT COUNTY.

FLAGLER REDUCTION-WORKS.—There are large quantities of ore on hand at these works at Silver City. The matting furnace is nearly ready to blow in, and in a short time both it and the chloridizing furnace will be worked to their full capacity.

IRON GOLD AND SILVER MINING COMPANY.—This company's property, which joins that of the Laclede, has been organized with a capital stock of \$2,000,000, in \$10 shares. J. K. Hayward is President of the company; C. A. Kendrick, Secretary; Otto Schubert, M. Cooney, and H. B. McNeil are the other members of the directory.

PENNSYLVANIA.

BERKS COUNTY.

QUAKER CITY SLATE COMPANY.—On the 10th inst., the sheriff levied on the slate quarry, machinery, tools, etc., of this company, which has been operating extensive slates quarries in Albany township. The levy was made at the instance of Allentown creditors. Among the future plans of the company, it is said, was the laying out of a town on an elaborate scale for homes for its workmen, and a summer resort for its stockholders, who are mostly Philadelphia capitalists.

UTAH.

BEAVER COUNTY.

HORN-SILVER.—The experiment of working the base low-grade ores recently made at Campbell's concentrator have proved a failure, according to Salt Lake papers.

JUAB COUNTY.

EUREKA-BULLION.—Bullion, Beck & Champion Mining Company, appellants and plaintiffs, vs. Eureka Hill Mining Company, respondents and defendants; appeal of appellants to the United States Supreme Court: The appeal was allowed by the Territorial Supreme Court, and the supersedeas bond to be given

therein in \$10,000. Respondent is enjoined from working any ground or ores under the surface of that part of Bullion lot No. 76 in controversy, appellant giving a bond in \$150,000 conditioned to pay all damages suffered by respondent in consequence of the issuing of said injunction. This last bond is, in other words, a bond to indemnify the Eureka people in case the Territorial Supreme Court judgment is sustained by the court of last resort, for all loss or damage they may have sustained while waiting three or four years for the case to come up on the docket at Washington.

VIRGINIA.

The joint committee on streets of the general council of Louisville, Ky., has just awarded a contract for 5000 tons of granite blocks from the Richmond granite quarries, at \$9.25. This is the second award for 5000 tons of this granite within the past few weeks from Louisville.

James B. White & Co., of Pittsburg, Pa., have just completed the purchase of a 5000-acre tract of manganese ore land in Virginia. This purchase, it is said, will enable these gentlemen to supply the home market with sufficient manganese ore to shut out the greater part of the spiegel and fine manganese imported from England. They will begin the development of the tract at once, and in a few months they expect an output of from 500 to 800 tons of ore a day. The new purchase lies 20 miles from Waynesburg, and is within three miles of the Shenandoah Valley Railroad. The construction of a branch road will at once begin and be pushed to completion as rapidly as possible. Men are at work now developing the tract, and they find that the ore is reached at a depth of about 80 feet. It lies in large bodies or pockets. As soon as the exact lay of the ore is determined on, the work of mining will begin. The tract lies up in the mountain, where there are no dwellings, and contracts for the building of a town will be let. Two hundred houses will be erected at once, and in the mean time the shafts will be sunk and all made ready for the beginning of work in the mines. The demand for manganese and spiegel that contains 40 per cent of manganese is very large, and with the exception of the Cambria Iron-Works and the mills of the Carnegies, all these metals are brought from England.

STAFFORD COUNTY.

RAPPAHANNOCK.—Official advices of the 11th inst. state that some rich ore has been struck, and operations are pushed vigorously. The mill is steadily running, and the prospect is, that the next clean-up will be better than the last.

WISCONSIN.

HOPPENYEAN IRON MINING COMPANY.—This company has been organized at Ashland with a capital stock of \$500,000; incorporators, L. J. Day, E. J. Palmer, and George T. Merrill.

GOGEBIC RANGE.

BESSEMER.—The force is actively at work on the open pit, and ore is taken out in quite large quantities and shipped. Every thing is working well.

CALEDONIA.—At this mine, they have struck both veins of ore. They have five shafts, two on the south vein and three on the north vein.

KAKAGON.—Shipments of ore have begun.

NIMIKON.—The new machinery has arrived. There are four shafts sunk down to the ore, the hoist is in position, and the work of getting out the ore is progressing favorably. An open pit has been stripped down to the ore.

MARKETS.

Silver.

NEW YORK, Friday Evening, July 16.

DATE.	LONDON.		N. Y.	
	Pence.	Cents.	DATE.	N. Y.
July 10.	44 3/8	96 3/4	July 14	43 13-16
12.	44	96 1/4	15	43 13-16
13.	44	96	16	43 13-16

* Weak.

This is the lowest price ever recorded here for silver, and there is nothing apparent indicating an early improvement.

Foreign Bank Statement.—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 1/2 per cent. During the week, the bank gained £17,000 bullion; and the propor-

tion of its reserve to its liabilities was raised from 35% to 39 1-16 per cent, against 45% per cent at the same date last year. On the 15th inst., the bank gained £5000 bullion on balance. The weekly statement of the Bank of France shows losses of 6,300,000 francs gold and 3,925,000 francs silver.

Copper.—This market is dull and featureless. Lake is held firmly at 10 cents; other brands, 9 1/4@9 1/2c., and in some cases, even below 9 1/4c. is accepted. In fact, copper is selling at prices for which the raw material to replace it can not be bought. Our exports, though of late somewhat heavier, are still far below last year's figures, and stocks here are very light. Consumption is still very heavy, and our production, except, in the Lake District, is declining.

The Anaconda for the past two weeks has been running only 18 out of 26 matting-furnaces, nominally on account of the necessity for repairing mill machinery. No intimation is given of the time this partial stoppage will continue. The Parrot has reduced its output about 25 per cent, and will probably reduce still more as the season progresses. Clark's is producing only about half its usual output. In fact, the foreign market gives very little encouragement to the shippers of furnace material.

The strike in the Allouez mine continues to prove well. More than 100 feet have now been driven in good ore.

Cables to the Metal Exchange to-day quote Chili Bars £38 17s. 6d., a still further decline, which will bring furnace material down considerably below the 7s. 9d. @8s. last quoted.

Messrs. Henry Bath & Sons, under date of July 1st, say:

"Our home trade continues depressed, while there is a better Indian inquiry, though at a low figure. Smelters show a disposition to curtail their output, while the present unremunerative rates for their productions continue.

"Deliveries for the fortnight have been 4338 tons, against imports 5037 tons, thus increasing stocks by 699 tons.

