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OUR warning to investors with respect to the boom in the iron lands of the Mesaba Range of Minnesota is equally pertinent with respect to the boom at the silver camp of Creede in Colorado. The mines that have so far been opened there are rich and their record during the few months that they have been producing is wonderful, but as yet there are only four shippers, and it is evident that these cannot support a population of 6,000 or 7,000 men, as Mr. EDMUND B. KIRBY, in a very conservative article, which we print in this issue, remarks. It is extremely likely that other mines will be discovered as soon as the snow melts and prospecting, stimulated by the rich discoveries of last autumn, is resumed, but unless the district proves to be another Leadville or Aspen, which no experienced mining man expects, the chances are that those who invest in town lots at inflated prices will lose their money. Just as has been the case in the majority of boomed mining camps. The men who are actually engaged in developing the resources of Creede deprecate the wild speculation in its mining claims and town lots, which they realize is bound to result in the injury of legitimate interests.

THE Mercer County (New Jersey) Board of Agriculture held its annual meeting at Trenton on the 15th inst., at which the president, Mr. S. B. KETCHAM, urged the members to take action toward the improvement of the roads in the County. The question was discussed favorably at considerable length. These discussions on this important subject, of which reports come occasionally, indicate that the farmers in some sections of the country are being awakened to the necessity of improving the condition of the highways over which they are obliged to travel, and although the progress is slow, as it is sure to be, it is gratifying to note that the leaven is working. The only way in which this reform can be carried out is to educate the people who have to use the roads most as to the method of constructing them properly, their maintenance, and the advantages to be derived from them. The remedy for the "discontent of the farmer" about which so much has been written of late may be, in part, merely the engineering problem involved in the improvement of his means of communication with the large towns and reducing the cost of the transportation of his products to railway points.

### CORNISH TIN MINING.

In our last issue we gave some figures relating to the mining industry of Cornwall during the past year which showed rather a discouraging state of affairs in that famous old mining region. Our English exchanges which have arrived this week contained an account of the annual meeting of the Mining Association and Institute of Cornwall held at Redruth recently, at which this question was the principal topic of discussion. The speakers were unable to deny the fact that mining matters in the county were in a rather depressed condition, but disagreed concerning the reasons for this. Some thought that the industry was suffering chiefly from lack of capital, investors having turned their attention during the past few years from home mines to those in foreign countries where the chances for a large return on their money were greater. There are large mineral deposits, particularly in the immediate neighborhood of Carn Brea Hill, it was stated, not yet developed, which should with a little capital prove remunerative. At present tin mining in Cornwall is confined within a limited area, about three-quarters of the ore raised being produced in the immediate neighborhood of Redruth. With tin ore at only £50 per ton it was agreed that mining was not a very profitable business in Cornwall.

Capt. W. T. WHITE undoubtedly struck the keynote of the present situation in remarking that one difficulty that they had to contend with was the fact that many of the shafts in Cornwall were of an antiquated type, and not at all suited to modern requirements, nor were the methods of mining so modern and economical as those of Australia, Africa, and America. As for the talk that Cornish mining was played out, the Cornish captains at the meeting did not believe a word of it. The Dolcoath mine, the deepest in the County, was said to show a strong lode in the bottom levels, with no signs of falling off, either in quality or size. Capt. JOSIAH THOMAS believed that if some of the old copper mines were sunk deeper a large quantity of tin would be found in them. The mining men of the County should try to reduce the cost of production and develop the mines more rapidly by improved machinery; as for reducing the cost of labor, that could not be done.

### THE METRIC SYSTEM.

A writer in one of our English contemporaries recently remarked, contemptuously, "We are constantly being told that some semi-barbarous country has adopted the metric system, among other fashions of civilization; and that this market or that will only purchase stovepipes that will fit a metrically designed stove, or hatbands a certain number of centimetres in depth." In replying to this in the *Electrician*, MR. J. EMERSON

DAWSON gives a list of the countries actually using the metric system at the present time, which includes thirty of the nations of the world, with an aggregate population of 323,489,773, and of this total the number who might be termed semi-barbaric is exceedingly small. Indeed, Russia and the English-speaking nations—Great Britain and her colonies and the United States—are the only great nations of the world which have not yet adopted the metric system, and in Russia, as we noted in our issue of December 5th, 1891, the question of its introduction is being considered very seriously. It is singular, indeed, that the English-speaking nations, whom we like to call the most enlightened of all, are the slowest to abandon their barbaric system of weights and measures.

We have repeatedly called attention to the necessity of the adoption of the metric system, at least for our export trade, if we are to extend our commerce in machinery, hardware, etc., with South American and other countries which use the decimal weights and measures exclusively. The British consuls in all parts of the world have been for a long time writing to the Foreign Office that if British manufacturers were to hold their trade this change must be made; American manufacturers stand in the same position. In this connection a paragraph, from a recent report of Col. HOWARD VINCENT to the Master Cutler of Sheffield, England, is particularly interesting. He says: "The Director of the Imperial Japanese Artillery (Lieut.-Col. T. OTA), an experienced officer with European training, expressed himself as fully sensible of the excellence of the metal manufactures of Sheffield, and of their superiority in cost, quality, workmanship, and originality of design. Notwithstanding these advantages, he considered it so easy for mistakes to be made in the measurements by feet and inches that, when exact dimensions were important, his Government preferred to order their material from Creuzot in France and Krupp in Germany, where the metric system is used, so that they may be relieved of trouble and anxiety."

The logic for this preference is incontrovertible. Our awkward and antiquated system of weights and measures, with our pounds troy and our pounds avoirdupois, tons and gallons of various descriptions, feet, in linear measure, divided into tenths and inches, etc., are confusing enough to an adept; much more to a foreigner unfamiliar with the system.

THE ENGLISH PRODUCTION OF PIG IRON IN 1891.

The statistics of the production of pig iron and steel in the United Kingdom in 1891, which have just been issued by the British Iron Trade Association, show a decrease of 646,634 gross tons (2,240 lbs.) as compared with the previous year, which was rather more than was expected when the figures for the first half of the year were sent out. Thus it appears that the iron trade experienced a period of depression last year in the three greatest producing countries—England, the United States, and Germany (including Luxembourg)—which in 1890 turned out 84 per cent. of the world's total make of pig iron. The figures for each country are given in the following table, all being converted, for the sake of uniformity, into metric tons (2,204 lbs.). The figures for England are those compiled by the British Iron Trade Association; for the United States those of the American Iron and Steel Association, and for Germany those of the German Iron and Steel Association, which are, however, provisional only with respect to the total for 1891:

PRODUCTION OF PIG IRON IN GERMANY, GREAT BRITAIN AND THE UNITED STATES.

	1890.	1891.	(Decrease.)	
United States.....	9,353,019	8,415,113	937,906	10%
Great Britain.....	8,003,761	7,315,566	687,195	8%
Germany.....	4,658,451	4,452,019	206,432	4.4%

The falling off in the output of the British furnaces having been so large, the United States continues to hold the rank which it won in 1890 as the largest iron producing country of the world.

While the stocks of pig iron in the United States decreased from 608,921 gross tons (2,240 pounds) on December 31st, 1890, to 596,333 gross tons on December 31st, 1891, the stocks in England showed a somewhat larger decrease, having been reduced from 1,393,041 gross tons to 1,292,277 gross tons—a difference of 100,764 gross tons. It will be noticed that the stocks of pig iron carried in the United States are less than one-half those of Great Britain. Our stocks at the end of 1891 were but a trifle more than 7 per cent. of the production during the year 1891, or less than four weeks' supply, while the stocks carried in Great Britain were nearly 18 per cent. of the make during the year, and on that basis a nine weeks' supply.

With especial reference to the English statistics, above quoted, it appears that the chief cause for the falling off in the make of pig iron in Great Britain in 1891 has been the lethargy which has characterized the iron trade of that country during the year. Adding the production to the stocks at the beginning of the year, the total available supply of iron was 8,621,537 gross tons; deducting from this the exports during the year, as reported by the Board of Trade, and the stocks on December 31st, 1891, the home consumption was apparently 6,488,487 tons, which was a decrease of 799,777 gross tons as compared with the previous year, the exports having been but 304,495 gross tons less.

The depression in the iron industry of the United Kingdom was quite general, but three of the important producing districts, Notts and Leicestershire, South Staffordshire and Worcestershire and Shropshire, showing an increase, while in Cleveland, whence comes the greatest output, was made the greatest reduction. The production of acid and basic Bessemer steel ingots declined from 2,014,843 gross tons in 1890 to 1,642,005 gross tons in 1891, and Bessemer steel rails from 1,019,606 gross tons to 662,676 gross tons, while the output of open hearth steel ingots fell off from 1,564,200 gross tons to 1,514,538 gross tons.

THE WORLD'S PRODUCTION OF COPPER AND SPELTER.

Through the courtesy of Messrs. Henry R. Merton & Co., the well-known metal dealers of London, we are able to give their statistics of the world's production of copper and spelter in 1891 simultaneously with their publication in London. From them it appears that the output of copper amounted to 274,714 gross tons (2,240 lbs.), which was an increase of 5,099 tons, against an increase of 8,410 tons in the previous year. As the output of the copper mines of this country (Messrs. Merton have, of course, adopted our figures for the United States) increased 11,854 gross tons, or more than twice the net increase for the world, the proportion of the copper product originating here is several per cent. greater than last year. In 1890 the United States furnished 43 per cent. of the total, while in 1891 the percentage had risen to 46.7. Spain, on the other hand, showed a very small relative increase, the proportion of its product to the whole in 1890 being 19.1 per cent., and last year 19.6 per cent. Of the three other countries, Germany, Chili and Japan, whose annual production is more than 15,000 gross tons, the last named alone showed an increase. The decrease in the yield of the German mines was comparatively small, but not so that of Chili, where all industrial operations were interfered with by the civil war.

PRINCIPAL COPPER SUPPLIES OF THE WORLD.

(In English tons—2,240 lbs.—of fine copper.)

	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Algers.....	120	120	160	50	150	110	250	260
Argentina.....	210	150	190	150	170	180	233	159
Australia.....	7,500	7,500	8,300	7,450	7,700	9,700	11,400	14,100
Austria.....	965	1,210	1,225	1,010	833	733	585	670
Bolivia—Coro, coro.....	2,150	1,900	*1,200	1,450	*1,300	1,100	*1,500	*1,500
Canada.....	*3,500	3,050	2,500	*2,250	1,450	1,560	1,200	1,000
Chili.....	20,000	26,120	24,250	31,210	29,150	35,025	35,500	41,648
Cape of Good Hope—								
Cape Copper Co.....	5,000	5,000	5,600	5,800	5,950	5,590	5,000	5,000
Namaqua.....	9.0	1,450	*2,100	1,700	1,300	625	450	.....
England.....	*900	935	905	1,456	389	1,471	2,773	3,350
Germany—								
Mansfeld.....	14,250	15,800	15,506	13,380	13,025	12,595	12,450	12,582
Other German.....	*2,000	*2,000	*1,850	*1,850	*1,850	*1,870	*2,800	*2,200
Hungary.....	285	300	300	858	531	365	*600	600
Italy.....	*2,200	2,200	*3,500	3,500	2,500	2,100	*2,000	*2,000
Japan.....	17,000	15,000	15,000	11,630	*11,000	*12,000	*10,000	*10,000
Mexico—								
Bol-o.....	4,100	3,450	3,280	2,566	1,950	.....	.....	.....
Other Mexican.....	1,025	875	500	200	100	250	375	201
Newfoundland—								
Betts Cove.....	540	735	1,115	1,300	1,180	1,125	778	668
Tilt Cove.....	1,500	1,000	1,500	750	125	.....	.....	.....
Norway—								
Vignaes.....	615	925	1,007	1,020	1,150	1,920	2,180	2,390
Other Norwegian.....	*450	*450	435	300	275	330	3.0	392
Peru.....	280	150	275	250	50	75	229	362
Russia.....	4,800	4,800	4,070	4,700	5,000	4,875	5,100	4,700
Sweden.....	*830	830	830	1,035	905	520	775	662
Spain and Portugal—								
Rio Tinto.....	32,000	30,000	29,500	28,500	28,500	24,700	23,484	21,564
Bol-o.....	*10,500	*10,300	*11,000	*11,000	*11,000	*11,000	*11,500	*10,200
Mason & Barry.....	*4,150	*5,6.0	*5,250	*7,000	*7,000	*7.0.0	*7,000	*7,500
Sevilla.....	875	810	1,350	1,700	2,300	2,135	1.5.0	2,000
Portuguesa.....	890	565	670	1,550	*856	1,258	1,665	*2,300
Other mines.....	*5,500	*4,425	*6,500	*7,000	4,050	3,560	2,424	2,251
United States—								
Calumet & Hecla.....	24,000	26,250	21,700	22,450	20,550	22,550	21,075	16,050
Other Lake mines.....	22,505	18,200	17,069	16,200	12,780	13,040	11,135	12,875
Anaconda.....	20,750	28,600	27,500	28,225	25,450	14,850	16,070	10,265
Other Montana.....	23,786	20,960	19,018	15,478	9,775	10,870	14,200	8,990
Arizona.....	17,725	15,945	14,419	14,062	8,635	6,985	10,135	11,935
Other States.....	8,415	6,370	6,068	5,235	2,519	1,510	1,435	2,585
Venezuela—								
Quebrada.....	128,179	116,325	105,774	101,710	79,109	69,805	74,050	64,700
World's total.....	6,500	5,640	5,563	4,000	2,900	3,708	4,111	4,600
Average of prices on the 1st of each month.								
Chili bars.....	£51 3/	£54 1/	£49 10/6	£52 7/6	£42 3/	£40 6/	£44 1/6	£54 15/6
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Those marked with an asterisk are estimated.

The world's production of spelter in 1891 showed about the same increase over 1890, as 1890 showed over 1889; but whereas two years ago it was distributed among all the zinc producing countries, last year it was almost entirely due to the United States, the Rhine District and Belgium and Poland being the only other countries which showed any increase at all. The total net increase in 1891 was 13,405 gross tons, and in 1890, 12,929 gross tons; but the increase in the product of the United States in 1891

was 11,905 tons against 6,932 tons in 1890. The ratio of the American product to the total has thus risen from 17.4 per cent. to 20.1 per cent.

PRODUCTION OF SVELTER IN EUROPE AND THE UNITED STATES.  
In English tons, 2,240 lbs.

	1891	1890	1889	1888	1887	1886	1885	1884
Rhine District and Belgium....	139,695	137,630	134,648	133,245	130,995	129,020	129,754	129,240
Silesia.....	87,080	87,475	85,653	83,375	81,375	81,630	79,623	76,116
Great Britain.....	29,410	29,145	30,806	26,783	19,339	20,730	24,299	29,259
France and Spain.....	18,360	18,240	16,733	16,140	16,028	15,305	14,847	15,341
Poland.....	3,760	3,620	3,026	3,735	3,785	3,580	4,145	4,164
Austria.....	6,440	7,135	6,330	4,977	5,338	5,000	5,610	6,170
United States.....	284,745	283,245	277,248	268,305	256,655	255,830	259,152	260,290
Tons.....	356,501	343,096	330,167	318,305	302,185	293,902	295,473	294,705
Average price of spelter ex- ship London.....	£234/6	£23/5	£19/6/2	£181/6	£15/4	£14/5	£14	£14/8/9
Imports of spelter into England according to the Board of Trade Returns.....	Tons. 58,483	Tons. 56,205	Tons. 56,842	Tons. 61,045	Tons. 56,187	Tons. 54,508	Tons. 60,229	Tons. 47,647

NEW PUBLICATIONS.

EXPLOSIVES AND ORDNANCE MATERIAL, Considered with Reference to some Recent Experiments with Emmensite, Gelbite, and Aluminum Bronze. By Stephen H. Emmens, Member of the U. S. Naval Institute, of the Society of Chemical Industry, etc., Pp. 93, with 11 plates. Reprinted from Proc. U. S. Naval Institute, Vol. XVII., No. 3. Baltimore Press of Isaac Friedewald Co., 1891.

This is a treatise reprinted from the Proceedings of the United States Naval Institute, and is handsomely bound in cloth and illustrated with eleven well-executed photo-lithographic plates. The scope of the work may be seen from the following table of contents: Chap. I. The Ballistic Theory of Explosives. II. The Ballistic Theory of Explosion Stress. III. The Comparison of Explosives. IV. Some Remarks upon the Foregoing Tables and upon the Humanity of Text Books. V. Emmensite. VI. Gelbite. VII. Aluminum Bronze and Ferro-Nickel. The work closes with an addendum giving some additional results acquired after the preceding matter had been written.

Professor Emmens's little book deserves careful study by all who are interested in the subject of which it treats. The theoretical discussion of, and comparison of various explosives is of great value, as are, also, the data concerning emmensite, and others, which are given. The ballistic theory which is propounded in the first chapter is an important contribution to the subject. The volume bears evidence all through of careful preparation and original work, and constitutes a noteworthy addition to the literature of explosives.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.]