"Total visible supply shows 61,232 tons, against 60,505 tons last fortnight.

"American arrivals have been 875 tons into England and 250 tons into France, or 1125 tons, against 1344 tons last year.

"Rumors have been current of a combination between the principal Spanish and American mines, and more latterly among the American mines only, to limit the production; but nothing appears to have resulted, though, doubtless, it is the possibility of their coming to terms which has kept our bar market so steady during the depression in other sorts of copper.

"Furnace material is in somewhat short supply."

We learn from private cables that the stocks increased last week 800 tons, which probably accounts for the further decline in bars. Best Selected are now quoted £43.

Exports of copper during the week amounted to 177,900 pounds copper; 1,038,000 pounds copper ore; 2,070,000 pounds copper matte; and 21,780 pounds old copper.

Tin.—The London market has fluctuated during the week between £100 7s. 6d. and £99 10s., at which latter figure it stood at the close of the market to-day. The price here has fluctuated from 22'40@22'20c., at which latter figure offers of 50 to 200 tons were made with a depressing effect. We quote to-day 22'10c., at which figures sales of 15 tons were recorded at the Metal Exchange.

Lead.—Our New York market is very quiet and very firm at 4'90c., at which figure both Domestic and Foreign can be purchased. The Richmond Company (an abstract of whose report appears on another page) claims to hold firmly at 5 cents; but in the face of Spanish lead in London £13 2s. 6d., and offering here 4'90@4'92 1/2c., the higher quotation is merely nominal. The company claims, with much force, that its 1500 tons is the only stock in this country, and stocks in Europe are also reported to be light, so that it may well be that 5 cents will be reached. At present, the lull in demand here is due to the stocking up in the recent heavy purchases. We hear of 600 tons Domestic arrived here to manufacturers, on contracts.

We quote manufacturers: Sheet-Lead, 7 3/4c. net, and Lead Pipe, 6 3/4c., less the usual 20 per cent discount. Shot, Buck and Chilled, \$1.45 per bag, in 25-pound bags.

Messrs. John Wahl & Co., of St. Louis, telegraph to-day as follows:

Market does not reveal any activity, but, on the other hand, shows no signs of weakness; holders having quite frequent inquiries for small lots, maintain prices fairly well. Both Common and Refined firmly held at 4'70c., and light sales at these figures.

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

The market remains about the same, if any thing a shade weaker, owing to some refiners forcing sales. Business has been quiet, and of a limited character, with quotations at 4'70 and 4'75c. Sales for the week sum up over 700 tons spot and future.

Spelter.—The European price has again advanced to £14 2s. 6d. for Silesian, and here we quote 4 3/4@4 3/4c. for Western brands, according to quality; 6 1/4@6 1/2c. for New Jersey; and 8 3/4c. for Bergeport Lehigh. Foreign Spelter, 4'80@4'90c.

Sheet-Zinc—5 1/2@5 3/4c.

New Jersey Zinc Oxide is quoted 3 3/4@4 1/4c.

Antimony.—This market is lower, following the decline in London. We quote 7'80c. from store, 30 days, for Hallett's, and 8 1/2@8 3/4c. for Cookson's, to arrive. In London, the price of Hallett's is £31 10s., as by cables to the Metal Exchange.

Nickel.—We quote 70c. nominal.

Bismuth—Is quoted at \$1.90@\$2 a pound.

Aluminium—Is quoted at \$1 an ounce.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, July 16.

Iron Ore.—The following are standard prices of Lake ores at Cleveland, but we understand they are shaded:

No. 1 Specular and Magnetic Bessemer ores, per ton	\$6.25
No. 1 Specular (non-Bessemer) ores, per ton	5.50
Bessemer Hematites	\$4.75@5.50
Non-Bessemer Hematites	3.75@4.25

Freights from Escanaba are 90@95c. a ton.

New York prices for foreign ores are from 8@9 cents per unit.

American Pig.—There is nothing worthy of note in this market. Prices of American pig remain unchanged.

We continue to quote for standard Lehigh brands, tide-water delivery: No. 1 X, Foundry, \$18@18.50; No. 2 X, Foundry, \$17@17.50; Gray Forge, \$16@16.50; while less popular brands sell 50c. or \$1 below these figures, and fancy brands go as much above them.

Scotch Pig.—There is little change observable in this metal, though prices are held a little firmer, owing to higher freights, which in turn are due to the structural iron coming to the Union Bridge Company, and for which charters for 9000 tons have been secured, with the option of doubling that amount. We quote: Coltness, \$20; Gartsherrie, \$19; Summerlee, \$19.75; Dalmellington, \$18.50; Langloan, \$19. There is neither Gartsherrie, Glengarnock, Carnbroe, nor Eglinton in this market. Cables to the Metal Exchange to-day quote: Coltness, 46s. 9d.; Summerlee, 45s. 6d.; Langloan, 43s. 3d.; Gartsherrie, 43s.; Glengarnock, 42s. 6d.; Dalmellington, 40s. 9d.; Eglinton, 39s. 3d.; Warrants, 39s.; Middleboro', No. 3, 29s. 4 1/2d. Freights are 5s. nominally.

Bessemer Pig.—This market is dull and but little doing. We quote Domestic at \$18@18.50 at the furnace, and Foreign, ex ship, \$18.50@19.

Spiegeleisen.—We quote English, \$25@25.50, and German, \$25; and even this price is said to be shaded. Eighty per cent ferro-manganese is quoted at \$63@65.

Structural Iron and Steel.—The good business recorded for some time past continues. Much building and bridge work is being contracted for, so that business in this department is likely to remain brisk until the close of the season. It is much to be regretted that the large order of the Union Bridge Company was allowed to leave this country. This company has contracted for 9000 tons of freight, which gives some idea of the extent of the order. We quote Angles, 1'90@2'10c. delivered; Tees, 2'40@2'45c.; Iron Beams and Channels, 3c. base, for American; Steel Angles, 2'35@2'45c.

Steel Plates.—We quote 2 1/2@2 3/4c. for Tank; 3@3 1/4c. for Boiler and Ship Plates; 3 1/2c. for Flanges; 4@4 1/4c. for Extra Flange and Fire-Box Plate.

Merchant Steel.—American Tool Steel, 7 1/2@10c.; special qualities, 11@20c.; Crucible Machinery, 4 1/2@5 1/2c.; Bessemer and Open-Hearth Machinery, 2 1/4@2 1/2c.