Practical Carriage Building. Compiled by M. T. Richardson. Published by M. T. Richardson Co., New York, 1892. Pages 222. Price, \$1. Illustrated.

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.

Faults of Some Mining Machinery.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The way in which some large manufacturers of mining and milling machinery make and put together their machinery, in my opinion, deserves criticism. One thing is the practice of putting on nuts upside down. All nuts are made round on top, and consequently the highest part is right about the hole. When put on with that side down, the tighter the nut is screwed the tighter does it close around the bolt, and when having to take off such a nut the thread is almost sure to strip. Some time ago I put in a new 60-H. P. boiler, and when I had to put new packing around the man-head I had a difficult task to get the nuts loose, and when taken off the threads were so badly stripped that I had to tap out the nuts and cut over the bolts.

Another thing which causes delay and trouble is the casting of flanges, mud drum heads, etc., without a rib or seat for the heads of bolts to keep them from turning, as the heads of the bolts are often in difficult places to hold with a wrench. Crushing rolls are also made on rather annoying principles. In a mill which I am running, we have a good set of rolls, yet one great fault with them is that the shells cannot be worn out, fully 1 1/2 in., being left, the cause being the lugs which the hopper is bolted to being cast on to the bed plate, and preventing the boxes of the sliding roll from going ahead far enough to wear the shells out. Also one set of gear wheels is sent which come together before the shells are worn out. Of course the lugs can be chipped off, but they should be made right in the first place, so that a set of smaller gear wheels could be put on without having to stop the mill and loose time taking apart and chipping such lugs.

It does not pay to throw away steel shells before they are worn out, as the expenses of mining and milling are large enough in most places when everything is worked as economical as possible without losing by such easily remedied faults. If things were made and put on as mentioned it would save time, money, and trouble to mill men in general, and give the manufacturers a better reputation, at least among the men who are in daily contact with such machinery.

THOS. ROWE,  
TRIUMPH, ALTURAS COUNTY, IDAHO, March 12, 1892.

Government Timber Tests.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: My attention has been called to an editorial in your issue of February 27th opposing the "Government timber tests." Just at the time when it seems probable that Congress may be brought to favor a special appropriation for this work, the necessity and importance of which you freely acknowledge, you have chosen to oppose the undertaking as being not properly within the province of a republican form of government. It is possible, however, that by inviting adverse opinions, which you generously do, your opposition may prove a blessing in disguise.

As an illustration of what private enterprise may do we have only the comparatively few tests made by Professor Lanza on three or four species of timber, on 3 in. x 12 in. joists and on columns. Nothing is known of the conditions of growth of the trees from which they were cut, nor their age, size, width of the annual rings, the specific gravity, the percentage of moisture when cut, length of time seasoned, nor from what part of the trunk of the tree or of the log the sample was taken. All we know is that a stick of such a species (and even this is not certainly known) had such an ultimate strength. The results are worth something to the engineer and architect, especially when their previous knowledge was practically zero as to the strength of large sizes. But they are absolutely worthless in any study of the conditions governing strength, because the conditions are not given and were not known.

As a further evidence of the insufficiency of private enterprise in such a great work, I may cite a heated controversy some two years ago as to the relative strength and toughness of Northern and Southern oak. Appeal was made to Mr. Fernow, Chief of the Forestry Division of the Agricultural Department, who, of course, had no authentic information on the subject. Although then having no connection with this Government department whatever, I agreed to test all such timber as would be submitted to me, toward settling this question, free of charge. This offer was circulated freely among the parties to the controversy, who were the carriage builders and persons supplying carriage and wagon timber, and every effort was made by the National Carriage Builders' Association to have tests made to decide this question. The only tests ever sent in were a few oak sticks, 4 ft. long by 1 1/4 in. square, from Connecticut. These were tested, the tests published and then a public challenge made to the Southern timber men, but no further specimens ever came.

In fact no attempt could ever be made in the direction of an adequate study of the timber of this country, by any authority, body, society or corporation, without being paralyzed at the outset by the size and cost of the undertaking and the patent impossibility of completing it except by Government aid. Even a State would be likely to confine its investigations to its own territory, while the citizens of any one State use timber from a dozen others.

So far as the Government tests are concerned, it is proposed to utilize such facilities as our leading educational institutions already afford, in place of duplicating them at the expense of the Government. The leading societies of engineers and of architects in the country, as well as of science, together with the lumber and building interests everywhere, are strongly in favor of these tests. In fact, the engineering societies have for years been trying to get the Government to establish a permanent commission to conduct scientific tests of materials similar to the one appointed some twelve years ago, and which received, I believe, but one appropriation from Congress.

J. B. JOHNSON,

Prof. Civ. Eng. and Director Testing Laboratory.

WASHINGTON UNIVERSITY, ST. LOUIS, MO., March, 1892.

The Yukon Gold Fields.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: These immense gold fields of interior Alaska are but little known and the difficulty of reaching them is very great. There are two routes, one by water from San Francisco to St. Michaels, and thence up the Yukon River about 2,000 miles, but this is too expensive for the miner, besides landing him at the gold fields almost at the close of the working season. The other route, and the one generally taken, is from Juneau, over the Chilcat pass. At Juneau small boats are taken to the head of salt water navigation at Chilcat near Healy's trading post. The miner must purchase his outfit of tools and supplies either from Juneau or Chilcat and take them along with him. His outfit must include everything that he will need for the entire season, including a Yukon sleigh, nails and other things used to build a boat on the river. From Healy's, at the mouth of the Dyr Ayr River, it is 16 miles to Sheep Camp, at the foot of the pass, then 3 miles to the summit and 12 miles down to the head of the lake. The outfit has to be packed to the summit by Indians, for which work they have been charging \$15 per 100 lbs., although they have agreed to pack for \$13 this season.

The trail up to Sheep Camp follows the river which it often crosses, and the swift current and treacherous river bed not infrequently cause trouble and give the packer a free bath in the icy water. At Sheep Camp a stop is made until the weather will permit the crossing of the summit. From the summit to the lakes and across some of the lakes the sleighs are used. This tax on the poor miner's pocketbook to get his goods over the pass is very severe, but with the present condition of the trail it cannot be avoided. There have been several attempts to have this trail put into better condition, but neither the American nor the British governments will do anything in the matter. The average miner's outfit will weigh not less than 700 lbs. The three first lakes, Lindemaw, 7 miles long; Burnett, 40 miles long, and Taku, 35 miles long, are usually crossed on the sleighs if the miner is there before the ice melts. It is 5 miles to Mud Lake, which is 25 miles long. There are the Takesh Indian house at the head and several Indian houses at the outlet, where camp is made until the river breaks up. Here boats are built in which to complete the journey.

Forty miles down the river is the White House cañon and rapids three miles long, where it is usually necessary to make a portage of three-quarters of a mile. This is the only point on the whole Yukon River, over 3,000 miles, where river steamers can not navigate. Thirty-five miles below it is Lake le Barge, a fine large lake 40 miles long, with an Indian camp at the head, about 2,400 miles from the mouth of river. Thirty-five miles more and the Hootalinka, the first large branch, joins the main stream, flowing in from the southeast. This stream has a little gold, but the big mud flats a short way up the river have headed off

prospecting. Thirty miles further the Salmon River comes in from the northeast; some pay dirt has been found on this stream. One hundred miles below is the Horseshoe Bend, an easily recognized land mark, from which it is 60 miles to Five Fingers and Rink Rapids, just below which there is a fine deposit of coal, for which, however, there is little use in that country as wood is abundant. Fifty miles more and Fort Selkirk, an old Hudson Bay trading post, is reached opposite the mouth of Pelly River, a large stream flowing in from the north and on which considerable mining has been done for a few hundred miles including several branches. Ninety miles from this fort the White River enters from the south. This is a very large stream which rises in the immense copper country and flows through the gold belt.

Sixteen miles below this stream is the Stewart River, the main branch of the Upper Yukon, and from its bars have come many thousand dollars worth of glittering dust. This stream has been worked in places for several hundred miles, and its many branches have all been mined to some extent. This stream heads far to the north and toward the valley of the Mackenzie River. Twenty-five miles below is Sixty-Mile Creek, a rocky stream of considerable size, which was the scene of activity two years ago. Sixty miles more and Fort Reliance, where the trading post used to be located, is reached. This is supposed to be situated on the 141st meridian, the boundary line between American and British territory, and about 150 miles south of the Arctic circle. The post has been moved down the river 40 miles to Forty-Mile Creek, on which stream the richest diggings yet found were worked last season. Here the gold was very coarse. One nugget found was worth \$236, several more were worth \$100, while \$50 nuggets were common. This gravel is worked without quicksilver and over 100,000 ft. of hand-sawed lumber was put in last season in Franklin and Nugget gulches, mostly in the former, which is about 90 miles from the mouth of Forty-Mile. The miner who winters in the Yukon Valley has the best show, as he can, during the winter, dig holes and build fires in them to thaw out and prospect the gravel and thus locate the pay streak. Moreover, he can saw his lumber and sleigh it up to his claims. It requires two years to properly open a good claim. When the water first begins to run in the early summer the dirt and other water is washed off the surface of the claims down to the gravel which is then washed through sluices. The local regulations require the miner to be on his claim from the first of July until August 25th, which represents the ordinary working season.

There were about 175 men in the Yukon country last season, and about 125 of them remained through the winter. The miner experiences great difficulty in obtaining a sufficient quantity of proper food, and his expenses are so great that he has little time to prospect, but must make for some known field, where there is pay, and rustle to get enough gold to buy his supplies for the next season. When the means for transportation into this country are improved so that it can be prospected and properly opened up, and its immense mineral wealth shown, there is little doubt that it will prove to be an important gold producer. Every stream has gold in its bed, fish and game abound everywhere, there are rich copper deposits, fine coal is found in several places, there are large quantities of excellent timber, and immense areas of good agricultural ground. The winters are cold and the summers short, but vegetation grows very rapidly and luxuriantly, and for a few weeks the sun shines nearly all the time.

The Yukon is navigable for 2,400 miles for steamers of 200 tons, and this distance can be traveled in less than three weeks. The freight steamer now makes the trip from St. Michaels to Forty-Mile Creek in about 14 days. The river is generally open from the middle of May to the middle or last of October.

ALASKA, February, 1892.

#### THE THOMAS GILCHRIST PATENTS.

The petition of the Dephosphorising and Basic Patents Company, Limited, to the Privy Council of England, asking for a prolongation of the Thomas-Gilchrist basic steel patents (which petition was not complied with) narrates certain facts of general interest, which are not commonly known. The patents were taken out in 1878, 1879, and 1880, but principally in the first named year, and covered the invention of dephosphorising steel by means of the basic lining of the converter, the success of the process giving a great impetus to the steel trade in those countries on the continent of Europe which have large supplies of phosphoric iron ore. The petition gives the following figures showing the progress of the basic process in Great Britain and the continent:

PRODUCTION OF STEEL IN TONS OF 2,240 LBS.

Year.	Great Britain.		Continent.	
	By basic process.	By other processes.	By basic process.	By other processes.
1878.....	20	983,000	.....	.....
1879.....	.....	.....	50	1,443,000
1880.....	10,000	1,285,382	40,000	1,827,000
1882.....	100,364	2,000,285	.....	.....
1883.....	.....	.....	511,993	1,998,000
1885.....	145,707	1,742,358	.....	.....
1886.....	.....	.....	1,055,165	1,410,000
1888.....	408,046	2,896,942	1,554,640	1,733,000
1890.....	503,400	3,075,643	2,021,903	1,140,000

In England the process was first adopted by Bolckow, Vaughan & Co., who agreed to work it on the conditions that they were given a one-third share in the English patents and what practically amounted to a free license. The patentees later on formed the Northeastern Steel Company, but it was not until 1885 that that company was able to do business on a remunerative scale. In 1882 it was thought advisable, for reasons of convenience, that the various interests in the patents should be represented by a specially-formed limited company, and therefore the Dephosphorising and Basic Patents Company, Limited, was formed, with a nominal capital of £30,000, divided into 3,000 shares of £10 each, of which 2,400 shares were allotted to those interested, and the nominal sum of 6d. per share was called up. Miss Lillian Thomas, the executrix and sole legatee of her brother, Sidney Gilchrist Thomas, holds 837 shares, and Mr. Percy C. Gilchrist 203 shares, but the beneficial interest in the two holdings belongs equally to the two holders.

The petition then states that, in order to procure money for the purpose of starting the process in England, the original patentees, (viz., Messrs.

Thomas and Gilchrist) found themselves obliged to part with their rights in Germany, Luxembourg, and the United States for about £60,000, the bulk of which was used for working the invention and assisting in the formation of the Northeastern Steel Company. Bolckow, Vaughan & Co., Brown, Bayley & Dixon, the Blaenavon Company, and the Dowlais Company were granted licenses free from royalties by the late S. G. Thomas. The total net profits realized from the patents were \$520,500. Mr. Gilchrist estimates the present value of the stock at \$310,000, and it yielded in 1891, \$35,750 in interest and dividends.

#### LIMITATIONS OF ELECTRIC POWER TRANSMISSION.\*

By A. Saunders Morris.

In planning an electric power transmission plant, care must be taken to select a type of motor best suited to the work to be done. The motor having the best starting torque is the direct current series wound motor, but its speed will vary inversely as the load. If a direct current motor and constant speed is required, the compound wound is the best; if alternating current is preferred, the synchronous motor is the best to use. Where low starting torque is not objectionable, the single phase may be used; for high starting torque the synchronous multiple phase may be used to good advantage. This must be considered only as a very general statement of the problem.

The allowable expenditures for copper conductor will largely determine the electro-motive force which may be used, and the general efficiency of the plant required will determine the line loss. This, as well as other conditions, will largely determine whether direct or alternating current is advisable. The practical limit of electro-motive force on direct current is reached at about 1,000 volts, for beyond this point the commutator begins to be troublesome.

With alternating currents, however, the voltage may be carried to 5,000 volts, and even higher if raising and lowering converters are used, so that the potential on moving machinery may be kept down to a moderate figure. Alternating current motors do not in general require a commutator subjected to the high voltage used on the line, but, instead, have two or more solid rings or collectors, by which means sparking is entirely avoided.

The efficiency of direct and alternating current motors and generators is about the same, and may be taken at 90% as an average figure. The efficiency of the line will vary in practice from 75% to 95%, which will give a plant efficiency, reckoned from the generator pulley to the motor pulley, of 61% to 77%. One of the advantages of electrical transmission is that the plant efficiency remains almost constant for wide variations of load, for, as the motor and generator efficiencies decrease, the line efficiency increases.

An alternating current plant in Colorado ran for almost 3,000 hours, with interruptions due to trouble in the transmission plant aggregating only 30 hours, or about 1%. One-half of this delay was for inspection of the line and building a crane to lift out the armature. The electro-motive force at the motor is 3,000 volts, and, according to last accounts, the plant was giving excellent satisfaction.

The design of a power transmission plant should involve consideration of (1) general nature of work to be done, (2) value of power at delivery and cost at generating station, (3) interest, depreciations, etc., of plant, (4) losses in transmission, (5) voltage allowable. It will be seen from this that the problem is a very complex one, involving several variables, which are largely dependent on each other.

**Magnesium-Copper.**—Mons. Mouchel has invented a new method of alloying pure copper with magnesium, says *Iron*, of which the following are particulars:—The copper is smelted with magnesium or materials capable of producing it by chemical reaction—that is to say, the magnesium can be itself pure or mixed with other substances. The main point is that at the end of the operation the copper contains magnesium. The metal thus obtained is afterward treated by the usual methods according to the application proposed. The addition of the magnesium to the copper imparts to this metal considerable tenacity and a certain hardness without altering its other properties, making it specially suitable for telegraph or telephone wires, conductors made of magnesium-copper being of great mechanical resistance and offering the minimum of electrical resistance.

**Heat and Light Phenomena Accompanying Electrolysis.**—At a recent meeting of the Brussels Academy of Sciences a note was read by P. J. Van Beneden, on the study of heat and light phenomena accompanying electrolysis. In an electrolyte of dilute sulphuric acid, a positive electrode having an area of 180 sq. cm. was immersed, while the negative electrode consisted of a wire of copper 0.25 mm. in diameter, submerged to a depth of 0.5 mm. below the level of the liquid. On passing a current from accumulators through the electrolyte the ordinary phenomena of electrolysis were observed. When the electromotive force was increased a kind of decrepitation resembling the fizzing noise which is heard when drops of water fall on a hot metal plate, was produced at the negative electrode. The liquid about this electrode appeared to be in a state of ebullition. The phenomena increased in distinctness as the difference of potential between the negative electrode and a point in the liquid 3 mm. from it approached 16 volts. At intervals when the difference of potential had reached 16 volts a number of luminous points were produced between the electrode and the liquid, and their frequency was found to increase with the difference of potential. The author has studied the phenomena, using electrodes of Pt, Cu, Zn, Sn, Fe and C of different dimensions, electrolytes of different degrees of dilution and different natures. He finds, among other things, that the phenomena commence when the electromotive force is the same (for a given degree of acidity) whatever the nature of the electrolyte. The intensity of the current increases, *ceteris paribus*, with the sections of the electrodes, and varies with the nature of the electrode. For the same degree of acidity, the same electrode and the same amount of immersed surface, the intensity of the current tends to remain constant, although the electromotive force varied from 76 to 98 volts.

\* Abstract of a paper read before the Engineers' Club of Philadelphia, February 20th, 1892.

## THE ORE DEPOSITS OF CREEDE AND THEIR POSSIBILITIES.

Written for the Engineering and Mining Journal by Edmund B. Kirby, M. E.

The new mining camp of Creede, Colo., is now attracting widespread interest, not only in that State but over the country at large, so that a brief account of its mineral deposits and their probable future will be of interest. In the latter part of September last I was engaged in professional work that involved an examination of the geology and ore deposits of this camp. I was able to devote seven or eight days to this examination, which was immediately followed September 26th. by a heavy fall of snow—the first of the season. Ever since that time the surface has been heavily covered with snow, to such an extent that it conceals many of the geological features and has made prospecting very difficult. Further examinations by myself or others have been almost impracticable under these circumstances, so there has been no opportunity to add anything of importance to these observations nor occasion to modify the conclusions then drawn.

The main town of Creede, formerly known as Jimtown, and now the scene of wild real estate excitement, is in Saguache County, twelve miles from Wagon Wheel Gap, and at the point where the cañon of Willow Creek, a northern tributary of the Rio Grande, opens out into the broad valley of that river. Following the stream about three-quarters of a mile up the narrow cañon it forks into East and West Willow. Moses Mountain, the scene of the first discoveries, is the lower extremity of a spur-like ridge from the main range on the north, and stands between the two forks. It rises with sharp precipitous sides 1,000 ft. to 2,000 ft. above the streams, while on the west side of West Willow fork is the slope of Bachelor Mountain, the present center of excitement. The Bachelor Mountain mines are 4,200 ft. west of those on Moses Mountain, and both

Two systems of fissure veins have been developed in this formation. One system is constituted by partings or fissures that have been formed and filled in great number in the bedding planes, and, therefore, have a corresponding strike of 25° to 35° west of north and a southwest dip of 70° to 85°; while the second system of fissures has fractured the formation at a sharp angle into the bed edges, with a strike of 5° to 10° west of north and a west dip of 60° to 70°. So far no pay body of ore has been discovered in the first system of veins, although their number is very great; but in the second system four or perhaps three separate veins have been discovered, and upon these three are located the five paying mines of the district.

The Holy Moses vein is within one or two hundred feet of that bearing the Ridge and Ethel mines, while the Last Chance and Amethyst vein is 4,200 ft. west, over on Bachelor Mountain. The fourth vein, disclosed by the Bachelor mine, is supposed to be identical with the Last Chance and Amethyst vein. All have the same strike and dip, with most characteristics in common. The original fissures were narrow, from four to twelve inches in width, and are now filled with hard white quartz showing deposition from solution from the walls to the center. Before being so filled, however, the mineral solutions along the plane of the fissure have decomposed the trachyte walls, altering the rock and dissolving out many of its constituents. These have been replaced by the deposition of much quartz and some baryta; together with pyrites and silver minerals, such as argentite, proustite and other sulpho compounds.

As present developments are all within the oxidized zone near the surface they therefore exhibit a 4 to 12 in. band of hard vein quartz, containing crystals of pyrites, silver mineral and some galena, that, owing to its density, has been protected from oxidation; while adjoining this is the soft mineralized and silver-bearing wall rock, now a complex mass of



LOWER CREEDE, COLORADO.

groups are about two and a half miles north of the town and 1,500 ft. to 2,000 ft. above it.

The district is situated within the border of a great area of eruptive rock—an area remarkable for the vast scale on which eruptive activity is displayed. At this place a great depth of eruptive rock deposited by successive flows, have been afterwards tilted upon edge so as to stand nearly vertical, and upon these upturned edges a very rugged topography has been carved by erosion. From Moses to Bachelor Mountain one may traverse over a mile of these exposed edges, and within this area they show quite a regular and uniform bedded structure with a southwest dip of 70° to 85°, and a strike 25° to 35° west of north.

The beds comprise a great variety of trachytes, differing greatly in color and appearance, and one variety changes into another, sometimes suddenly and often gradually. They have a rough, porous, microcrystalline matrix, sprinkled with numerous small crystals of sanidine feldspar, some biotite mica and plagioclase feldspar, and occasionally hornblende, chlorite, etc. The prevailing color of the matrix is a reddish brown of many shades, but a great variety of white, gray, pink and lilac colors are also shown in the numerous flows. Many of the beds are speckled or spotted with white spots or blotches of much the same texture as the brown matrix, but often one or two inches in diameter, perhaps caused by segregations of plagioclase feldspar that have become partly kaolinized. By the miners such beds are variously denominated as "spotted porphyry" or "birdseye porphyry."

A number of these beds in the center of the district are composed of rhyolite, showing a hard smooth matrix, generally brown in color, sprinkled with sanidine and plagioclase feldspar crystals, and marked with characteristic fluidal bands. No free silica, however, is apparent to the eye. Most of these trachytes and rhyolites weather in columnar form, with sharp slopes, jagged pinnacles and ledges, and steep bluffs and precipices. Masses of brecciated trachyte are quite frequent. The surface is bare of soil, thereby facilitating the work of prospectors.

altered and broken trachyte, and clay cemented by silica and some baryta, that have been deposited from solution. The mass is filled with a number of minerals that have been decomposed to oxidation products, and is colored in every shade of yellow, red and brown by iron oxides, green and blue by copper carbonates, and black by manganese oxide. These mineralized walls constitute the main ore bodies of the mines, and in the Holy Moses mine are found 8 ft. to 20 ft. thick and so soft as to yield readily to the pick. It is generally the hanging wall that has been so mineralized, but in places both are silver bearing.

The quantity of silver in these large bodies is said to be 10 to 15 ozs. per ton, but large streaks and patches through the mass are high grade, bearing 50 to 100 ozs. per ton, and these constitute the shipments sent to market. This pay ore is distinguished from the mass only by assay. It is nearly free from lead and gold. The quartz streak is said to be low in silver, so the mining is mainly the development of the high grade ore streaks in the soft hanging wall.

The Holy Moses Company has explored an area about 225 ft. deep and 400 ft. horizontally along its vein. It has shipped up to March 1 a total of about 875 tons of ore ranging from \$50 to \$80 per ton in value, and is said to have quantities of ore now developed. No other mine has been discovered upon this vein.

Within 200 ft. of the supposed course of the Moses vein is the parallel vein upon which the Ethel and the Ridge mines are located, at a distance of 2,900 ft. and 1,800 ft. south of the Holy Moses mine. In this vein the rhyolite walls have been mineralized by the deposition of argentiferous galena, which in places forms ore bodies of considerable size, 3 ft. to 5 ft. thick, averaging high in lead. This galena is accompanied by some zinc blende and pyrite. The vein is understood to average 30% to 40% lead and 3 oz. to 6 oz. silver per ton; but this is sorted so as to make the shipments 50% to 60% lead and 4 oz. to 8 oz. silver. Oxidation has extended but a few feet from the surface. The Ethel mine has explored the vein for some 200 ft. in depth and for several hundred feet horizontally. Its total

shipments up to March 1st have been about 450 tons of the above grade. The Ridge at a depth of 100 ft. has drifted horizontally about 30 ft. on the vein, and will begin shipments in a few weeks. Both mines, though 1,100 ft. apart, show the same characteristics, and expose good bodies of this low grade galena.

From the third parallel vein, 4,200 ft. west, over on Bachelor Mountain, the heaviest shipments of the district are now being made from the Last Chance and the adjoining Amethyst mine. Here the quartz filling of the original fissure has been tinted a rose-violet by manganese oxide, whence the name of Amethyst. The mineralization of the wall in this vein seems to be more uniform in thickness and grade than in the others, so that from the surface down there has been a continuous body of ore 3 ft. to 5 ft. thick, and averaging \$90 to \$130 per ton in silver. Like the Holy Moses ore, it contains no lead. The Amethyst has developed the vein to a depth of about 110 ft. horizontally, while its total shipments up to March 1 approximate 2,700 tons of about \$100 average value per ton. The Last Chance workings, about 800 ft. south, are about 90 ft. deep and 400 ft. along the vein. The total shipments to March 1 are about 4,300 tons, ranging from \$90 to \$130 per ton in value. The Bachelor mine exposes a fourth vein of this system, about 3,500 ft. south of the Last Chance, and is claimed to be the extension of the same vein. The ore has been narrow and low in grade, but it is just announced that they have exposed a 5 ft. width of \$50 to \$60 ore. In many claims the discovery of extensions of the three pay veins is announced, but in nearly every case it is a vein of the first system that has been uncovered, and so far no pay bodies of ore have been found in the district other than those above described.

The Mammoth vein, one and three-quarter miles southeast of the Holy Moses, has been worked for the past year on the strength of a small and uncertain streak of high grade ore, often assaying as much as 1,000 oz. of silver per ton. It was not visited, owing to its distance and the fact that it is unproductive.

The present rate of shipment from the district is 150 to 175 tons daily; 100 tons of this being from the Last Chance and the rest from the Amethyst, Holy Moses, and Ethel in the order named. This is a remarkable record and justifies large expectations for the future.

The veins of the first system in the bedding planes of the trachyte and rhyolite beds, are very numerous and seem to abound over the entire district. They appear both in and between the various flows, which display frequent and very regular bedding planes; and many of these veins show one to six inches of the hard vein quartz in tight barren walls. Others, however, in addition to the quartz vein, show one wall decomposed and replaced as in the second system, so as to make a vein several feet thick. Unfortunately the silver contents are found to be low or nothing, notwithstanding the large number of these veins that have been exposed. A distinction between the two systems is therefore of great importance to the many investors who are now buying claims located upon these bedding plane veins. Their resemblances in form and filling to those of the other system and the slight differences in direction, are now misleading many people who suppose they have opened extensions of the three pay mines.

There is no geological reason apparent why some of these first system veins should not contain as good ore bodies as those of the other system, but the presumption so far is against them. It is to be noted, however, that few of these veins have been opened more than 10 ft. deep, and it is possible the silver compounds in the form of sulphide have been leached out more than usual from the oxidized parts near the surface. The deepest shaft on this system is one 30 ft. deep, which shows an ore body of some size, with a regular increase of assay value from nothing at the surface to 5 oz. to 8 oz. of silver per ton at the bottom; so that further developments of this kind may lead to encouraging discoveries.

The surface of both mountains is covered with locations, most of them based upon a 10-ft. hole in the wash or in the barren rock, without either vein or ore, and all these are consequently absolutely void under the law; but notwithstanding this fact a number of such claims are being purchased for large sums in cash. Many valid locations, however, have been made by uncovering one of the numerous first system veins, and many sales are being made of these claims.

The short period of five months, in a winter with heavy snow fall, has seen the advent of the railroad, the shipment of some 8,300 tons of high grade ore, and a rush to the district that has changed the population from two or three hundred to six or seven thousand men. No new discovery of pay ore has been proven in this time, but under the efforts of boomers real estate speculation in the town has reached fantastic proportions. Lots worth \$10 to \$25 last summer are now selling for \$2,500 cash, while town lots are being sold over an area sufficient for a city and reaching from the mouth of Willow Cañon well over the broad valley of the Rio Grande, here some two miles wide. Only a remarkable and improbable number of genuine new discoveries this summer can prevent a speedy collapse of this insane inflation. The loss will fall chiefly upon the Eastern investors and "tenderfeet" who will become the final lot owners; but it will none the less react in inevitable injury to the genuine mining and real estate interests of Colorado.

A second Leadville or Aspen at this point is absolutely out of the question, and there is no basis for a real estate boom of such excessive proportions. There is enough real merit without exaggeration. The district is remarkable, and its mines have a sound basis for prosperity; but the real work of development will begin in six or eight weeks when the snow disappears. There are most attractive opportunities for careful prospecting, and with several thousand men turned loose over the hills there should be a number of discoveries this season. It is very improbable that the breaking force which caused the three pay fissure veins one mile distant from each other has not also made other like fissures in this and the adjoining area.

It is important to notice that the soft mineralized wall rock constituting the valuable ore is so friable that it weathers into unrecognizable dust at the surface, and the only float to be found are the pieces of the hard quartz streak. These are of honeycombed vein-quartz, stained yellow, red and brown with iron oxides and assaying low in silver. The extensions of the three veins are also to be developed, and as the intersection of each vein plane with the irregular ground surface produces a very irregular line of outcrop, there is need of intelligent and industrious prospecting to discover its location.

The chemical and physical character of the bed through which a fis-

sure chances to pass will affect the ore deposition, and as the beds vary much in character, the same vein traversing several beds may bear larger ore bodies in one and be barren in others, but developments have not yet thrown light on this point. Some of the Carboniferous limestones underlying the eruptive flows appear below the town along the north side of the Rio Grande Valley, and much prospecting is being done along this line of contact by Leadville and Aspen miners, always eager for a contact. Nothing has been found so far to indicate ore bodies, but it is hoped more work will result in discoveries.

**Wire Glass.**—Under the name of wire glass a new invention has been brought on the market by a Dresden firm, the *Actien-Gesellschaft für Glasindustrie vorm. Friedr. Siemens*, says *Iron*, which marks an important development in the glass-making industry. The process of manufacture consists in furnishing glass in a hot plastic condition with a flexible metallic layer, iron wire netting, for instance, which is completely inclosed by the vitreous substance and effectively protected against exterior influences, as rust, etc. The new glass possesses much greater resisting power than the ordinary material and is, it is claimed, indifferent to the most abrupt changes of temperature. A proof of its toughness and durability is the fact that it may, in a highly heated state, be sprinkled with cold water without being materially damaged. The glass is specially adapted for skylights, the powerful resisting qualities of the material enabling the usual wire protectors to be dispensed with. As wire glass cannot be cut by the diamond, except under the application of great force, and cannot be broken without creating considerable noise, the substance is claimed to be, in a measure, burglar proof. Wire glass has also been successfully applied to the manufacture of hollow glassware, it being particularly suitable for making glass vessels which have to withstand a high pressure or be subjected to rough usage. The new material is at present being manufactured in sheets of 8 mm. thickness and upwards.

**Improvements in the Manufacture of Alumina.**—J. A. Bradburn and J. D. Pennock, of Syracuse, N. Y., have devised a new method of preparing alumina. The object of this invention is the manufacture of alumina from bauxite, preferably from that variety of the mineral which contains the iron in the ferric state and is contaminated with little or no organic matter. The difficulties connected with "art of obtaining alumina from ferrous bauxite" are overcome by mixing the ground mineral with a solution of bleaching powder and passing carbonic acid through the mass; the chlorine thus liberated oxidizes the iron and organic matter. The bauxite is then digested with a caustic soda solution containing, say, 150 grms. of  $\text{Na}_2\text{O}$  per litre, which extracts the bulk of the alumina. The solution is filtered off. Should the residue contain a paying quantity of alumina, it is heated with  $\frac{1}{2}$  to  $\frac{1}{4}$  parts of sodium carbonate, and the resulting mass lixiviated with the sodium aluminate solution previously obtained. The resulting tank liquor has a turbid appearance, which is due to iron in suspension; it may be clarified by the addition of milk of lime, the gelatinous precipitate of hydrated alumina thus produced carrying down the iron with it. The filtered and heated liquor is now precipitated with sodium bicarbonate, and after washing the alumina "with a reasonable amount of water," it is heated with a solution of ammonium chloride, which converts the soda into common salt. This is easily washed out, and the pure alumina is then filtered, dried and calcined.

**Metallic Hydrosulphides.**—Messrs. S. E. Linder and H. Picton have investigated the sulphides of copper, mercury, arsenic, antimony, cadmium, zinc, bismuth, silver, indium and gold, and the results of their work is given in *Proc. of the Chemical Society*, 1891-92, p. 176. With the single exception of bismuth, all these metals form hydrosulphides of a more or less complicated character, which, in most cases, undergo molecular condensation with elimination of sulphureted hydrogen when submitted to the action of acids. Taking copper as a type, on treatment with sulphureted hydrogen, copper hydrate forms a solution of the hydrosulphide  $7\text{CuS} \cdot \text{H}_2\text{S}$ . Acetic acid, in presence of excess of sulphureted hydrogen, promotes molecular condensation, a product being formed which has approximately the composition  $9\text{CuS} \cdot \text{H}_2\text{S}$ ; while acetic acid, in absence of sulphureted hydrogen, promotes the formation of a product approximately represented by the formula  $22\text{CuS} \cdot \text{H}_2\text{S}$ . Hydrochloric acid produces still further condensation. Mercuric sulphide forms products approximately represented by the formulae  $31\text{AgS} \cdot \text{H}_2\text{S}$ ;  $62\text{HgS} \cdot \text{H}_2\text{S}$ . The latter formula represents the precipitate formed in presence of acid, and is a remarkably stable substance. Zinc sulphide solution obtained from the hydrate contains about 14% excess of sulphur as sulphureted hydrogen; in presence of acetic acid, a product represented approximately by the formula  $12\text{ZnS} \cdot \text{H}_2\text{S}$  is formed. The authors regard their results as evidence tending to support the conclusions that the metallic sulphides are in most cases polymerides of very high molecular weight.