Steel Rails.—The allotment has been increased to 1,400,000 for the year, which practically means that every mill will make all it pleases or can make. There are many orders in the market, but the mills can only accept business for late delivery, and we understand some of the mills are contracting for next year at the prices now ruling, \$34@35 at Eastern mills. Some of the mills decline to contract for next year, expecting higher prices.

Foreign rails are still offered at \$37, New York delivery.

Plate Iron.—Common Tank, 2@2 1/4c.; Refined, 2 1/2c.; Flange Iron, 3 1/4@3 5/8c.; Extra Flange, 4@4 1/2c.

Bar Iron.—Refined we quote at 1'75@1'90c.; Common, 1'60@1'70c. Store prices are 10@20c. higher.

Old Rails—Are offered at \$18.50@19.

Cast-Iron Pipe.—The business of the pipe-founders continues active. We quote \$32.50 per ton for 4-inch pipe; \$31.50 for 6-inch; and \$28.50 for 48-inch, at the foundry.

Scrap.—We quote \$18@19 for Wrought, and \$13@14 for Cast.

Philadelphia.

July 15.

[From our Special Correspondent.]

The situation in the Eastern Pennsylvania iron trade at this writing is briefly this: Small lots of Foundry iron are selling at \$18@19 for No. 1, and about \$16.50 for No. 2, with Gray Forge practically neglected. Opinions are this way and that way as to the fall trade, but it is practically impossible to make any predictions worth any thing. The heavy production is showing itself in the little accumulations here and there.

Foreign Material.—No sales. Speiseisen is quoted at \$25@25.50; Bessemer, \$17.75@19.50, according to quality.

Muck-Bars.—No sales have been made, although an inquiry or two is on the market to-day; asking price, \$29.

Merchant Iron.—There is a rumor that the mills will start up. Quite a number of inquiries are on the market for finished iron of one kind or another. This has grown partly out of the apprehension that the mills will be idle all summer. Refined iron is \$1.90; Medium, \$1.70; Common, \$1.60@1.50.

Nails.—Nails have improved a little, and \$2@2.10 is now the paying price. Some buyers who had an opportunity to stock up at 20 cents less now regret their delay. There is quite an active building demand, and the country demand has shown itself quite actively.

Plate Iron.—A few small sales with more inquiries are having a good effect upon manufacturers. Several mills will start up next Monday.

Wrought-Iron Pipe.—Skelp is quoted at 1'80@1'90c., and the card rates on wrought-iron pipe are readily paid as fast as mills can guarantee deliveries.

Steel.—The merchant steel makers report a change in quotations and no substantial change in trade conditions. The ship-yards, locomotive-works, and car-works will be good buyers of material this fall, and already several inquiries have been received and some few orders secured.

Steel Rails.—Quotations range from \$34@36, with no material change.

Old Rails.—Old rails are quoted at \$19@20, with a good many buyers hanging around, waiting for a favorable opportunity to secure a few hundred tons, but up to to-day no business of consequence can be reported.

Scrap.—The scrap market is quiet.

Pittsburg.

July 15.

[From our Special Correspondent.]

The first and second weeks in July are generally off weeks. The present year seems to be no exception. Of course, there are certain branches that show more or less activity.

Pig-Iron.—This is not so firm as at the date of our last review. We hear of offers to sell at 25@50 cents below previous current rates. What has brought about this movement we are not able to say; but such is the fact. There is no demand of importance, but most of the holders of standard brands have the fullest confidence in the future, and are in no hurry to force the market. In the mean time, most of them are well sold up. Our city furnaces' business for the year has been large. Some of them have orders still unfilled. Apart from outside brands and qualities such as are generally slow of sale, the available supply is not large. In point

of fact, if the demand during the rest of the year is going to be as expected, stocks will be small. Of course, all depends on the demand. The position is certainly a very sensitive one, and at this writing it is impossible to say what turn things will take. The expectation and the chances are decidedly in favor of steady improvement.

Lake ores remain steady. There are movements going on that, if consummated, will make considerable change in the near future. A party, including several Pittsburgers, has purchased 4500 acres of ore land in Virginia. This tract is within three miles of rail connection with Pittsburg. A railroad will be built at once. The ore is claimed as a new Bessemer.

Muck-Bars.—Demand light, at \$27.25@27.50 cash.

Old Rails.—Without change. Last sale, \$20.50.

Pig-Iron.—Following are the current rates:

Coke or bituminous	\$	20 p. c. Spiegel	\$
Foundry No. 1	1.17	27.50@28.00	
Foundry No. 2	1.16	27.50@28.00	
Gray F., No. 3	1.15	29.00@33.00	
" No. 4	1.14	29.00@33.00	
White	1.14	21.00@21.00	
Mottled	1.15	20.50@21.00	
Silvery	1.15	20.50@21.00	
Bessemer	1.17	17.50@18.00	
Charcoal			
Foundry No. 1	1.21	36.00@36.50	
Foundry No. 2	1.20	36.00@36.50	
Cold-Blast	1.25	1.70@1.75	
Warm-Blast	1.18	2.00@2.00	

Pig-Iron Sales.—Market quiet, demand merely for lots to be used as mixtures. Dealers are apart in their views.

Coal and Coke Smelted Lake Ore.

1200 tons Gray Forge	.....	@ \$16.00	cash.
50 " Mottled	.....	@ 15.25	"
500 " Bessemer	.....	@ \$17.50	@ 18.00

Louisville.

July 14.

[Reported by GEORGE H. HULL & Co.]

The pig-iron market in this section seems to be in thorough sympathy with Eastern markets. Standard brands are firm at our quotations. Some sales of favorite brands have been made at a shade over our quotations. On the other hand, some brands not so well liked have sold at prices under our quotations.

We quote for cash in round lots as below:

PIG-IRON.

Southern Coke, No. 1 Foundry	.....	\$16.00@	\$17.00
" No. 2	.....	15.00@	16.00
Hanging Rock Coke, No. 1, Foundry	.....	16.00@	18.50
" Charcoal, No. 1, Foundry	.....	18.00@	19.00
Southern Charcoal, No. 1, Foundry	.....	17.00@	18.00
Southern Coke, No. 1, Mill, Neutral	.....	14.50@	15.00
" No. 2	.....	13.50@	14.00
" Charcoal, No. 1 Mill	.....	17.00@	17.50
Southern Car-Wheel, Standard Brands	.....	23.50@	24.50
Hanging Rock, Cold Blast	.....	23.50@	24.50
" Warm Blast	.....	19.50@	20.50

COAL TRADE REVIEW.

NEW YORK, Friday Evening, July 16.