**The Pogonip Fog.**—The city of Carson, Nev., experienced the other evening the thickest and coldest pogonip fog in the memory of the oldest inhabitant," says a writer in a recent issue of the *Evening Post*. The pogonip fog is peculiar to elevated altitudes in the Nevada Sierras. It ascends from the valleys, and its chill embrace is so much feared by the Indians, who are predisposed to affections of the lungs, that they change their camp if apprised by the atmospheric conditions that the dreaded fog is approaching. Mr. Ogden, a chemist of the Nevada Mining Bureau, furnishes this pleasing description of the pogonip: "In the White Pine Mountains, the Toyabi, the Hyko and the Pahranagat ranges it is quite common to see the trees, houses and everything out in the open gradually become white without any apparent cause. There is no perceptible fog, but the hot air from the valleys gradually ascends up the mountain-side, and becoming crystallized, the minute crystals attach themselves to anything in sight. This phenomenon affects human beings in just the same manner, and when the fog passes by the frozen particles will adhere to the hair and clothing, producing a very grotesque effect. Hot Creek Valley is situated right in the center of the mining district, and is so called because of the warm springs that are always to be found there. These springs cause a pogonip in that district every night, and for this reason. The wind in the valley always blows from one direction in the daytime, and after sunset it invariably blows from the opposite point. The effect of the cooler air passing over the hot valley is to force the heated air to rise. When it reaches a temperature of about 25° the result is a pogonip."

CANADIAN PLATINUM.\*

By J. T. Donald, M. A.

It has long been known that platinum had been found in the Province of Quebec. In the Report of the Geological Survey for 1851-52 it is stated that Dr. Hunt had detected native platinum in some of the gold washings of the Chaudière district. In the Province of Ontario platinum has been discovered in the Sudbury district. It there occurs in combination with arsenic, forming the mineral sperrylite, which is of great interest, as it is "the first mineral yet found containing platinum as an important constituent other than the natural alloys with various metals of the platinum group." So far as can be learned, no effort has yet been made to utilize sperrylite as a source of platinum, but at present it brings a high price as a mineralogical curiosity.

Canadian platinum ore, as a commercial article, is entirely the product of British Columbia. In association with alluvial gold it has been met with in a number of the streams of that Province. At present the most important platinum-bearing district of British Columbia, as well, indeed, as of North America, is that of the Tulameen or North Fork of the Similkameen River. Placer mining in this district yields both gold and platinum, the latter being found, like the gold, in grains and small nuggets. A notable quantity of platinum has already been obtained from this district. One firm in the United States claims to have purchased within the last year or two fully 2,000 ozs. of British Columbia platinum, and it is well known that a portion of the yield of this district has found its way to the London market.

An increased output may be expected, as the Tulameen Hydraulic and Improvement Company has made preparations to begin hydraulic mining on a large scale with the advent of spring. Mr. R. G. Tatlow, a member of this company, informs me that his company has erected a saw mill, having a capacity of 5,000 ft. per diem, and has constructed about two miles of flume, 5 ft. at base, 20 in. high, on sills placed on solid bed about 7 ft. wide, and having a grade of 1/4 in. in 12 ft. The water is taken from Eagle Creek, about 14 miles above Granite Creek, the only creek capable of giving the necessary quantity of water and pressure. In addition to this flume, the company has on the ground and ready for work about 400 ft. of iron pipe and a monitor, which, where work is to be commenced, will work with a pressure of 900 miners' inches and a drop of about 160 ft. Mr. Tatlow also states that the largest yield of platinum appears to have been in the vicinity of and below Eagle Creek, where the yield has been about two parts of gold to one of platinum.

Two samples of this Tulameen ore contained 89.28% and 72% platinum. It is really a very complex alloy of platinum with a number of the comparatively rare metals of this group, such as palladium, iridium, and notably an alloy of osmium and iridium, known as osmiridium, which, in grains of proper size and form, is used for pen points. This ore is worth to-day about \$5.50 per oz. troy. The price is very unsteady, being determined by the demand for the metal and by the state of affairs in Russia, the principal producer of the ore.

An interesting statement in connection with the metallurgy of platinum was made by the president of the chemical section of the British Association at the meeting of last year. It is to the effect that one firm of refiners in London have such facilities that 2 1/2 cwts. of platinum may be melted in a single charge, and that the same firm, in a single operation, extracted a mass of palladium valued at £30,000 from gold-platinum ore actually worth more than a million sterling!

THE SIEMENS ELECTROLYTIC PROCESS FOR THE EXTRACTION OF COPPER FROM ITS ORES.

The following description of the Siemens process for the extraction of copper directly from its ores is a translation from a pamphlet issued by Messrs. Siemens & Halske, of Berlin, Germany. The estimates given at the end of this article are based on German prices. The mark is equivalent to 23.8 cents.

At many mines now in operation, as well as in many ore deposits not yet worked, there are ores which, on account of their low grade or the cost of fuel, cannot be worked economically by a smelting process. The wet methods of copper winning which have been introduced require a difficult roasting of the ore, extraction of the copper by means of acids, and its subsequent precipitation with iron, etc. After this a smelting process for the winning of fine copper is still necessary. This method is a tedious one, and the amount of copper remaining in the residue is usually very great. By the electrolytic method of extracting copper directly from its ores, hereafter to be described, no smelting process is necessary and the metal is won, directly, chemically pure. The time required is but about ten hours, and the amount of copper remaining in the residue is but from 1/10% to 1/5%, whether the ore is rich or poor. The chief requisite for an installation of this process is mechanical power, and if there is water power it can be used to great advantage. At the works of Siemens & Halske, at Martinikenfelde-Berlin, a large copper plant using this method has been in uninterrupted operation since June, 1890, during which time ores of various kinds have been worked.

Copper has hitherto been extracted from its ores in the electrolytic way by using as anodes either plates of impure copper or copper matte. The copper was then dissolved from the anode and precipitated galvanically at the cathode. Only a part of the electric current was utilized, however, for dissolving the copper, the solution soon became poor in copper and had to be replaced by a new solution, the formation of which from the ores was attended with expense and difficulty. Moreover, the use of copper matte for the anodes required a previous smelting of the roasted ore, which forms one of the costly parts of winning copper in the ordinary manner. Finally, the casting of the anode plates is difficult and uncertain, and the electrolytic process itself is interfered with by the falling to pieces of the anodes before their complete solution.

Soluble anodes are, however, necessary in the ordinary electrolytic process, because the use of insoluble anodes leads to strong polarization whereby the useful work of the electric current is reduced in very great measure. In the Siemens method this evil is overcome by adding to the decomposing copper-carrying solution another solution, which takes up

\* From a paper read before the General Mining Association of the Province of Quebec, January 13th, 1892.

the oxygen set free at an insoluble anode, and thereby lessens the polarization. For such a depolarizing solution ferrous sulphate is used, which is changed, by the oxygen set free at the anode, into ferric sulphate. A lixiviant for the copper in the ore is thus obtained, at the same time, as ferric sulphate is capable of dissolving metallic copper, as well as the sulphides of copper.

Instead of the iron sulphates the chlorides, ferrous and ferric, were formerly used with similar results. In this method, however, there were insuperable practical difficulties, so that it was abandoned. The method of Dr. Höpfner differs essentially from the Siemens, only in that no iron salts are used, but cuprous and cupric chlorides instead; besides the construction of the apparatus is different. The electrolyte used in the Siemens method consists of a solution of ferrous and cupric sulphates, with the addition of some free sulphuric acid to increase its conductivity. This liquid is continually added to the cathode chamber, where a portion of the copper is deposited by the electric current, after which the liquor passes down into the anode chamber, and is finally drawn off at the bottom of the latter.

During this passage downward the ferrous sulphate is changed into basic ferric sulphate; then by the action of the free sulphuric acid, coming from the decomposition of the cupric sulphate it is changed into neutral ferric sulphate, which by its greater specific gravity sinks down to the carbon rods or plates of which the anode is composed. The liquor drawn off has thus become poor in copper and consists of a solution of neutral ferric sulphate. This solution has the property of converting cuprous and cupric sulphides, as well as metallic copper, into cupric sulphate. The ferric sulphate is thereby reconverted into ferrous sulphate, while the oxygen set free oxidizes the copper.\* This oxidation and solu-

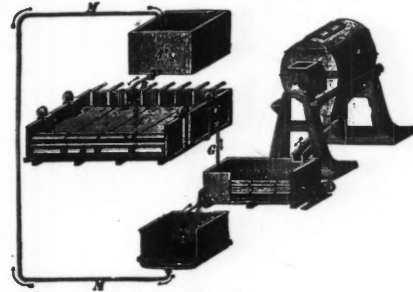


FIG. 5.

- A. Solution vat (cupric sulphate and ferrous sulphate).
- B. Feed pipe (cupric sulphate and ferrous sulphate).
- C. Bath (electrolytic decomposition cell); *k*, cathode chamber; *b*, anode chamber.
- D. Discharge pipe (ferric sulphate).
- E. Ball mill.
- F. Ore launder to leaching vat.
- G. Conduit to leaching vat (ferric sulphate).
- H. Leaching vat (ferric sulphate and ore).
- I. Discharge from leaching vat (ore, cupric sulphate and ferrous sulphate).
- K. Filter.
- M. Filtrate conduit (cupric sulphate and ferrous sulphate).

tion of the copper can be completely carried out with many finely pulverized sulphide ores, even in an unroasted condition, by use of a solution moderately heated. With other ores, however, a moderate roasting of the pulp, by which the copper compounds are converted essentially into cuprous sulphide, must precede the solution of the copper.

The lixiviation of the pulverized ore by means of the decopperized and oxidized liquor is performed in long, narrow, shallow wooden troughs, in which the pulp is kept suspended by means of stirrers. The liquor coming from the electric cells is continually fed at the head of the trough, mixed

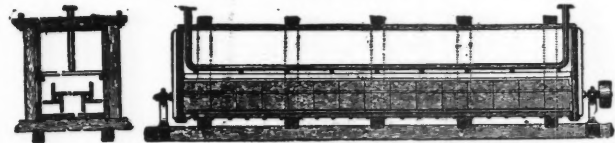


FIG. 6.

with the necessary amount of pulp, and leaves the trough with the decopperized pulp at the other end. The solution is hastened, if necessary, by heating the lixiviant by means of a steam-pipe lying in the trough. The leached pulp is separated from the solution either by settling or by a filtration apparatus. The solution has now become rich in copper and deoxidized, and is fed anew to the electric apparatus. Thus is constituted a continuous process between the leaching of the ore and the electrolysis of the solution, the lixiviant being produced electrically in the decomposition cells and the electrolyte regenerated chemically by the solution of the copper in the ores. The general scheme of the process is shown in Fig. 5.

For the successful operation of this process it is necessary that it be carried on continuously night and day. The dynamo should be driven by its own motor in order to secure the most even possible running. The shallow baths (decomposition cells, -C, Fig. 5)—are most advantageously placed on the same floor, and only if cramped for room should they be arranged one above the other. Between each row of baths there should be a space wide enough for attendance. The copper carrying liquor is conducted to the baths through pipes from receiving basins (A, Fig. 5) standing higher than the baths. Each bath has its own feed pipe (B, Fig. 5), with a cock for regulating the flow of the liquor. The decopperized and oxidized liquor flowing from these baths passes directly into the leaching vat (H, Fig. 5) for the lixiviation of the ore. In order to avoid

\* Dr. W. Borchers in his *Electro-Metallurgie* (1891), gives the following reactions as taking place during this process:

- 1.  $x \text{H}_2\text{SO}_4 + 2 \text{CuSO}_4 + 4 \text{FeSO}_4 = 2 \text{Cu} + 2 \text{Fe}_2(\text{SO}_4)_3 + x \text{H}_2\text{SO}_4$
- 2a.  $x \text{H}_2\text{SO}_4 + \text{Cu}_2\text{S} + 2 \text{Fe}_2(\text{SO}_4)_3 = 2 \text{CuSO}_4 + \frac{1}{2} \text{Fe}_2\text{O}_3 + \text{S} + x \text{H}_2\text{SO}_4$
- b.  $\text{CuO} + \text{H}_2\text{SO}_4 = \text{CuSO}_4 + \text{H}_2\text{O}$
- c.  $3 \text{CuO} + \text{Fe}_2(\text{SO}_4)_3 = 3 \text{CuSO}_4 + \text{Fe}_2\text{O}_3$
- d.  $\text{CuO} + 2 \text{FeSO}_4 + \text{H}_2\text{O} = \text{CuSO}_4 + (\text{Fe}_2\text{O}_3 + \text{SO}^2) + \text{H}_2$

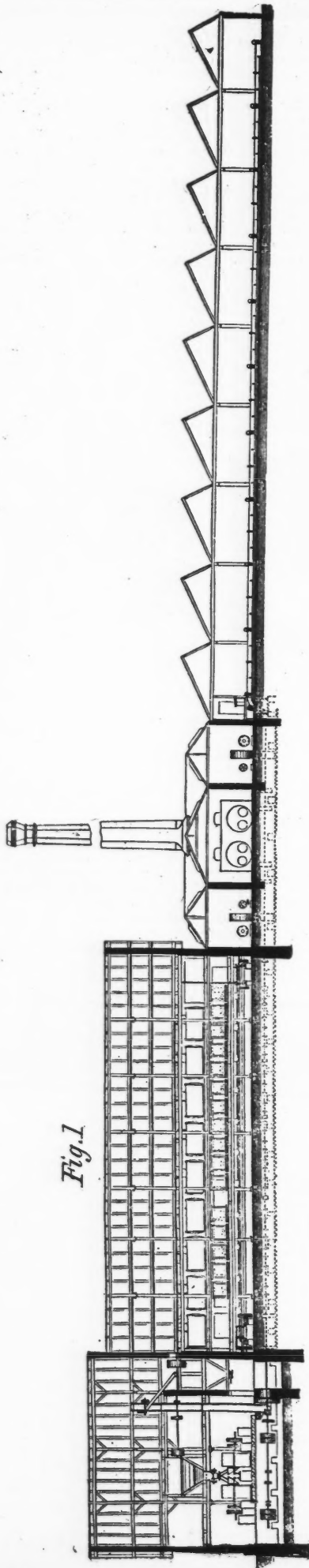


Fig. 1

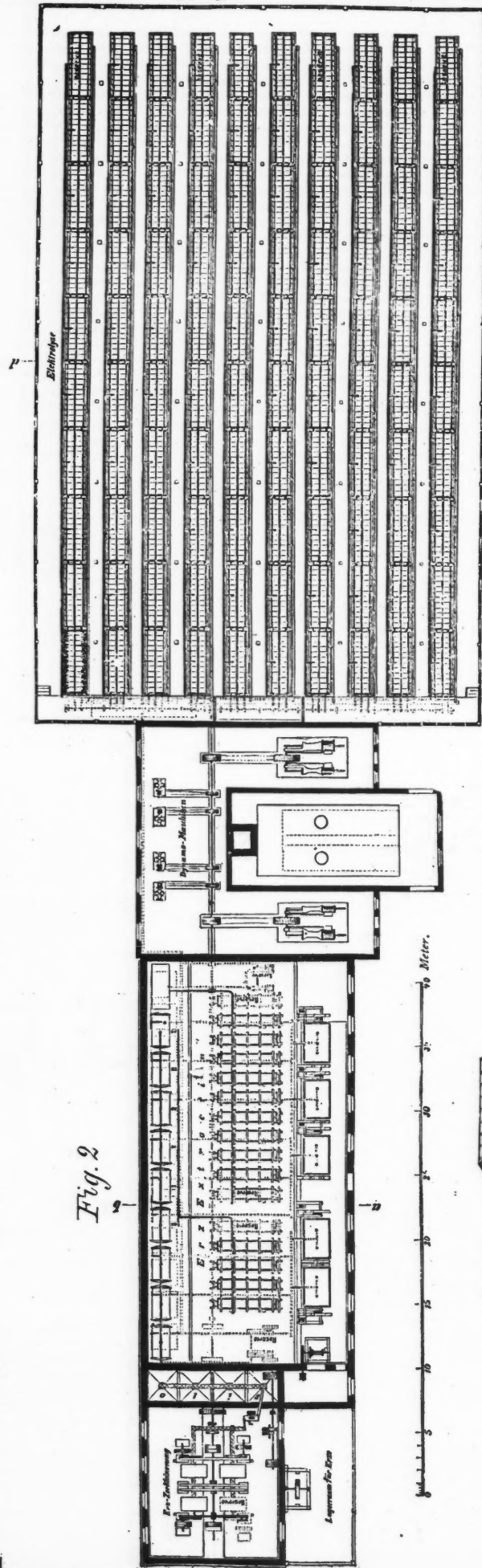


Fig. 2

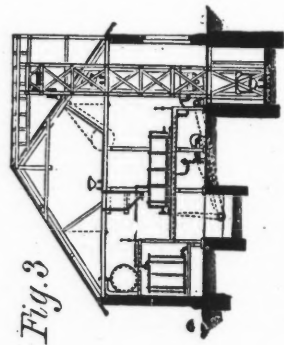


Fig. 3

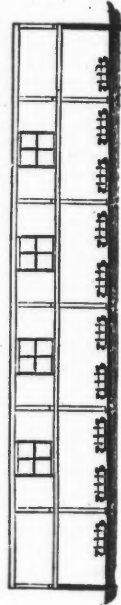


Fig. 4

Fig. 1.—Longitudinal section of works. Fig. 2.—Plan: Erz-Zerkleinerung, crushing machinery; Erz-Extraktion, leaching department; Dynamo-maschinen, dynamos; Elektrolyse, electrolytic department. Fig. 3.—Cross-section through a b. Fig. 4.—Cross-section through c d.

PLANS FOR A PLANT FOR THE PRODUCTION OF FINE COPPER PER 24 HOURS FROM ORES CONTAINING 4% TO 4 1/2% COPPER.



the necessity of pumping this liquor up again the last bath should stand higher than the leaching vat.

The leaching vats are wooden troughs 4½ m. long, ¾ m. wide and 1 m. deep, inside measurement, in which revolve two horizontal paddle wheels. The number of these vats is determined by the quantity of the ore to be worked. The ore is fed into the vats by screw conveyors, or similar apparatus. During the treatment of the ore with the lixiviant the latter is usually warmed to about 90° C. After the leaching is finished the decopperized ore and the solution are run into a filter (K, Fig. 5) where they are separated. The filters are placed on a lower level than the leaching vats. The dynamos, precipitating baths, leaching vats and crushing machinery are all placed in separate rooms. Of course, all parts of the apparatus with which the liquor comes in contact must be lined with lead or asphaltum.

The vats for the lixiviation of the ore and regeneration of the solution (Fig. 6) are wooden troughs lined with lead, 4½ metres long, ¾ of a metre wide and 1 metre deep, in the lower part of which are two horizontal four-cornered steel shafts covered with lead, upon which are fixed four wooden paddles which act as stirrers. The bearings and driving wheel of these axles are placed outside the box, the openings in the ends of the latter through which the axles work being packed in a peculiar manner. If it is necessary to heat the lixiviant a lead tube is placed above the stirrers as shown in the drawing.

The filters for the separation of the ore and the solution are vacuum filters, consisting of an upper box of wood lined with lead, which receives the mixed ore and solution, and a lower box likewise lined with lead, both separated by a grate on which is a perforated sheet of lead supporting the filtering medium. The lower box is connected with an air pump or similar vacuum apparatus. The whole filtering apparatus (Fig. 7) is supported on trunnions so that after the solution has been drawn off the ore collected in the upper box can be dumped.

The baths, or decomposition cells (Fig. 8), are usually wooden boxes lined inside with asphalt. On the bottoms of these boxes, which are inclined toward the discharge pipes for the decopperized liquor, lie the anodes. At a fixed distance above the latter is a linen filter, stretched on

following apparatus constructed at the proposed works: 100 wooden boxes (baths), 4,970 mm. long, 1,620 mm. wide, and 370 mm. deep, inside measurement, lined with asphalt; 5 wooden boxes, (leaching vats), of 2 cu. m. contents, lined with asphalt; about 500 m. of wooden launders, lined with asphalt, 100 mm. wide and 100 mm. deep; 1,200 wooden slabs, (cathodes), 1,520 mm. long, 400 mm. wide and 25 mm. thick, without the copper plates; 600 wooden gratings, (filters), 1.6 m. long, 0.815 m. wide, and 15 mm. thick, made of staves 25 mm. wide, together with 900 square metres of linen; 100 wooden gratings (stirring apparatus for the baths), 4,700 mm. long, 1,560 mm. wide, 20 mm. thick, made of staves 25 mm. wide.

The leaching plant consists of 16 wooden vats, with the stirring apparatus (Fig. 6) 4,500 mm. long, 750 mm. wide, and 1,000 mm. deep; one wooden vat, lined with asphalt, for fresh liquor, nine iron vacuum chambers of 3 cu. in. contents, lined with lead, for half-regenerated lixiviant, and three of the same size for regenerated lixiviant; 10 wooden settling basins, lined with asphalt, 2×2×2 metres, 100 wooden launders, 100 mm. × 200 mm.; vacuum pumps, stirring apparatus, pipe fittings, filters, etc. The power required for the leaching plant is estimated at 10 H.P.

The crushing machinery, figured in this estimate, consists of three patented ball mills, with a capacity of comminuting 25 tons of ore to the necessary size per 24 hours. The estimate also includes the conveyors, elevators and other appurtenances. For this part of the plant 45 H. P. is required.

The cost of producing 1,000 kilos. of fine copper per 24 hours, from 4%, 4½% ores, is estimated as follows: Interest on the capital invested in the plant (209,600 marks) at 5% per annum, 28.75 marks; amortization of plant, at 10%, 57.50 marks; motive power (130 H. P.) 62.40 marks; labor, 15 men, at 2 marks per man per day, 30 marks; interest on the copper in the baths, 10 marks; fuel for warming the lixiviant, 10 marks; general expense, superintendence, etc., 40 marks; total, 238.65 marks, exclusive of the cost of ore.

The cost of producing 1,000 kilos of fine copper from ores rich in copper, copper matte, with 35% Cu. for example, is estimated as follows: Interest on the capital invested in the plant (160,000 marks), at 5%, 22

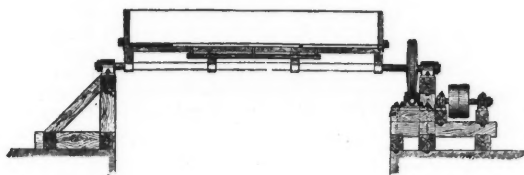


FIG. 7.—SECTION.

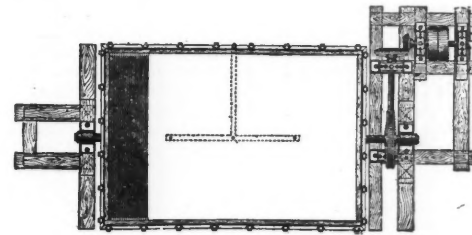


FIG. 7.—PLAN.

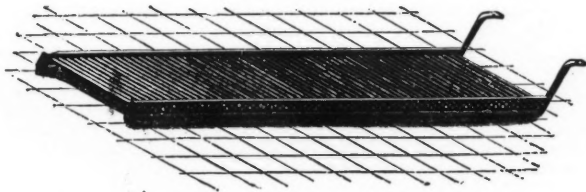


FIG. 9.



FIG. 8.

a wooden frame, which divides the bath, above and below, into two separate chambers—the cathode chamber and the anode chamber. In the cathode chamber covering the whole surface of the bath lie wooden plates or cathodes, whose under sides are covered with a thin sheet of copper, on which the copper of the electrolyte is deposited. Between the filter and the cathode plates works a stirring apparatus for the purpose of keeping the cathode liquid well mixed.

The anodes (Fig. 9) consist of round homogeneous rods of carbon prepared in a peculiar way, of which 233 are arranged in a lead casting in a system 1.9 metres long and .405 metre wide. The electrical connection is made through strips of lead attached to the end of the casting. By the peculiar method used for the preparation of this anode system the durability of the carbon, aside from mechanical wear, is claimed to be unlimited. Anodes of this kind which were in continuous use for a year showed absolutely no wear.

The baths or decomposition cells are made in three sizes corresponding to the strength of the current, viz.: About two square metres of cathode surface for 120 ampères; four square metres for 240 ampères and seven square metres for 400 ampères. The baths have an efficiency, measured in copper precipitated, of about 95% of the strength of the current. The following table shows the size and capacity of the baths:

Cathode surface in sq. metres.....	2	4	7
Length.....	1.85	3.5	5.15
Breadth.....	1.81	1.81	1.81
Height.....	0.45	0.45	0.45
Weight of anode, kilos ...	126.5	253	379.5
Yield in copper, per bath, per 24 hours, kilos .....	3.125	6.25	10.9

The cost of a plant for the production of 1,000 kilos. of pure copper per 24 hours, for ores containing from 4% to 4½% copper, not including buildings, motive power or foundations, is estimated as follows: Electrolytic plant, 115,308 marks; ore crushing plant, 31,152.50 marks; leaching plant, 61,140 marks; total, 209,600.50 marks. With ores rich in copper the cost of the crushing and leaching plants is less inversely, as the grade of the ore. The size and number of the electrolytic vats, etc., is the same, whether the ore is rich or poor.

In the above estimate the electrolytic plant includes dynamos, capable of precipitating 1,040 kilos. of copper per day, measuring instruments, conductors, 1,200 anodes (Fig. 9) and the fittings for 100 baths. Also the

marks; amortization, at 10%, 44 marks; motive power (85 H. P.), 40.80 marks; labor, 12 men at 2 marks, 24 marks; interest on copper in the baths, 10 marks; fuel for heating the lixiviant, 10 marks; general expenses, superintendence, etc., 35 marks; total, 185.80 marks.

**The Gold Output of De Kaap and Swaziland, South Africa, in 1891,** shows a great increase over 1890, amounting to 66,355 ounces against 48,382 ounces in the previous year.

**Liability for Death of Unskilled Workman.**—Where a person employs about dangerous work men who are not skilled in the work he must provide them with proper safeguards. A man was employed about dangerous work at a factory, in which he had no experience, under the direction of a competent master mechanic. The master mechanic left the work and placed in charge an unskilled man, and by reason of the use of improper tools and appliances an accident occurred and the workman was killed. The employer was liable in damages to his surviving family.—*McElligatt v. Randolph, Supreme Court of Errors of Connecticut, 22 At. Rep., 1094.*

**The Influence of Steam on Magnets.**—The influence of steam on magnets is the subject of an interesting note in the *Schweizerische Bauzeitung*, in which reference is made to the researches of Strouhal and Barus. These have shown that with long continued heating in steam magnets lose from 28% to 67% of their power. If, after this, the magnets are remagnetized and again exposed to the action of steam, only a very slight loss of magnetic power is found to take place. The experiments which have been made would seem to warrant the conclusion also, that after such treatment a magnet is less liable to deterioration from mechanical vibration as well as heat. In one of the experiments a short magnet was boiled in water for four hours. It was then magnetized and held in an atmosphere of steam for two hours more, after which its magnetic moment was measured. It was then subjected to 50 blows from a piece of wood, both transversely and longitudinally. Again measuring its magnetic moment, showed a loss of 1/10, and on repeating the hammering with the wooden bar the loss was 1/15 of the original moment. In view of this, repeated steaming and magnetizing is recommended as a good means of securing permanent magnetism in pieces of hard steel.

## FAILURES IN BOOMED TOWNS; FORT PAYNE, ALA. I.

Written for the Engineering and Mining Journal.

As an example of a town which has been boomed upon a complete basis of misrepresentation, probably Fort Payne, Ala., stands pre-eminent. Few places have been advertised more extensively or have been more talked about, and certainly none deserves more censure for loose methods of doing business and questionable statements concerning resources.

Fort Payne lies in the narrow Wills Valley between Lookout Mountain, and the first of the ridges to the west, and Sand Mountain, 51 miles south of Chattanooga and 91 miles north of Birmingham, Ala. Its only railroad connection is the Alabama Great Southern, and owing to the mountains and comparatively poor country on either side, it is not likely that any further roads will come in. The Wills Valley, in which the town is situated, was formerly fair farming soil, but continued growth of the same kind of crops without any addition of fertilizer, and the destruction of forests, allowing the heavy rains to wash away the top soil and expose the tough red clay beneath it, which is valueless as farm land, have greatly reduced its bearing value. In former years the mountains and hills in the country around were well timbered, but now little good wood remains within 20 miles.

All the details of the boom at Fort Payne cannot be secured, but its origin was much as follows: A number of persons secured options on large tracts of land in and around the place, and formed a development company. Falling to sell their stock or bonds, they secured the services of a well known "promoter" of Kansas City, who, after a cursory examination and also after having seen a report made upon the property by an engineer of eminent ability who condemned it throughout for the purposes proposed (and whose report, it is needless to say, has never been made public), took the matter to well known men in the New England States; with whose assistance he formed the Fort Payne Coal and Iron Company, capitalized at \$5,000,000, and purchased from the Development Company the property upon which it held the option, paying for it a good round sum—far more than its value.

The organizers of the Fort Payne Coal and Iron Company very shrewdly made it a point to first interest and secure the co-operation of various persons of political prominence in the New England States; these, in turn drew their friends in, many of whose names were considered almost a guarantee for the safety of an investment in the stock. People of small means who had, after years of hard labor, saved a few hundred dollars, invested all in this stock, expecting it soon to bring them a handsome return; many bought stock in enterprises established at Fort Payne; others bought lots; some moved there and opened stores. Almost without exception absolute reliance was placed in the men who were at the head of affairs. One man who went there and lost all in the general failure of the place said, "When I came down I could not see how they were going to make so much out of the property. I figured it out as well as I knew how and didn't see where the profit came in; but then everyone else said it was a good thing, the mining engineer, the chemist, the manager and all the officers; so I thought they knew their business better than I did, and accepted their word for all. I have paid well for my experience, and now have life to commence over after having passed the sixtieth post." This is only one instance in many, and out of the 1,800 stockholders of the company there are probably but few who have not been embarrassed by the loss in value of the stock.

The object of the parent Coal and Iron Company was to build a town and draw to it such industries as would be valuable, and to aid and encourage them; also to mine ore and coal and make coke. As in all of these boomed towns, the manufacture of iron formed the important feature, and its "natural advantages" were duly blazoned in crimson and gold, and formed the basis for many tempting estimates of enormous profits to be made in the future. The chemist who took samples states in a letter to the company that from the time the ore veins were first opened they have continued of unchanged excellence, the hard ore increasing from 2½ ft. where first opened to 8 ft. a few thousand feet away; that the brown ore was found to cover the whole side of the mountain near the furnace, and was several feet thick, requiring but little stripping to expose it; that the coal improved materially on being more fully opened, and the limestone was good from the start; concluding by saying, "I have never seen any mineral property show up any better, nor, of equal prospects, increase so rapidly in quality or in quantity, or of such uniform continuity of strata, with so few geological faults or disturbed rocks. Everything is in its proper place and uniform quality." Those who have not seen the place cannot appreciate the absurdity of these statements, and it is much to be regretted that the gentleman who made them has so clearly shown either his utter incapacity, or that he has stepped aside from that straight path which is the pride of professional men.

For many years farmers had secured from Lookout Mountain such coal as they required for family use; and at various times attempts have been made to mine for the market, but without exception these have been failures owing to the thin seams in which the coal occurred, its impurity and more than all the difficulty of mining caused by the many faults and great disturbances in the strata. Not content to profit by the experience of others in this matter, the company, through its manager, who was totally ignorant of anything pertaining to coal mining, selected an old opening on the top of the mountain nearly 10 miles away from the town, which, of course, necessitated the building of a railroad to enable it to ship the coal. Five entries were commenced at this place and run in all directions.

The average thickness of the seam is 18 in., though in places it is only 16 in., and again as high as 20 in. or 22 in. A small seam of fine slate from 4 in. to 6 in. thick runs with the coal at the bottom of the seam, and is, by the uninitiated, measured in with the latter. Above this seam lies another called the "wild-cat," from the fact that its habits are so irregular; it comes and goes and is thick or thin without any regard for the rules laid down by imaginative geologists. It sometimes attains a thickness of nearly 8 ins. but generally, when present, does not average above 4 in. In one place in the mines—and visitors are always shown this—the wild-cat seam comes within 6 in. of the main seam; a section through this as shown by the entry; is as follows: Top; 1. 8 in. coal, (wild-cat); II. 6 in. slate; III. 15 in. coal; IV. 2 in. slate; V. 3 in. coal; VI. 8 in. bottom slate; a total of 42 in., of which 26 in. is coal; but 50 ft. away the "wild-

cat" shoots upward and leaves but 17 in. of coal behind it in the seam proper.