Statistics.

Production Anthracite Coal for week ended July 10th, and year from January 1st:

TONS OF 2240 LBS.	1886.		1885.	
	Week.	Year.	Week.	Year.
P. & Read RR. Co.	204,092	5,428,851	281,211	5,141,085
L. V. RR. Co.	101,830	3,038,071	156,523	2,677,822
D. L. & W. RR. Co.	75,438	2,523,264	109,685	2,062,669
D. & H. Canal Co.	61,869	1,857,088	78,827	1,721,447
Penna. RR.	44,039	1,570,889	47,104	1,531,749
Penna. Coal Co.	24,411	645,513	26,840	606,796
Penna. Canal Co.	11,438	169,422	10,663	144,724
Total	523,117	15,233,098	710,792	13,886,292
Increase	.....	1,346,806	.....	.....
Decrease	.....	187,675	.....	.....

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

Production for corresponding period:

1881	.....	13,663,325	1882	.....	14,712,252
1882	.....	13,901,634	1884	.....	14,694,861

Production of Coke on line of Pennsylvania RR. for week ended July 10th, and year from January 1st: Tons of 2000 pounds.

	1886.		1885.	
	Week.	Year.	Week.	Year.
Allegheny Region	1,319	99,202	3,266	97,280
West Penn. RR.	1,769	54,187	1,338	24,146
Southwest Penn. RR.	48,004	1,306,638	38,152	1,021,349
Penn. & W. Region	6,617	171,101	5,260	122,066
Monongahela	3,215	67,467	2,688	52,307
Pittsburg Region	.....	.....	.....	.....
Snow-Shoe	725	10,594	261	8,116
Total	61,649	1,709,189	50,965	1,325,244

Production Bituminous Coal for week ended July 10th, and year from January 1st: Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1886.		1885.	
	Week.	Year.	Week.	Year.
Phils. & Erie RR.	.....	7,507	73	16,748
*Cumberland, Md.	65,671	887,514	55,342	1,370,142
Barclay, Pa.	3,356	103,596	2,967	126,882
*Broad Top, Pa.	.....	.....	.....	.....
H. & Broad Top RR.	6,539	193,528	1,658	86,872
East Broad Top	.....	.....	.....	.....
Clearfield Region, Pa.	.....	.....	.....	.....
Snow Shoe	3,167	46,700	1,729	82,795
Karthauss (Keating)	1,974	59,950	1,973	69,729
Tyrone & Clearfield	55,192	978,300	55,800	1,584,043
Allegheny Region, Pa.	.....	.....	.....	.....
Gallitzin & Mountain	2,275	406,381	9,657	263,724
Total	138,174	2,684,476	129,399	3,600,935

* Tons of 2240 lbs.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.				
West Penn RR.	5,003	175,875	3,014	131,890
Southwest Penn. RR.	1,276	98,700	3,115	55,167
Pennsylvania RR.	4,964	131,357	4,344	104,202
Westmoreland Region, Pa.				
Pennsylvania RR.	29,155	526,603	35,038	575,993
Monongahela Region, Pa.				
Pennsylvania RR.	8,531	199,375	7,239	124,205
Total	48,929	1,131,910	52,750	691,457
Grand total	187,103	3,816,386	182,149	4,592,392

The report of the total output of coal from the mines on the line of the Chesapeake & Ohio Railroad for the week ended June 30th, 1886, and year from January 1st, is as follows: 1886, week, 27,195 tons; year, 580,507 tons; 1885, week, 29,662 tons; year, 550,133 tons. Decrease, 1886, week, 2467; year, 30,374 tons.

The Norfolk & Western Railroad Company reports shipments of Pocahontas Flat-Top coal for the week ended July 10th, 1886, and year from January 1st, as follows, tons of 2000 pounds: 1886, week, 15,549; year, 415,659; 1885, week, 12,275; year, 285,223. Increase, 1886, week, 3274; increase, year, 130,436.

Anthracite.

The anthracite coal trade is about as completely demoralized as it is possible for it to be. The large companies have openly reduced their prices, and their contractors are selling at about \$3.25 for Stove, and \$3 for Broken and Egg f. o. b. It is supposed that there is a commission of from 10 to 15 cents off this price. We have high authority for the statement that at least one of the large companies has sold coal within three days past at less than the above prices with the commission off. Should the other companies discover this fact to their entire satisfaction, there would probably be a further row. We hear of Chestnut coal offering at Albany at \$3.10, if not lower.

We do not blame the companies for reducing prices. It was childlike for the sales-agents to expect to get \$3.40 per ton for stove coal, when buyers could secure from individual operators a better quality at \$3.25. There was nothing for the companies to do but meet the market, or close some of their mines until the demand exceeded the supply of the individuals, and brought prices up to the companies' standard. It has been stated right along that the combination had nothing to do with prices, its object being to regulate production so that prices should be remunerative. As the combination can not keep the production within the allotments, not to speak of the requirements of the market, we do not see that there is any thing for the companies to do but suffer for their excessive production.

As we stated two weeks ago, the trade is in a critical position, and needs very radical action to improve it. It really requires a production of not over 1,500,000 tons for August to put it in good shape, or at least two full weeks' stoppage next month. At the outside, the output should not be above 2,000,000 tons. We do not think that the most sanguine, however, expect to get it below 2,500,000 tons, while it is evident that the Philadelphia idea ranges between 3,000,000 and 3,250,000 tons. Stocks are enormous, both in first and second hands. At shipping ports, July 1st, they amounted to 700,736 tons. It is said there were at that date 150,000 tons of stove coal at Perth Amboy. The Reading was 303,000 tons ahead of its quota on the 1st, and the Lehigh Valley Railroad 146,000 tons ahead. It is thought that of the large excess of production this year over last, amounting, July 1st, to 1,822,054 tons, not more than from 25 to 40 per cent has gone into consumption. What is wanted is prices and profits, not quantity and losses.

It is stated that the Delaware, Lackawanna & Western Railroad Company sold but about 26,000 tons of coal at Hoboken last month, and even this small quan-

tity only averaged about \$2.91 per ton f. o. b. This is 5 cents less than in May, 30 cents less than in June, 1885, and 71 cents less than during June, 1884. The average for the first six months of this year was \$2.85, or 47 cents less than for the corresponding period of last year, and 82 cents less than for the like period of 1884. Such figures, and existing conditions and prospects, must alarm every one connected with the coal companies, either as stockholders or managers.