The roof of the seam, so far as the entries have been extended, does not exceed 20 ft. in thickness; near the outcrop it is a broken and shaley sandstone, very rotten and difficult to support; but further in it changes to an exceedingly tough and compact sandstone which is very hard to drill. Through this roof there are many crevices extending to the soil on top, so that after a heavy rain the mine is flooded with water, and as the openings run with the dip a pump has to be kept in operation continually excepting during a very dry season. The floor of the mine undulates, thus adding to the difficulty in keeping it drained.

Under the coal lies the fire clay, which varies in thickness from 10 in. to 2 ft., and under this again comes sandstone. From the fact that this coal seam has been much disturbed geologically, and also saturated with water from the surface, the coal has but little coherence. With the most careful mining not above 30% lump can be secured, and after this has been exposed to the air for a short time, it also breaks down into small coal. These analyses show about the extremes and the average composition of the coal:

	Extremes		Average.
Volatile matter.....	22·25%	30·25%	24·87%
Fixed carbon.....	64·00%	56·40%	61·00%
Sulphur.....	3·16%	3·34%	2·92%
Ash.....	10·30%	13·00%	10·60%

The area of the coal field on Lookout Mountain has never been accurately ascertained, but whatever its extent may be, there are so many ravines cutting through it and such a multitude of faults that it cannot be considered of any commercial value so long as the large and regular fields, such as the Warrior, to the south, and Walden's Ridge and Sand Mountain, to the north and west, remain unexhausted. A part of this company's property lies on Sand Mountain and a few attempts have been made to expose the coal seams lying beneath it, but in every instance the test openings were made on a small seam which is half way up the side of the mountain and easily reached, and none on the thicker one, which is near the base, but heavily covered; indeed, it is doubtful if it would pay to go to the expense of even proving that the coal is there, as it would be necessary to build over eight miles of railroad across the ridges in order to bring it to market or to the coke ovens.

In a circular issued by the Fort Payne Coal and Iron Company it states that its coal (that on Lookout Mountain) is from 30 in. to 60 in. thick; that the mine has good drainage and dry roadways; that there is a large area of unbroken coal field which can be worked from the present openings, and that the diamond drill has shown this in several places. Further, it says that crossing Beeson's Gap the coal opens the same in quality, but thickens up to about 5 ft. These statements are misleading, as the fact is that while the diamond drill did show coal, it also showed that it was not thicker than 24 in. in any place, and in most of the holes not above 18 in. In no place on the mountain is there an opening of any kind which shows 5 ft. of coal or anything near it.

In reference to the iron ores found at Fort Payne, the Coal and Iron Company says:

"West of the city, running parallel to the Lookout and Sand Mountain ranges, is a series of ridges from 250 to 300 ft. in height. The ridge nearest the city is called Iron Mountain from the great quantity of iron ore contained in it. The above named ridges extend the whole length of the Wills Valley, being a section of a similar mineral belt extending from Birmingham on the south to Chattanooga on the north, and are practically one mass of iron ore, comprising the main ore deposit owned by the company. The seams of the richest ore vary from 3 ft. to 32 ft. in thickness, and lie in parallel strata separated by beds of sandstone and the clayey soil, which is red in color owing to the presence of a large per cent. of oxide of iron caused by infiltration of water from the ore. An analysis of some of this soil has given as high as 11% metallic iron."

"The iron mines now being developed are located on Iron Mountain. . . . On the east slope, at a distance of about 800 ft. from the Fort Payne Furnace Company's stock house, is opened and now operated the brown ore or limonite mine. This has been fully developed by stripping and by drift into the face of the ore, and is known to extend in a southerly direction 1,500 ft. before it goes beneath the surface. It also extends northerly to Mill Gap with a thickness at the drift of 24 ft. of good ore. The indications show very plainly that this thickness will be increased from 5 ft. to 10 ft. as it runs under the hill. A large body of this ore, enough to run the furnaces for years, can be used without washing. An analysis of the unwashed ore shows: Silica, 20·02%; metallic iron, 47·09%; phosphorus, 28%." (This is supposed to represent the run of the mine.)

"On the west side of Iron Mountain the red hematite ore has been fully developed to show five distinct veins of iron ore, varying in thickness at the outcrop from 3 ft. to 14 ft. The 3-ft. veins of ore increase in thickness as the drift extends into the mountain, some of them now showing a thickness of 7 ft. The red hematite belongs geologically to the fossil iron ores; an analysis of a sample of this ore obtained by boring through the thickness of the different veins shows: Metallic iron, 25·39%; silica, 4·11%; lime, 30·13%; carbonate of lime, 53·8%; phosphorus, 336%.

"This ore, though low in iron, is really a valuable one for the furnace, the high percentage of lime making it desirable for a flux. At the outcrop of the red hematite ores where it has been exposed to the elements, it is known as soft red ore and can be readily mined by stripping, and is of such good quality that it is economical to strip a foot of surface for every inch thickness of ore unless hard rock is encountered. An analysis of a sample of soft red ore, an average of all the veins as it will be delivered to the furnaces, shows: Metallic Iron, 53·34%; Silica, 10·37%; Lime, 1·07%; Phosphorus, 46%."

So says the company. If the statements made in these quotations were even nearly true there would be no doubt of the advantages of Fort Payne as a point for the manufacture of pig iron, but they are so entirely incorrect that it is considered worth while noticing them in order to show the extent to which they exaggerate the facts and avoid the truth.

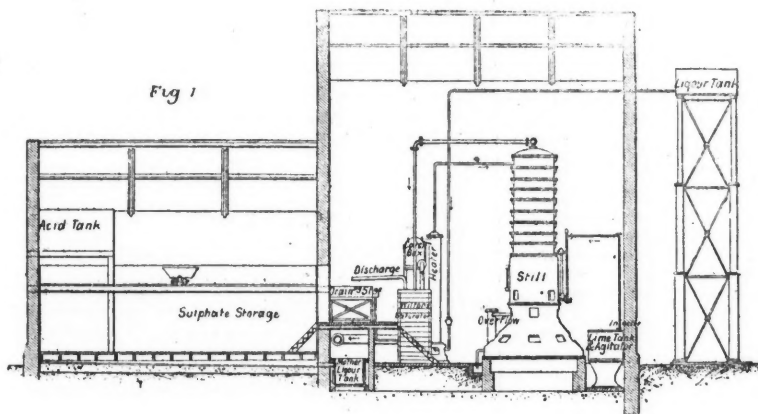
The brown ore mine referred to consists of a small space which has been stripped near the top of the hill, and from which probably 3,000 cu. yds. of ore, rock and clay have been removed; of this there were 500 tons of ore which was delivered to the Fort Payne Furnace Company and used in the furnace. The ore occurs, associated with chert, in a yellow clay in

which there are some boulders of limestone. In appearance it is dark and flinty; the lumps of ore all have small pieces of chert in them, some partially decomposed to a white and extremely fine sand; there is so much chert in the clay with the ore that it would be of very little advantage to wash it unless the most careful hand picking was also resorted to in order to separate the ore from this chert. Probably not over 10% of the material moved will be ore, and mixed with this is, of course, the chert. The various analyses made of this ore show it to contain from 31% to 50% iron, and 3% to 25% silica, depending entirely on the care taken in selecting the samples. An average sample taken from the stock-house at the furnace gave the following results, and may be taken as showing what the ore would yield as delivered to any furnace which could be induced to use it: Metallic iron, 31.08%; silica, 35.73%; phosphorus, .517%; which, of course, is worthless for making iron.

(To be continued.)

A SULPHATE OF AMMONIA PLANT.

The accompanying engraving, for which we are indebted to *Engineering*, illustrates a sulphate of ammonia plant designed by F. Livesey and built by Mr. Henry Simon for the South Metropolitan Gas Works, London. The process of manufacturing sulphate of ammonia combines three different features. 1. The distillation of the ammonia contained in the gas liquor. 2. The absorption of the ammonia gas in sulphuric acid. 3. The treatment of the waste or noxious gases evolved during the process of manufacture. The ammoniacal or gas liquor to be worked up is continuously pumped from the liquor well into an overhead tank, placed about 33 ft. above the ground level, whence it flows by gravity in a constant stream through liquor heaters (described below) into the top of the two ammonia stills. Each ammonia still is a self-contained and complete apparatus in itself, and consists of three essential parts; the lower, in which the volatile or free ammonia is driven off, the lime vessel in which the fixed ammonia compounds are decomposed and liberated, and the boiler in which, by means of a stepped cone and steam coil, the last



A SULPHATE OF AMMONIA PLANT.

portions of ammonia are expelled. The tower has a series of chambers fitted with internal trays and overflow pipes. The fresh gas liquor, entering at the top of the tower in a continuous flood, encounters the steam which travels in the opposite direction; as the liquor passes downward, gradually becoming poorer in ammonia, it always meets steam until it leaves the last chamber entirely free from its volatile ammonia compounds and enters through a by-pass to the liming vessel. Here a certain quantity of milk of lime is introduced and intimately mixed with the liquor by the action of the steam entering the lime vessel through numerous inverted pipes and keeping the liquor in constant ebullition.

The milk of lime is prepared in a large cast iron V-shaped tank, fitted with a steam agitator which keeps the milk constantly stirred up. The lime is supplied to the lime vessel by means of an injector. In the center of the lime vessel is a large overflow pipe forming the communication with the bottom part of the still, the boiler. In this there is arranged a stepped cone over which the liquor flows; in consequence of the increased area of each step the surface of the liquor in flowing downward becomes larger and larger, thus permitting the passing steam to act upon it very thoroughly and to set free the last traces of ammonia. The live steam is admitted through a perforated coil placed at the bottom of the cone. We have thus a current of ammonia mixed with steam continuously passing away from the top of the still, while the spent liquor flows off at the bottom through a hydraulic overflow pipe.

The absorption of the ammonia in sulphuric acid is effected in an apparatus called the saturator. It consists of a wooden closed tank lined internally with lead, containing diluted sulphuric acid into which the ammonia from the still is led. The ammonia readily unites with the acid, and after a certain time forms a salt (sulphate of ammonia), which deposits at the bottom of the tank in a well, from where it is lifted and discharged on a draining table by Wilton's patent automatic sulphate discharger. The mother liquor draining off, the sulphate runs back through a pipe into the saturator. The sulphate, after having been primarily dried on the table, is conveyed in small trucks to the adjoining storage building.

The waste gases are evolved in the top of the saturator, and consist chiefly of carbonic acid and sulphuretted hydrogen. In order that these gases may create no nuisance or damage to the surroundings when passing into the atmosphere, the hot gases (about 220° F.) from the saturator are led into

a leaden catch-box in order to retain the heavy particles of sulphuric acid carried over along with the effluent gases; thence the latter are passed through a liquor heater, which serves two purposes, namely, to cool the gases and at the same time utilize their heat for warming the gas liquor before entering the ammonia still; the heater is made up of a cast iron shell containing numerous tubes, through which the liquor flows. The gases surrounding the tubes warm the liquor to a temperature of about 140° F., at which the ammonia evaporates. The heater stands on a cast iron base, which serves as a depositing tank for the pitchy and other impurities contained in the liquor.

In addition a sulphur recovery plant has been erected in which the sulphuretted hydrogen is decomposed by burning it with a limited supply of air. The hydrogen forms water, while the sulphur is condensed and deposited in a brick chamber and in a condenser formed of earthenware pipe. After leaving the chambers the gases pass first through a lime tower to neutralize any sulphurous acid, and then through oxide of iron purifiers to eliminate the remaining traces of sulphuretted hydrogen. They are then discharged into the atmosphere.

RECENT DECISIONS OF THE COURTS AFFECTING THE MINING INDUSTRY.

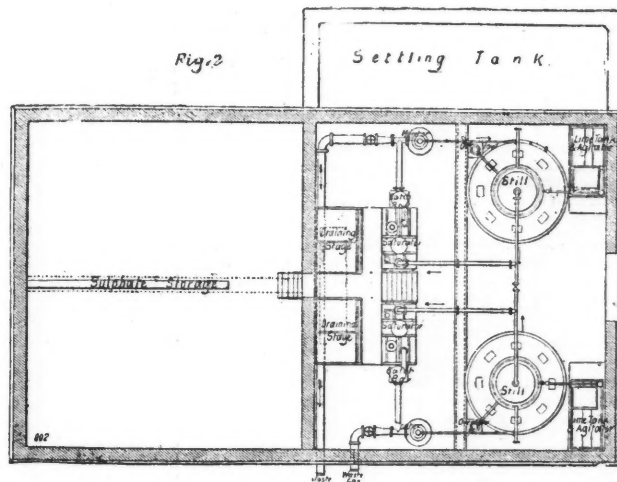
United States Circuit Court.

MINE-DUMP CLAIM—OREGON LAW IN ALASKA.

Action of ejectment to recover possession of a dump claim for mill-tailings situate in the Harris Mining District, Alaska Territory.

By the law of Oregon, which is in force in Alaska Territory, a party in possession may maintain an action to recover the possession of real property from which he has been ousted by a mere intruder.—*Campbell v. Silver Bow Basin Mining Company* [9th U. S. Cir., Dist. of Oregon, January 25th, 1892].

Dr. Coleman Sellers stated in a recent lecture that a pressure of 3,000 to 4,000 lbs. per square inch will deform hot steel, but at least 15,000 lbs.



is necessary to fill the corners of a mold, and 20,000 if the corners are square. This last pressure must be adopted for designs for hydraulic forging machines using closed dies and for power riveters.

**The Tin Resources of Tenasserim.**—The persistent efforts which have been made during the past two years by the Geological Department, with the encouragement of the local government, and under the personal direction of Mr. Hughes of that department, in investigating the tin resources of Tenasserim, in Lower Burma, seem likely to be at last productive of satisfactory and positive results, says *Iron*. Several persons have come forward with offers to open tin mines, and the chief commissioner is now negotiating an important lease of stanniferous land, brought to light by the researches of the Geological Department, with an influential syndicate of Singapore.

**A Tar Asphalt Lacquer for Iron** is composed, according to the *Metal-arbeiter* of February 24th, 1892, of 30 parts of West Indian copal, 30 parts of American pine-resin, 30 parts of mineral asphalt, 30 parts of tar-asphalt, 5 parts of yellow wax, and 6 parts of Venetian turpentine. These ingredients are melted and uniformly mixed by stirring. If the mixing is properly done the melted compound runs off the spatula in a cohesive, uniform, thick stream. The following are then added to the substance while it is still moderately warm: 12 parts of resin oil, 30 parts of linseed oil varnish, 30 parts of turpentine oil, and, finally, from 30 to 45 parts of benzine. If it be desired to make the lacquer thin fluid, the quantity of benzine is increased.

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:

TUESDAY, March 15th, 1892.

- 470,658. Dumping Car. Smith W. Bradley, South Butte, Assignor of one-half to George Lindoff, Anaconda, Mont.
- 470,712. Metallurgical Furnace. Carl Siemens, St. Petersburg, Russia.
- 470,781. Ore Concentrator. Gustavus L. Cudner, New York, N. Y., Assignor of four-fifths to Jacob Ruppert, Jr., George E. Metz and Adam E. Schatz, same place.
- 470,833. Construction of Mills for Grinding Flint, Stone, Bone, Glaze, &c. Henry Cotton, Hanley, England.
- 470,929. Magnetic Separator. Thomas A. Edison, Llewellyn Park, N. J.
- 471,065. Apparatus for Galvanizing Sheet Metal. Moses Bayliss, London, Assignor to Davies Brothers & Company (Limited), Wolverhampton, England.

## PERSONALS.

Mr. J. Howard Wilson, assayer and chemist, of Pueblo, Colo., sailed for England on the 12th inst. He will return in May next.

Mr. E. E. Olcott, mining engineer, of New York, left on Wednesday the 16th inst., to examine mining properties in Colorado and Utah.

Mr. H. B. Crowl, analytical chemist, has opened a laboratory with Mr. Chas. F. Howe, mining engineer, in the Chamber of Commerce Building, Duluth, Minn.

Mr. T. Lainson Wills, manager of the General Phosphate Corporation, Limited, of Canada, was in New York during the past week en route from London to the mines.

Mr. Wm. Kent, mechanical engineer, of New York, has returned from Tennessee, where he has been for the past two months engaged on professional business.

Mr. J. B. West, of West & Penrose, a large phosphate firm of London, spent a few days in New York this week. He is en route for Florida, where he expects to remain two months studying the phosphate industry of that State.

Mr. John Hays Hammond, mining engineer, of San Francisco, Cal., and president of the Bunker Hill & Sullivan Mining and Concentrating Company, of Idaho, was in New York last week. Mr. V. M. Clement, manager of the Bunker Hill mine, was also in New York at the same time, but went to Chicago on Wednesday last.

## OBITUARY.

J. T. Brady, at one time a noted mining operator and stock broker in San Francisco, died at Virginia City, Nev., on February 29th. In the early '70's he was an impecunious clerk, but being in possession of news that Cons. Virginia & California would reach high figures he bought in at \$75 per share. About sixty days later he sold out at \$600 per share, the stock subsequently advancing to \$800. In later years Colonel Brady made his home on the Comstock where he won a reputation as a mining expert, but was in bad odor with the mining magnates, who accused him of persistently sending true accounts to his San Francisco friends of the progress in the mines thereby bearing the stock market. At the time of his death he was 47 years of age.

John F. Winslow died on the 11th inst. at Poughkeepsie, N. Y. He was one of the leading iron makers of the State, and, with John A. Griswold and Alexander L. Holley, introduced the manufacture of Bessemer steel into this country, and at their works in Troy, N. Y., made the finest steel rails in America. Mr. Winslow's most important public work, however, was the building of the "Monitor," his firm taking the responsibility of furnishing the vessel complete to the Government, their pay being conditioned on its success as a war vessel. The success of the vessel and the good work done in its fight with the rebel iron-clad "Merrimac" is a part of history. Mr. Winslow was from 1863 to 1867 president of the Troy Polytechnic Institute, was President of the Poughkeepsie Bridge Company, and was largely engaged in works of benevolence.

Dudley Steele died at his home in East Orange, N. J., on the 12th inst., after an illness of three weeks. He was born October 30th, 1839, educated at the private school of William T. Dickinson in Jersey City, and in 1859 entered the Hudson County National Bank as teller. During the War of the Rebellion he served as a paymaster's clerk and was stationed at Louisville. After the War he was employed by his father in the Titan Iron Works, and subsequently was admitted to the firm. Upon the death of his father he formed a partnership with Nathan W. Condit, Jr., under the style of Steele & Condit. As one of the proprietors of the Jersey City Car Wheel Works he accumulated a large fortune. He joined the National Guard of New York in 1865, and subsequently the National Guard of New Jersey. At the time of his death he was Brigadier General, commanding the First Brigade N. J. N. G. He served one term in the New Jersey Assembly in 1868.

## INDUSTRIAL NOTES.

The Somerton Tin Plate Works, of Brooklyn, is nearing completion, and will be put in operation about May 1st.

The Walburn-Swenson Mfg. Company, of Fort Scott, Kan., has erected a small experimental concentrating plant, with a capacity of 10 to 20 tons per day, for the purpose of testing ores.

The Sebastian Lath Company, of Cincinnati, O., is mailing to the machine trade its catalogue for 1892, which is a book of 60 pages, containing descriptions of the tools for hand or power work manufactured by it.

The United States Glass Company's factory D at Pittsburgh was totally destroyed by fire March 9th. The loss is estimated at \$250,000, fully insured. Two hundred and twenty men are thrown out of employment.

The Maryland Steel Company, of Baltimore, has

decided to erect a large open hearth furnace plant and plate and shape mills, and will turn out all varieties of material required for the construction of ships, bridges and buildings.

Naylor Brothers' foundry at Peekskill, N. Y., was burned to the ground on the 12th inst. The fire is supposed to have originated from sparks from a passing locomotive. The loss is about \$10,000, fully covered by insurance.

The Cincinnati Corrugating Company has recently removed its machinery into new and commodious quarters at Piqua, O., where it has established its rolling mills, galvanizing works and tin plate factory. In its new catalogue, dated January, 1892, it illustrates the different products manufactured, its specialty being its patent edge roofing sheets.

The H. Ward Leonard Company, of New York, has made arrangements for the sale and application of its automatically governed electric motor, for use on elevators and general hoisting, with the Otis Elevator Company, of New York, the Crane Elevator Company and the Hale Company, of Chicago; the Whittier Company, of Boston, and the firm of Stokes & Parrish, of Boston.

The Dietrich's Oil Company, of Cleveland, O., filed a deed of assignment on the 12th inst. The credit of the company was impaired by the failure of the Merchants' Oil Company, considerable of whose paper it had indorsed. The liabilities are about \$13,000 and assets about \$27,000, including outstanding accounts very uncertain of collection. There are mortgage preferences aggregating \$7,000.

Messrs. Merchant & Company, of Philadelphia, are manufacturing what are called "The Spanish Copper Tiles," which are claimed to be superior to clay tiles for roofing, etc., on account of their lighter weight and greater durability. They are made of copper, tin or steel heat in such form as to allow for the contraction and expansion of the metal. Of the copper tiles 180 are contained in 100 sq. ft., and the weight of the same is but 175 lbs., whereas a square of terra cotta tiles weighs, it is said, from 750 lbs. to 800 lbs.

Two patents which will greatly interest copper producers were issued on the 8th inst. to Pierre Manhès, of Lyons, France. These patents cover broadly the process and apparatus for converting copper mattes into pig copper, which has been carried on for several years at the Parrot Silver and Copper Company's Works at Butte, Mont. We are informed that the exclusive right to practice these inventions in this country is vested in Messrs. Farrel and Migeon, of the above company, who have also the sole right to license others to use the invention.

According to press dispatches, all the puddling crews at the Oliver Iron and Steel Company's Tenth street mills have been suspended on account of overstock and no orders. The finishing departments will be left running as long as possible. The same company has curtailed the puddling crews at the Fifteenth street mills. About 250 furnaces are idle as a consequence of the depressed market. The Eagle Rolling Mill, also of Pittsburg, has shut down in every department, and 75 men have been paid off and discharged. Painter's Sons, at the West End Mill, have begun to retrench also. Sixty-five puddling furnaces were shut down on the 12th inst., and the men notified to seek other places. Almost 100 men have been discharged at the Homestead Steel Works of Carnegie, Phipps & Co. in the last three weeks, and on the 12th inst. over 300 more were discharged.

The Trenton Iron Company, of Trenton, N. J., in addition to the wire rope tramway which it has just built so successfully for the Holy Moses mine at Creede, Colo., has received a contract for a similar line for the Amethyst mine, also at Creede, having a length of 8,250 ft. and a capacity of 200 tons per day. Other recent contracts are a line of 5,150 ft. for the Smuggler-Union Mining Company, of Ouray County, Colo., with a capacity of 200 tons per day, and another line for one of the Haggin mines in Guanacevi, Mex., having a capacity of 100 tons per day and a length of 5,960 ft. The company has also under contract a large cable hoist for the Avondale Stone Company, of Pennsylvania, and has just completed a duplicate one for the Passaic Quarry Company, of Paterson, N. J. The big cable transfer over the Susquehanna, at Williamsport, is being duplicated and an 800 ton per day tramway for the Pennsylvania & West Virginia Coal Company, in West Virginia, and another one for the transportation of culm for the St. Bernard Coal Company, of Kentucky, are being built; also a large haulage plant for the Croton Magnetic Iron Ore Company, near Brewsters, N. Y.

## MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

## GOODS WANTED AT HOME.

2,600. An 80 to 100-H. P. return tubular boiler and a 40 to 60-H. P. compound steam engine for a manufacturing plant. New York.

2,601. A cupola for foundry, for casting from 6 to 15 tons daily. New York.

2,602. Rolls, shears, punches and other tools for boiler works. New York.

2,603. Lumber for a frame building 600 ft. long and 50 ft. wide. New York.

2,604. A double surface planer, matcher, molder and gang lath mill. Florida.

2,605. An elevator, corn crusher, iron piping and canning apparatus. Virginia.

2,606. A hay fork. Maryland.

2,607. A second-hand level and tripod. Illinois.

2,608. A boiler and pipes, to be used for radiation heating in a green house. Virginia.

2,609. Asbestos and other coverings for two 40-H. P. boilers, steam pipes, etc. Florida.

2,610. Tremolite, or short refuse asbestos, to be used as filler in making plaster slabs. District of Columbia.

2,611. Water-works complete for a town. South Carolina.

2,612. Machinery for a pottery. Georgia.

2,613. Gearing and chain for marine railway; capacity of vessels, 150 tons. Georgia.

2,614. All kinds of machinery for mining, washing, drying, and conveying phosphates. Florida.

2,615. Stone channellers, steam hoisting derricks and machinery for sawing and polishing marble. Kentucky.

2,616. A 25-H.P. detached engine and a 30-H. P. portable boiler on skids. Alabama.

2,617. A small saw mill, capacity 5,000 to 10,000 ft. per day. Alabama.

2,618. Machinery for a cannery to cost about \$3,000. Texas.

2,619. Outfit for a barrel factory to cost about \$5,000. Texas.

2,620. A double stand of 6 x 12 smooth rolls and an 8 ft. flour dresser; second-hand if in first-class order. Tennessee.

2,621. Ice machine for manufacturing ice in a Southern city of 10,000 inhabitants; give full estimates and information generally. Idaho.

2,622. Machinery for crushing sand and limestone. Georgia.

2,623. Engine, boiler, pulleys, belting and six excelsior machines. Indiana.

## AMERICAN GOODS WANTED ABROAD.

2,589. Corundum crushers. England.

2,591. Complete plant for manufacturing lap and butt welded pipes and tubes. Europe.

2,598. Catalogues, price lists and circulars of refrigerators, coolers, and small ice machines of from 100 to 1,000 lbs. capacity. Central America.

## GENERAL MINING NEWS.

STANDARD OIL TRUST.—The call for a meeting of holders of certificates in this trust on the 21st inst., as reported in our last issue, for the purpose of deciding whether the organization shall be continued or disrupted has been the subject of general comment during the past week. Concerning the matter, Mr. S. T. C. Dodd, the solicitor of the trust, said:

"We have no intention of reorganizing the trust. This decision has been brought about in part by the decision against the trust in Ohio, but more largely by the opposition and legislation against trusts of this sort in different States of the Union, and which has become burdensome. The decision in Ohio was the first one given against our trust deed in any State. Of course it only affected the trust in that State.

"When the trust was organized it comprised about 30 persons. Now there are 2,000 persons' names on the book as certificate holders. The capital of the trust is \$95,000,000, and during the ten years of its existence it has paid quarterly dividends of 3%, or 12% per annum.

"The manner in which the trust shall be wound up depends largely upon the certificate holders. The only property the trust owns consists of stock of the constituent corporations. If the trust is wound up that stock will be returned to its owners and the constituent corporations will carry on business as usual."

The famous trust deed became operative on January 2d, 1882, but its contents were not disclosed to the public until the trust officials were compelled to produce it in evidence before a Committee of the Senate of New York, appointed to investigate trusts. It provided that the trust should exist during the lives of the survivors or

survivor of the trustees and for 21 years thereafter, with this provision—that at any time after the expiration of 10 years, at a meeting called for that purpose, it should be in the power of a vote of two-thirds in value of the stock to terminate the agreement; and a two-thirds vote at the same meeting or at one called thereafter could settle the method of distribution. The 10-year period is up now, and so the way is open for a dissolution. The author of the trust deed was S. T. C. Dodd, the trust's principal legal adviser.

Under the trust deed, all of the property, real and personal, assets and business of each and all of corporations and limited partnerships mentioned or embraced in class first were transferred to and vested in the several Standard Oil companies. All of the property, assets and business in or of each particular State were transferred to and vested in the Standard Oil Company of that particular State, the consideration therefor being the stock of the respective Standard Oil companies, equal at par value to the appraised value of the money, property and businesses so transferred. Such stock was in turn delivered to the trustees under the trust deed in exchange for trust certificates equal at par value to the par value of the stocks of the Standard Oil companies. There are nine trustees. Those elected under the deed were J. D. Rockefeller, Oliver H. Payne, William Rockefeller, J. A. Bostwick, H. M. Flagler, W. G. Warden, Charles Pratt, Benjamin Brewster and John D. Archbold. Each trustee is entitled under the deed to a salary for his services not exceeding \$25,000 a year (the president \$30,000).

There are seven Standard Oil companies in different States which are included in the trust, as well as other corporations. The Standard Oil companies are, of New York, Pennsylvania, New Jersey, Ohio, Indiana, Iowa and Kentucky. They are all refining companies. The other corporations are transporting and exporting companies. The most important of the former is the National Transit Company, which has an oil pipe line from the oil regions of Pennsylvania to New York.

There were three classes of parties to the trust agreement. They were specified in the deed as follows:

(1.) All the stockholders and members of the following corporations and limited partnerships, to wit: Acme Oil Company, New York; Acme Oil Company, Pennsylvania; Atlantic Refining Company, Philadelphia; Bush & Co., Limited; Camden Consolidated Oil Company; Elizabethport Acid Works; Imperial Refining Company, Limited; Charles Pratt & Co.; Paine, Abett & Co., Limited; Standard Oil Company, of Pittsburg; Smith's Ferry Oil Transfer Company; Solar Oil Company, Limited; Sone & Fleming Manufacturing Company, Limited.

(2.) The following individuals, to wit: W. C. Andrews, John D. Archbold, Lide K. Arter, J. A. Bostwick, Benjamin Brewster, D. Bushnell, Thomas C. Bushnell, J. N. Camden, Henry L. Davis, L. M. Flagler, Mrs. H. M. Flagler, H. M. Hanna and George W. Chapin; D. M. Harkness, D. M. Harkness, trustee; S. V. Harkness, John Huntington, H. A. Hutchins, Charles F. G. Heye, O. B. Jennings, Charles Lockhart, A. M. McGregor, William H. Macy, William H. Macy, Jr., estate of Josiah Macy, Jr.; Wm. H. Macy, Jr., executor; O. H. Payne, O. H. Payne, trustee; Charles Pratt, Horace A. Pratt, C. M. Pratt, A. J. Pouch, John D. Rockefeller, William Rockefeller, Henry H. Rogers, W. P. Thompson, J. J. Vandergrift, William T. Wardwell, W. G. Warden, Joseph L. Warden, Warden, Frew & Co., Louise C. Wheaton, Julia H. York, George H. Vilas, M. R. Keith, George F. Chester, trustee.

(3.) A portion of the stockholders and members of the following corporations and limited partnerships, to wit:

American Lubricating Oil Company, Baltimore United Oil Company, Beacon Oil Company, Bush & Dmslow Manufacturing Company, Central Refining Company, of Pittsburg; Chesebrough Manufacturing Company, Chess-Charley Company, Consolidated Tank Line Company, Inland Oil Company, Keystone Refining Company, Maverick Oil Company, National Transit Company, Portland Kerosene Oil Company, Producers' Consolidated Land and Petroleum Company, Signal Oil Works, Limited; Thompson & Bedford Company, Limited; Devoe Manufacturing Company, Eclipse Lubricating Oil Company, Limited; Empire Refining Company, Limited; Franklin Pipe Company, Limited; Galena Oil Works, Limited; Galena Farm Oil Company, Limited; Germania Mining Company, Vacuum Oil Company, H. C. Van Tine & Co., Limited; Waters-Pierce Oil Company.

**TENNESSEE COAL, IRON AND RAILROAD COMPANY—DE BARDELEBEN COAL AND IRON COMPANY.**—Thomas C. Platt, president of the Tennessee Coal, Iron and Railroad Company, and Henry F. De Bardeleben, president of the De Bardeleben Coal and Iron Company, made a statement early in the week that these companies have consolidated, as the result of negotiations which have been pending for two weeks. After summarizing the results of the negotiations, the two gentlemen named made this statement:

"There will be no change in the organization of the Tennessee Coal and Iron Company except increased representation in the board of directors and an increase in the amount of capitalization. The capital of the De Bardeleben Company was \$10,000,000 in stock and \$3,000,000 in bonds. That

of the Tennessee Coal and Iron Company was \$5,000,000 in bonds, \$1,000,000 in preferred stock, and \$9,000,000 common stock. That is to say, the two companies represented a capitalization of \$19,000,000 in common stock, \$1,000,000 in preferred stock, and \$8,000,000 of bonded indebtedness. The capital stock of what may be termed, for convenience the new company will be \$17,000,000 common stock and \$1,000,000 preferred stock. Of this \$17,000,000, \$1,000,000 will remain in the treasury. It will be seen from this that the joint capital stock has been scaled down, not increased. The importance of this transaction can be better understood by a brief glance at the two properties:

"The Tennessee Coal and Iron Company was chartered in 1852 as the Sewanee Mining Company. In 1857 it was changed to the Tennessee Coal and Railroad Company, and continued operating under that name until 1881, when it absorbed the Sewanee Furnace Company. A year later it absorbed the Southern States Iron and Land Company (Limited), and then its name was changed to its present title, the Tennessee Coal, Iron and Railroad Company. Four years later it absorbed the Pratt Coal and Iron Company and the Alice Furnace Company. At present it owns 208,000 acres of coal and iron land, chiefly in Alabama, and has 10 blast furnaces and 1,950 coke ovens. Its daily output is 1,000 tons of pig iron and 6,500 tons of coal.

"The De Bardeleben Company represents the consolidation of a half dozen different corporations. It at first absorbed the Bessemer Iron and Steel Company, next the Little Bee, and then the Eureka and the Henryellen. All this absorption has taken place within the last four years. This company owns 160,000 acres of coal and iron lands in the Warrior and Cahaba coal basins of Alabama. It has seven blast furnaces and 1,040 coke ovens. Its daily output is 700 tons of pig iron and 3,000 tons of coal.