The present trouble in the coal trade is attributed to Delaware & Hudson management. This we emphatically deny, and at the same time congratulate the gentlemen at the head of that company for resenting an imposition on the part of the other companies. This company was having its trade taken away from it by the excessive production and low prices of some other companies, and therewas nothing for it to do but to enter the market and sell its coal at the best prices obtainable.

We quote ordinary free-burning coals f. o. b. as follows:

	-Week ended-		
	July 16.	July 9.	July 2.
Lump	\$3.00@	\$3.00@	\$3.00@
Steamboat	3.00@	3.00@	3.00@
Broken	2.80@3.00	2.85@3.00	2.85@3.00
Egg	2.80@3.00	2.85@3.00	2.85@3.00
Stove	3.00@3.25	3.10@3.25	3.10@3.25
Chestnut	2.70@2.80	2.75@3.00	2.75@3.00
Pea	1.75@2.00	1.75@2.00	1.75@2.00
Buckwheat	1.50@1.65	1.50@1.70	1.50@1.70
Dust	1.20@	1.20@1.25	1.20@1.25

We hear of lower prices than the above, but as they are exceptional, we omit them.

Bituminous.

There is very little business doing, and in its absence no change in prices is to be observed. This branch of the coal trade, however, does not make a much better showing than anthracite. Vessels are in abundant supply, and this week rates under the minimum are reported to have been made at Georgetown, as well as in Philadelphia and in this city.

Buffalo.

July 15.

[From our Special Correspondent.]

Last week's review in the ENGINEERING AND MINING JOURNAL so clearly defines the condition of the anthracite coal trade, with the peculiar features of cause and effect, that your correspondent feels under the necessity of only reporting that the Buffalo market is unchanged in price, supply, and demand, and that buyers and sellers are awaiting another letter (as promised two weeks since) from Mr. "OCCASIONAL."

Bituminous coal is fairly active and steady, at previous low quotations. The supply is ample for all requirements, but no accumulations are reported. The assortment is good, enabling dealers to fill orders exactly as to name and quality. Profits to producers and carriers are almost zero. Coke is quiet and steady.

To supply a long-felt want in consequence of the closing of all the yards in our city, since dealers purchase their coal now directly from the companies, accommodation depots on the railroads are opened in the suburbs, so that farmers and others need not come so far for their loads.

The growth of Buffalo is steady and encouraging. From the figures in the new directory, it appears that the population now is over 240,000, as compared with 232,000 a year since. Cheap fuel means increased manufacturing, and consequently increasing population.

The award for the coal for the schools has not been made yet. There is a legal point raised relative to the right of the bidder to withdraw his "housing" clause. The city would save from \$600 to \$700 if the coal is delivered into the bins instead of being dumped on the sidewalk.

Lake freights on coal to Western points are demoralized and lower. Shippers and vessel-owners remained apart for seventy-two hours; then an engagement or two was made at going rates; then a charter was reported at 60 cents to Chicago, and then two others to Chicago and Milwaukee at same figures, and so the freight was finally fixed at the decline of 10 cents per net ton. Shippers feel good, and the owners take the matter somewhat coolly, hoping for a turn in the wheel of fortune before many days have elapsed. Yesterday, coal was in light supply, and vessels comparatively plentiful, so that charters could have been made at 60 cents to Chicago and Milwaukee without any trouble; but somehow nothing was done. To-day, rates are easy; supply of coal light, and vessels also.

The coal shipments by lake from July 8th to 14th, both days included, aggregated 53,350 net tons;

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par value), ASSESSMENTS (Total levied to date, Date and amount per share of last), DIVIDENDS (Total paid to date, Date and amount per share of last). Rows include Adams S. L., Alice S. C., Albion S. L., etc.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par Value), ASSESSMENTS (Total levied to date, Date and amount per share of last). Rows include Agassiz Cons., Albion S. L., Allouez, C., etc.

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood has previously paid \$275,000 in eleven dividends, and the Terra \$75,000. ¶ Previous to the consolidation of the California and Consolidated Virginia in August, 1881, the California had paid \$31,320,000 in dividends, and the Consolidated Virginia \$42,930,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends.

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.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	July 10.		July 12.		July 13.		July 14.		July 15.		July 16.			July 10.		July 12.		July 13.		July 14.		July 15.		July 16.		
	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.			1.55																						200	
Alta, Ariz.																									1,600	
American Flag																									200	
Barcelona, G.																									400	
Bechtel Con., G.																									2,210	
Belvidere			1.40	1.35	1.35		1.35		1.40		1.35	1.80													200	
Belcher																									2,500	
Best & Belcher, G. S.																									100	
Big Pittsburg, S. L.																									200	
Boyman Silver																									600	
Bull-Domingo, S. L.																									6,900	
Central Ariz., S.																									200	
Chollar																									200	
Cons. Imperial			1.35	1.40		1.55	1.45	1.45		1.40															6,900	
Crown Point			2.40																						200	
Deadwood-Terra						3.60	3.05																		550	
Eureka Cons., Ne.			1.00	.99																					700	
Father de Smet, Dk.																									350	
Freeland																									200	
Gold Stripe, Ca.																									100	
Gould & Curry, Ne.	1.00																								100	
Grand Prize, Ne.																									100	
Green Mountain, Ca.																									350	
Hale & Norcross, Ne.			2.25						2.50																200	
Helena								1.85	1.80																130	
Homestake, Dk.			21.38					21.50																	100	
Horn-Silver, Ut.								2.70																	100	
Independence, Ne.																									100	
Iron Silver, Co.						2.15																			100	
Leadville C., Co.	.32		.35		.40		.49	.41	.55	.50	.52	.39													5,100	
Little Pittsburg, Co.							.25	.24	.24		.25														709	
Little Chief, Co.							.40	.35			.39	.35													1,250	
Martin White, Ne.							2.00	1.65	1.95	1.90															550	
Moulton			.80	.75	.83	.78	1.25	1.10	1.05		.85														5,000	
Navajo, Ne.																									810	
North Belle Isle, Ne.			29.25		30.00	29.00																			600	
Ontario, Ut.			1.20				1.00		1.40		1.45														200	
Ophir																									200	
Oscoda								15.93																	200	
Plymouth								25.75	24.75	29.00	27.00	3.50													550	
Quicksilver Pref., Ca.	24.00							6.00			7.75	7.00													600	
Quincy							.65	.59	.68																485	
Robinson Cons., Co.																									200	
Savage, Ne.																									700	
Serra Nevada, Ne.	.85										.90	.80													485	
Silver King, Ar.											3.00	7.50													200	
Spring Valley, Ca.																									100	
Standard, Ca.											.85														700	
Stormont, Ut.	.18																								700	
Tip Top, Ar.																									700	
Yellow Jacket																									700	

Dividend shares sold, 37,126. Non-dividend shares sold, 51,800.

namely, 17,510 to Chicago, 17,630 to Milwaukee, 5230 to Duluth, 5560 to Superior, 2180 to Detroit, 2000 to Green Bay, 450 to East Saginaw, 250 to Windsor, 300 to Alpena, 260 to Kelly Island, 300 to Kincardine, 630 to Manitowoc, and 1050 to Muskegon; grand total for the season, 581,890 tons. The engagements and rates reported per net ton were as follows: 70@60c. to Chicago, Milwaukee, Green Bay, Kenosha, Manitowoc, and Sheboygan; 45c. to Duluth and Superior City, 40c. to Kincardine, 30c. to Kelly Island, 20c. to Detroit and Windsor; on owners' account to Alpena.

The receipts of coal here by canal for the week ended July 15th were 7070 net tons; the shipments for the same period 643 net tons

The coal charters by canal during the past week included 1 load to New York at \$1.20 per net ton, captain to pay loading and unloading; 4 loads to Syracuse, 50c. gross, and 1 load to Palmyra, 45c. net, all free in and out. The nominal rate to Albany or Troy, 90c. per net ton, captain to pay loading and unloading.

Boston.

July 14.

[From our Special Correspondent.]

The market for anthracite coal remains very dull for the very good reason that it is thoroughly unsettled. The situation has grown worse rather than better since my last letter. No one thinks of asking over \$3.25 f.o.b. at New York for Stove coal. The \$3.40 coal has been very much of a humbug any way. The companies have pretended to ask it, but scarcely any one has paid as much; \$3.25 has been nearer the real figure on actual transactions. We hear of \$3.20 for some outside coals. The truth is, as first noticed in the ENGINEERING AND MINING JOURNAL'S New York report, that the combination has not been working effectively of late. This is plainly evident from the condition of affairs in this market. Unless there shall be real restriction during August, there is good reason to expect still lower prices, perhaps back to \$3@3.10 for Stove, with broken and egg in proportion. There is every reason for the exercise of caution on the part of would-be buyers until the outlook is more clearly seen. Broken and Egg remain at about \$2.90 f. o. b.

Bituminous coal is in very good demand. The companies are mining an amount of coal never before equaled in the history of the business. We quote

\$2.10 as the bottom f.o.b. figure, with some sales at \$2.15.

Freights are all unsettled. The vessel-owners have lost their grip, and it is a question now whether they can hold their association together. An agent of the association has been sent East to see if vessel-owners in Maine can not be brought into the association more unanimously. Meantime, a "tie-up" is threatened, but with little avail.

We quote rates exclusive of discharging: New York, 70@80c.; Philadelphia, 90@1.05; Baltimore, \$1.10@1.15; Newport News and Norfolk, \$1.05@1.10; Richmond, \$1.10@1.15; Cape Breton, \$1.85@2; Bay of Fundy, \$1.60.

Retailers are naturally a little quiet about advanced prices just now. Trade is very quiet with them.

Pittsburg.

July 15.

[From our Special Correspondent.]

We have to report a dull and unsatisfactory market. The Ohio still remains too low for navigable purposes; notwithstanding the fact that before Davis Island Dam on the Ohio, six miles below here, was raised, we had 1 foot 10 inches water, the raising of the "dam" makes 6 feet water in the harbor. It is the largest dam of the kind in the world, and has proved a big success. The pools have very little coal ready for shipment. A rise at present would be of no value to the miners.

The price of coal is unchanged: River, wholesale, on board, 3½@4½c. per bushel; railroad, 4½@4¾c.

Connellsville Coke.—Nothing new to note. General dissatisfaction is the rule, not the exception. The workmen are still talking strike. Blast-Furnace, \$1.50 f.o.b. cars at ovens; Foundry, \$1.75; Crushed, \$2.25.

FINANCIAL.

Mining Stocks.

New York, Friday Evening, July 16.

The railroad stock department of the Consolidated Stock and Petroleum Exchange is growing rapidly in the volume and character of its transactions, and there is not the slightest difficulty in executing one thousand or two thousand share orders in any of the active stocks. There are at least 700 active brokers on the floor of the Exchange, and besides the crowd in the pit, the groups in Western Union, Lackawanna, Lake Shore, and St. Paul are particularly large. The min-

ing stocks, for which the Exchange was originally organized, are now the smallest feature in the business of the Exchange; but the time is not far distant when there will again be a considerable increase in this direction. The business in the better class of stocks is daily growing, and new companies are added to the list of dividend-paying mines.

During the week under review, the market has been very active, showing a tendency to higher prices. The transactions, as compared with last week, show an increase of 48,414 shares; but this is due to the large sales of Rappahannock, which alone amounted to 44,900 shares. This stock was firm, ruling at from 11@14c. A strike is reported, which, according to statements made, will considerably increase the production.

The advance in Quicksilver Preferred and Common is due to the dividend of \$1.25 a share on the preferred stock, and to the recent rise in the price of quicksilver. The former went from \$24@29, and the latter from \$5.25@7.75. Plymouth Consolidated remains at from \$15.50@15.63. Bodie Consolidated was firm at from \$1.40@1.30, assessment unpaid. The same may be said of Bulwer at 80@83c. Consolidated Pacific sold at from 23@20c., and Mono at \$2.

In Colorado stocks, Leadville has received the most attention, advancing from 32@55c.; the lowest price recorded to-day again was 39c. Little Pittsburg opened at 40c., and closed 35c. Little Chief ruled at 24c. Iron Silver showed a sale of 100 shares at \$2.15. Colorado Central remained firm at \$2.75; and Robinson Consolidated, at from 59@68c.

The Homestake has declared its usual monthly dividend of \$50,000, making a grand total of \$3,468,750; the stock holds its own at \$21.50. Deadwood-Terra, for which also a dividend is said to be in "sight," sold at \$2.40. Father de Smet and Caledonia were not so fortunate. The former sold at \$1, and the latter at 85c.

The Comstocks have added their usual quota to the week's business. Consolidated California & Virginia, to which we refer extensively in another column, is selling at from \$1.35@1.55. Hale & Norcross, at from \$2.25@2.50. Ophir advanced from \$1.20@1.60. Among the other Nevada stocks, Navajo was the most prominent, being actively dealt in at from 75c.@1.25, closing at 85c. Eureka declined from \$3.60 to \$3.05, closing at \$3.25.

COAL STOCKS.

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

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of \$100. Philadelphia prices are quoted so much per share.												Sales from July 10th to July 16th, inclusive.	
		July 10.		July 12.		July 13.		July 14.		July 15.		July 16.			
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.		
Barclay Coal.....	50	19 1/4	19	19	18 1/4	18 1/2	18 1/2	18 1/2	19	18 3/4	19	18 3/4	19	18 3/4	3,460
Cameron Coal.....	10					24 1/2	23 1/2							197	
Ches. & O. RR.....	100	9		9									7 1/2	400	
Consol. Coal.....	100														
Cumb. C. & I.....	100														
Del. & H. C.....	100	99 1/2	98 1/2	99	97 1/2	97 1/2	96 1/2	97 1/2	98 1/2	97 1/2	98 1/2	97 1/2	97 1/2	12,589	
D. L. & W. RR.....	50	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	189,050	
Elk Lick Coal Co.....	50	50 1/4	49 3/4	50				50 1/4	50	50 1/4	50			1,207	
Lehigh C. & N.†.....	50	56 1/4	56	56	55 1/2	56 1/2		56 1/2	56	56 1/2	56			296	
L. & W. C. & I. Co.....	100					15 1/2								50	
Maryland Coal.....	100														
Montauk Coal.....	100														
Morris & Essex.....	50														
New Central Coal.....	100														
N. J. C. RR.....	100	55 1/2	55 1/2	55 1/2	54 1/2	55 1/2	54 1/2	54 1/2	54	56	54 1/2	56	55 1/2	32,340	
N. Y. & S. Coal.....	50														
Penn. Coal.....	50														
Penn. RR.†.....	50	53 1/2	53 1/2	53 1/2	53 1/2	53 1/2	53 1/2	54	53 1/2	54 1/2	54	54 1/2	54	5,560	
Ph. & R. RR.*.....	50	24 1/2	24 1/2	24	23 1/2	24	23 1/2	24	23 1/2	25 1/2	24 1/2	25 1/2	25	31,934	
Spring Mountain.....	50														
Westmoreland Coal.....	50														

* Of the sales of this stock, 17,808 were in Philadelphia, and 14,126 in New York. The quotations for these stocks are not percentage, but actual price. Total sales, 277,083.

The stock of the Helena Mining and Reduction Company was listed at \$1.85. This company is a reorganization of the Alta-Montana Company, of Wickes, Montana. For some time past, the new company has been carrying on active operations, erecting extensive works, and producing quite largely. The dividends paid to date amount to \$197,970, and it is reported that the present prospects of the company will bring a continuation of the same. Moulton has been firm at \$2.75 and \$2.70; and Alice, at \$1.55.

Ontario ruled between \$29 and \$30. Horn-Silver was almost entirely neglected, the sales only amounting to 50 shares at \$2.70 a share. Stormont sold at 13c.

Meetings.

The annual and special meetings of the following companies will be held at the times mentioned:

Gregory Bobtail Mining Company, No. 1 Nassau street, New York City, August 4th, from twelve to one o'clock P.M.

Spring Valley Hydraulic Gold Company, No. 61 Broadway, New York City, July 20th, at twelve o'clock M.

Dividends.

Adams Mining Company, of Colorado, has declared dividend No. 27, of ten cents a share, or \$15,000, and an extra dividend (No. 28) of the same amount, making a total of \$30,000, payable July 21st, at the Farmers' Loan and Trust Company, Nos. 20 and 22 William street, New York City.

Alturas Gold Mining Company, Limited, of Idaho, has declared a dividend of 5 per cent, free of income tax, payable July 16th, in London.

Amy & Silversmith Consolidated Mining Company, of Montana, has declared dividend No. 1, of ten cents a share, or \$34,141.90, payable on the 20th inst., at Messrs. Hoge, Brownlee & Co.'s, Butte, Mont.

Homestake Mining Company, of Dakota, has declared dividend No. 96, of 40 cents a share, or \$50,000, payable on the 26th inst., at Messrs. Lounsbury & Co.'s, No. 17 Broad street, New York City.

Pennsylvania Manufacturing, Mining, and Supply Company has declared dividend No. 1, of 15 per cent, out of the earnings of the last eleven months, payable on the 21st inst., at Pittsburg, Pa.

Quicksilver Mining Company, of California, has declared a dividend of \$1.25 a share, or \$53,750, payable August 16th, at No. 20 Nassau street, New York City.

Pipe Line Certificates.

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

The petroleum market during the week has been very dull, and speculation has been light outside of the professional room traders. The market is likely to soon awaken from its Rip Van Winkle sleep, and we think higher prices will follow. How long it may hang dull and listless no one can say; but the price is low, a considerable short interest exists, and when some big parties come in, they will find but little difficulty in putting up prices. Stocks and

ASSESSMENTS.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Amount.
Andes, Nev.....	29	May 28	July 2	July 22	.25
Apex, Utah.....		June 12	Aug. 2	Aug. 2	.03
Bannock, Idaho.....		June 7	July 26	July 26	.50
Rear Butte, Dak.....		June 14	Aug. 2	Aug. 18	1/2
Belmont, Nev.....	40	Apr. 30	*July 8	*Aug. 3	.10
Best & Belcher, Nev.....	34	June 14	July 20	Aug. 9	.50
Bodie Cons., Cal.....	5	June 21	July 26	Aug. 16	.50
Car. Mammoth, D.k.....	1	June 21	July 24	Aug. 10	.01
Chimax, Dak.....	1	June 10	July 9	July 20	1/4
Crocker, Ariz.....	3	May 25	July 6	July 28	.20
Dudley, Dak.....	1	June 28	July 29	Aug. 18	1/4
Eldorado, Dak.....	12	June 21	July 27	Aug. 16	.25
Globe, Dak.....	1	June 1	July 27	Aug. 20	1/4
Golden Fleece, Cal.....	53	May 20	July 13	Aug. 2	20.00
Gould & Curry, Nev.....	1	June 21	July 26	Aug. 17	.50
Homew'd B'nd, Dak.....	1	May 25	June 26	July 20	1/4
Iron City, Dak.....	1	June 7	July 26	Aug. 16	.02
Iron Mountain, Dak.....	1	May 31	*Aug. 3	*Aug. 20	1/4
Live Oak Drift, C.L.....	1	May 25	June 30	July 22	.05
May Flower Gravel, Cal.....	31	July 1	Aug. 9	Aug. 31	.25
Mexican, Nev.....	32	June 17	July 22	Aug. 12	.25
North Peer, Ariz.....	3	May 19	June 24	July 19	.02
Ontario, Dak.....		June 21	July 21	Aug. 7	1/4
Ophir, Nev.....	5	June 7	July 13	Aug. 2	.25
Overman, Nev.....		July 9			.15
Palomas Placer, Cal.....	1	June 1	July 5	July 19	.02
Pennsylvania, Cal.....	7	June 21	July 21	Aug. 23	.30
Potosi, Nev.....	24	June 25	July 29	Aug. 19	.30
Quincy, Dak.....	1	July 1	Aug. 2	Aug. 18	1/4
Rainbow Dak.....	3	June 1	*July 24	*Aug. 10	1/4
Rockland Land & Mining, Mich.....		June 8	Aug. 1	Aug. 1	.03
Ruby, Dak.....		June 3	July 5	Aug. 5	.01
Ruby Wonder, Dak.....	1	June 14	July 14	Aug. 2	1/4
Savage, Nev.....	66	June 17	July 20	Aug. 9	.50
Seabury-Calkins, Dak.....	3	July 1	Aug. 2	Aug. 20	.01
Sierra Nevada, Nev.....	83	May 27	July 2	July 26	.25
Silver Star, Dak.....	1	July 8	Aug. 9	Sept. 1	1/4
Silver Ridge, Dak.....	1	May 13	June 17	July 17	.01
Spruce Gulch, Dak.....	1	June 22	July 26	Aug. 7	1/4
West Galena, Dak.....		June 5	July 8	July 29	1/2

* The delinquent day of the Belmont assessment was postponed to July 8th, 1886, and the day of sale of delinquent stock until August 3d; of the Iron Mountain, to August 3d and 20th respectively; and of the Rainbow to July 24th and August 10th.

grain have both had a bull turn, and oil should come next.

The exports for June, 1886, were 3,000,000 gallons larger than for the corresponding month in 1885, but the total exports for the year ended June 30th, 1886, were 500,000 gallons less than for the preceding year. We are not losing our foreign market, and Russia, with all her petroleum resources, can not compete with us at present prices.

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

	Opening.	Highest.	Lowest.	Closing.	Sales.
July 10.....	64 1/2c.	65 1/2c.	64 1/2c.	65c.	1,970,000
12.....	65	66 1/2	64 1/2	66 1/2	3,962,000
13.....	66 1/4	66 1/2	65 1/2	66	2,908,000
14.....	66	66 1/2	65 1/2	65 1/2	2,543,000
15.....	65 1/2	66 1/2	65 1/2	66 1/2	2,973,000
16.....	67	67 1/4	65 1/2	66	3,942,000
Total sales.....					18,358,000

San Francisco Mining Stock Quotations. Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS.					
	July 9.	July 10.	July 12.	July 13.	July 14.	July 15.
Albion.....						
Alpha.....						
Alta.....	.50	.50	.60	.65	.60	.65
Argenta.....						
Bechtel.....						
Belcher.....		.75				
Belle Isle.....						
Best & Belcher.....	1.12 1/2	1.00	1.00	1.12 1/2	1.12 1/2	1.75
Bodie.....	1.50	1.50	1.50	1.50	1.50	1.50
Bullion.....						
Bulwer.....	.80		.80	.70	.75	.75
Chollar.....	1.62 1/2	1.25	1.56 1/4	1.62 1/2	1.50	2.00
Con. Pacific.....	1.37 1/2					
Con. Cal. & Va.....	1.12 1/2	1.00	1.37 1/2	1.62 1/2	1.50	1.50
Crown Point.....					1.12 1/2	1.12 1/2
Day.....						
Elko Cons.....	3.12 1/2	3.00	3.00	3.25	3.25	3.25
Eureka Cons.....						
Exchequer.....	1.37 1/2	1.00	1.25	1.12 1/2	1.00	1.12 1/2
Gould & Curry.....						
Grand Prize.....	2.50	2.50	2.50	2.50	2.50	2.75
Hale & Norcross.....						
Independence.....						
Martin White.....						
Mexican.....	.60	.55	.60	.70	.65	.70
Mono.....	2.00	2.00			1.87 1/2	1.87 1/2
Mount Diablo.....						
Navajo.....	.75	.80	.95	1.25	1.12 1/2	.90
Northern Belle.....						
North Belle Isle.....	1.25	1.12 1/2	1.25	1.50	1.50	1.50
Ophir.....						
Overman.....						
Potosi.....	.75	.60	.70	.65	.65	.80
Savage.....	3.25	2.75	3.50	3.12 1/2	2.87 1/2	2.87 1/2
Scorpion.....						
Sierra Nevada.....	.75	.70	.80	.85	.90	.85
Silver King.....						
Tip-Top.....						
Union Cons.....	.65	.60	.70	.70	.65	.70
Utah.....	1.00	.90	1.12 1/2	.90	.90	
Wales Cons.....						
Yellow Jacket.....	1.37 1/2	1.25	1.37 1/2	1.50	1.37 1/2	1.37 1/2

FREIGHTS.

Coastwise Freights. Per ton of 2240 lbs.

Representing the latest actual charters to July 16th:

To	From Philadelphia	From Baltimore.	From New York shipping ports.
Alexandria.....	.60		
Baltimore.....	.58 1/2		
Bangor.....	1.05*	1.15	
Bath, Me.....	1.05*	1.15	.90*
Beverly.....	1.05*		.90*
Boston, Mass.....	1.05*	1.15	.85*
Bridgeport, Conn.....		1.05	.55
Brooklyn.....		1.00	.18 1/2
Cambridge, Mass.....	1.05*†		.85*†
Cambridgeport.....	1.05*†		.85*†
Charleston, S. C.....	.70@.75	.80	
Charlestown.....	1.05*		.85*
Chester.....	1.05*		.85*
Com. Pt., Mass.....	1.05*		.85*
E. Boston.....	1.05*†		.85*
East Cambridge.....	1.05*†		.85*
E. Greenwich, R. I.....			.80
Fall River.....	.95*	1.00	.75
Galveston.....		3.00	
Gardner.....	1.05*†		.85*†
Georgetown, D. C.....	.60@.70		
Gloucester.....	1.15*		
Lynn.....	1.05@1.15*		1.35
Warblehead.....	1.10*		
Newark.....		1.25***	.80
New Bedford.....	.90*	1.00	.80
Newburyport.....	1.20*	1.30*	1.00*
New Haven.....		1.05	.55
New London.....		1.00	.65
New York.....			