"This company's lands are interlocked and interwoven with those of the Tennessee Coal and Iron Company. In fact it may be said that the two companies have been rivals in the fullest sense of the word. They mined their coal in practically the same territory, made their iron and coke under similar conditions and with the same advantages, sold their output in the same markets, and the main advantages of a union would be of course to minimize the expense and cost of production, and it was, from a strictly business point of view, the logic of the situation.

"The two great coal basins of Alabama are the Warrior and Cahaba. They are separated by the Red Mountain, which contains the iron ore from which these companies draw their supply. Over sixty miles of this mountain is now owned by these companies. The Warrior coal field, carrying the coking coal, is underlain by the Pratt and Blue Creek seams, the Pratt being about 4½ feet in thickness and the Blue Creek 8 feet minimum. The Cahaba carries the domestic and steam coals. By this union the new companies acquire about forty-five miles of the Cahaba and about fifty miles of the Warrior fields."

The Sloss Iron and Steel Company finally withdrew from the negotiations and is not included in the consolidation, as was reported last week.

#### ALASKA.

**ALASKA TREADWELL GOLD MINING COMPANY.**—The official statement of this company for the month of January shows: Receipts—Free gold from 17,130 tons crushed (\$2.17 per ton of ore) \$37,190.82; chlorination—treating 475 tons concentrates (86c. per ton of ore), \$14,777.27; interest received, 1c. per ton of ore, \$79.55; total, \$52,047.64. Expenditures—Mining: 17,130 tons of ore (86c. per ton), \$14,762.76; milling; crushing 17,130 tons (34s tons concentrates saved), 60c per ton, \$10,210.73; chlorination: 475 tons concentrates treated (22c. per ton of ore) \$3,710.46; general expenses at mines (25c. per ton of ore), \$4,287.66; general expenses at San Francisco, 2c., \$405.75; bullion charges; freights, insurance and refining (5c. per ton of ore), \$818.31; total per ton, \$2; total expenditure, \$4,195.67; mining profit for month, \$1.04 per ton=\$17,851.97. The expenses at mine include \$3,422 extraordinary expenses, such as fire insurance for the year, etc. Steam power was used the entire month, which accounts for large cost of milling. The company had on hand January 31st, \$48,823.08 in cash. The net profits available for dividends for the first eight months of the company's current financial year (up to January 31st, 1892), have been \$252,277.08.

#### ARIZONA.

##### MARICOPA COUNTY.

**VULTURE.**—T. E. Farish reports that a strike has been made in this mine at a depth of sixty feet that goes from \$15 to \$80 a ton. The vein is five ft. wide and the ore is easy to work. This strike was made 600 ft. east of the old works. Mr. Farish says he will fix up fifteen stamps of the old mill and run them on this ore.

##### CALIFORNIA.

##### EL DORADO COUNTY.

An asbestos mine has been located by M. T. Lawrence, J. H. Richie, Daniel Kerby and William Houchin, of Auburn. It consists of a fine 7-ft. ledge of what is said to be good quality of this mineral. The mine is located 16 miles from Auburn, a mile and a half from the American River, and about four miles from Greenwood.

##### HUMBOLDT COUNTY.

(From our Special Correspondent.)

The oil well being sunk near Garberville has proved a success.

##### NEVADA COUNTY.

**EMPIRE.**—The shaft has reached the depth of 2,100 ft. A cross-cut will soon be run to cut the vein. This will give nearly 300 ft. of new backs.

**MASSACHUSETTS HILL.**—While it is stated in Grass Valley that this mine has been bonded by an English syndicate it is denied that it has been sold as yet.

**NORTH BANNER.**—At this mine three shifts are running a cross-cut to develop the new ledge recently cut in the 400 level. The space between walls ranges from 2 to 3 ft., with 5 or 6 in. of quartz on one wall and 2 or 3 in. on the other wall. The quartz is high grade.

##### PLACER COUNTY.

**EUREKA GRAVEL MINING COMPANY.**—Last week the main tunnel was in 1,300 ft. At that distance from the mouth an upraise was made, and in 30 ft. cut through into the channel. The gravel is of a quartz character, while the sand or finer material has a bluish cast. They struck through on the rim or side of the channel above the bed, but the tunnel is nevertheless low enough to work the channel to its lowest depth. This is a new mine in a new section. The claim covers six miles of ground and carries with it a water right equal to 70 H. P., which can be made valuable in operating the mine.

##### SAN BERNARDINO COUNTY.

The Los Angeles *Express* says: "Theodore L'Hommedieu, of New York, and C. S. Whipple, of Indianapolis, have closed a deal for a red granite and marble quarry near San Bernardino. They are going to New York to organize a company for the purpose of getting out red granite and variegated marble. They pronounce the red granite and marble to be superior to anything found in the quarries of the East. The marble is of beautiful color and highly susceptible to polish."

**SILVER KING MINING COMPANY.**—The manager reports that "The old mill has been repaired, and new machinery added, and the mill was started on February 10th. This makes 30 stamps now working, which will be increased as further development requires. The mill is now crushing at the rate of 100 tons per day, ore assaying 14 ozs. per ton."

**WATERLOO MINING COMPANY.**—This company has closed down, throwing 130 men out of employment. The trouble is said to be low grade of the ore and law suits.

##### COLORADO.

A number of coal companies operating mines in Southern Colorado are considering a plan to unite their interests under one management, with headquarters in Pueblo. This is independent of the combination forming in New York under the lead of the Colorado Fuel Company and Colorado Coal and Iron Company.

Mineral surveys approved by the United States Surveyor General for Colorado during the week ending March 12th, 1892: Survey No. 7,124, district, Leadville; name of claim, Silver Anchor lode; No. 7,332, Montrose, the Mascott Mill Site, No. 7,315, Durango, Button, Jersey Queen, Jersey, Little Chief, Devine, Diamond Dust, Forest Dell, Forest and Forest Leaf lodes; No. 7,108, Leadville, Nellie Placer; No. 6,937, Durango, Empire State lode.

##### BOULDER COUNTY.

**NI-WOT & MADELEINE GOLD MINES, LIMITED.**—The superintendent of this company reports that the 10-stamp mill is now running steadily and crushing about 16 tons of ore per day. The ore is running from 1½ oz. to 3 oz. per ton in gold, and 1 oz. to 7 oz. per ton in silver.

##### DOLORES COUNTY.

**DIAMOND L.**—It is reported that M. N. Sawyer, who is working the Diamond L. group, adjoining the Union-Carbonate mine on Mineral Hill, has struck a body of lead ore in sinking a shaft which was being put down for the purpose of catching the Union Carbonate contact at a depth of 80 ft. from the surface. The ore is similar in character to the Union-Carbonate ore, but, it is said, higher in silver.

**RICO-ASPEN CONSOLIDATED MINING COMPANY.**—The report comes from Rico that all of the principal mines and prospects on Dolores Mountain, south and east of the Enterprise group and south and west of the Newman group, have been consolidated under one management, known as the Rico-Aspen Consolidated Mining Company, controlled by Denver and Eastern capital. There are in all 32 mines in this consolidation, four of which are said to be producing now \$30,000 per month. They are all well known properties, and include the Aspen group, the Vestal group, the Silver Glance group, the Old Discovery, Montezuma, Syndicate and Telegraph and the Stephanie. The company is capitalized for \$5,000,000. A. B. Roeder, of Denver, is at the head of the company, and Douglas V. Browne is the consulting engineer. Mr. Browne is now on the ground directing the development work.

##### GILPIN COUNTY.

**SAN JUAN MINING AND MILLING COMPANY.**—David G. Jones, administrator of the estate of

Edward L. Baker, who met a violent death at Racine last December, has demanded a court investigation of the affairs of this company. Mr. Baker, during his life, owned \$133,330 worth of stock and held another \$100,000 worth in trust for his nephews and wards, Robert H. and Charles H. Baker.

In his bill of complaint, filed in the Superior Court at Chicago, the administrator says that several of the stockholders are conspiring to cheat and defraud the minority. He has been refused the books, he says, and the court is asked to decree an accounting and rule the officers to produce the ledgers.

The San Juan Mining and Milling Company was organized in Chicago in February, 1889, with a capital stock of \$1,000,000. Besides the shares, 23,000 in number, that Mr. Baker owned and held in trust, the rest is divided as follows: Mrs. A. J. Severence, 49,999 shares; A. B. Cooper, 26,666; Wallace A. Merriell, 1, and John S. Cook, 1. But the complainant charges that this showing is only nominal, and that in truth the stock purporting to be held by Mrs. Severence, Merriell, and A. B. Cooper is owned by T. J. Cooper and J. B. Cooper. T. J. Cooper is said to have had the active management of the mine, and to have controlled the finances, without making any report of his actions save to the parties with whom he is charged with colluding.

During the last year the bill estimates that \$150,000 worth of ore has been taken from the mine. Out of this from \$75,000 to \$100,000 should have been profit, but the complainant says that T. J. and J. B. Cooper, A. J. Severence, W. A. Merriell, and J. S. Cook, a Chicago lawyer, forming the board of directors, fraudulently conspiring to cheat the minority, have appropriated all of the earnings and profits under guise of paying salaries and allowing commissions.

The bill charges that all of the confederates except J. S. Cook have removed from this State and taken the books with them. The complainant says he demanded the books at Chicago and was told they were in Colorado. Going to Gilpin County and making a like request on T. J. Cooper, this bill says Mr. Jones was again referred to Chicago, with the explanation that the records had been taken there to the annual meeting.

The further charge is made that the Coopers, Severence, Cook, and Merriell are negotiating a pretended sale to defraud the minority stockholders and that the contemplated price is \$350,000, while the property is worth \$500,000. The defendants are said to be planning to take a \$50,000 commission from this alleged sale.

The complainant asks that the books he produced and that the defendants be enjoined from selling the property. Judge Shepard granted the latter order.

#### GUNNISON COUNTY.

**BLACK EAGLE.**—A strike is reported in this mine at Crystal.

**LITTLE TYCOON MINING COMPANY.**—A car of ore was shipped recently from the Little Tycoon mine at Pitkin which averaged 243 ozs. silver and .06 oz. gold. The company has just leased and bonded three claims adjoining the Tycoon, Pawnee, Sioux and Silver Plume, on which a good deal of work has already been done.

**RUBY KING MINING COMPANY.**—Mr. F. G. White, agent, has written the following letter to Mr. L. R. Ehrlich, President of this company: The developments which we made in the upper tunnel of the Ruby King show us that there has been a large stope mined out above that tunnel, from which a large quantity of valuable ore was taken. Our expectation was that in driving the tunnel we would develop stoping ground which would give us large returns, but although the results gave us a length of 130 ft. upon the vein, a fault having occurred, the ore only extended 8 ft. in height when it encountered the wash and cut off all hope of much ore in that direction. This stope and drift gave a result of nearly 30 tons of ore of a value of 133 ozs. silver and  $\frac{1}{2}$  oz. in gold, and also showed the ore in bottom of level extending downward, and proved that we would be forced to drive the lower tunnel to secure the value that we now know is contained in that block of ground. This will give us stoping ground of about 100 ft. in height upon the vein. This tunnel should reach the vein before April 1st, and as it will be necessary to extend this tunnel 350 ft. to reach the ground vertically under that from which we have taken the ore, it will pass through 350 ft. of vein. The development of this tunnel will also fully demonstrate at what point a shaft should be sunk to reach greater depth, and will drain off all surface water and at same time prove the value of the vein to a depth equal to the 300 ft. level in the Forest Queen, with which it will connect.

#### LAKE COUNTY.

(From our Special Correspondent.)

The work of the month of February in Leadville district was very satisfactory, though the only strike of much importance was that made in the ground of the Maid of Erin Silver Mines, Limited. Here a fine body of lead carbonate ore was disclosed in the south workings, from which shipments at once began. A tremendous amount of new work was, however, inaugurated, and the strikes of the previous month opened out well in every instance, while the developments in the older properties were such as to induce further exploitation.

The smelters did not average as heavy stacks in blast as during the previous month. Still, with 15 going, some 16,650 tons of ore were treated, giving a bullion product of 1,979 tons. This was divided as follows:

	No. of stacks.	Tons of ore.	Tons of bullion.
American.....	5	5,500	630
Arkansas Valley.....	6	6,000	712
St. Louis S. & R. Co.....	3	4,000	525
Elgin Company.....	1	1,150	112
Total.....	15	16,650	1,979

**A. Y. & MINNIE.**—This mine continues to open up the caves filled with high grade lead carbonate, found over the intrusive sheet of grey porphyry, in working south from the so-called "Seller's Upraise," and about 1,500 tons of this class were shipped from there during February.

**GUNNISON.**—A strike of some importance has just been made in this mine, on Sugar Loaf Mountain, averaging 200 ozs. of silver to the ton. This is a new shaft sunk on the vein, about 200 ft. north of the first, or main shaft.

**LOUISVILLE.**—The north workings are putting out 30 tons a day of lead carbonate, while the lower levels, working under lease, put out about 20 tons of high grade sulphide. In the north workings there is now a breast of about 11 ft. of the lead carbonate ore and the chute appears to thicken in that direction.

**MAID OF ERIN SILVER MINES, LIMITED.**—There were exaggerated reports flying about as to the drowning out of the lower levels of this mine, but upon a personal visit of your correspondent nothing of the sort was found to be the case. These reports probably originated in the choking of the valves of the pump at the 750-ft. or lower level, which necessitated a temporary suspension of the work at that point until new valves could be put in. At no time during this operation was the water standing in the levels at a greater depth than 3 in., and, as may be readily seen, this small amount was at once removed when pumping was resumed. During the past month the output from the Wolfstone lease amounted to nearly 1,000 tons of high grade ore, while the other portions of the ground, including the Adams lease, put out 6,098 tons. This included the lead carbonate ore, the sulphide being sent to Denver for treatment.

**PENROSE.**—Nothing definite is known with respect to the ultimate action of the Penrose people, as to the unwatering of that shaft, but the owners of the Sixth street shafts are to be in Leadville about the 18th inst., and a meeting of the different interests, involved will then ensue, and some plan, looking to a united action, will be adopted. At present nothing is being done.

**SILVER CORD COMBINATION MINING COMPANY.**—The big tunnel is being pushed with vigor, as the Gardiner and Goodell claims will eventually be worked through this natural outlet. Meanwhile, those properties are being opened through the east shaft of the Mike & Star. The tunnel only requires about 270 ft. of further driving to make connection with the inner heading, and as it has already been continued to the eastward more than 1,500 ft. from that point the immense reserves of low grade sulphide will be at once available.

**STAR OF HOPE MINING COMPANY.**—The Bohn shaft is still going down, and has a depth of nearly 500 ft. Every precaution is being taken to prepare for a sudden influx of water when the contact is caught, and it is a source of great satisfaction to know that so far no difficulty is met with in handling that already encountered.

**WOLCOTT MINING COMPANY.**—A bond and lease is in existence on the Lucy B. Hussey and part of the Star Placer, included in the Wolcott Mining Company's property, which calls for \$50,000 to be put up for development purposes by the 1st of April, 1892. Some action will doubtless be taken as soon as the Sixth Street-Penrose affair is definitely settled. \*\*\*

#### OURAY COUNTY.

**IRONCLAD GOLD AND SILVER MINING COMPANY.**—A press dispatch from Ouray announces that a cave has been broken into in the Ironclad mine, near the American-Nettie, on the gold belt, showing a body of honeycomb quartz running \$60 in gold to the ton. The cave is  $6\frac{1}{2}$  ft. in height, extends into the mountain to an unknown depth, and is similar in character to some of the rich caves found in the American-Nettie.

**MINERAL FARM.**—This mine closed down on the 9th inst., and discharged all its men, giving as a reason the grade of the ore.

**REVENUE TUNNEL.**—A terrible explosion took place in the Revenue Tunnel, Mount Sheffels, on the 12th inst., by which two men were instantly killed and a third man severely wounded. It was caused by a premature blast. Four men were in the tunnel, but the fourth man was only slightly injured.

#### PITKIN COUNTY.

The Hardinge Smelting Company, of Aspen, recently filed articles of incorporation, with a capital stock of \$500,000. The incorporators are: H. W. Hardinge, E. White, H. F. Silleck and George T. Welch.

**ARKANSAS CONSOLIDATED MINING COMPANY.**—This company has filed suit in the District Court at Aspen against John A. Chandler to recover part

of the Arkansas lode, amounting in all to 156-100 acres, \$500 and \$125 additional as cost of filing, adverse costs of suit and counsel fees. The Arkansas is virtually the Smuggler. The ground in dispute is said to be of great value and adjoins the Smuggler on the north.

**LEADVILLE.**—A strike of extremely rich ore is reported in this mine at Aspen. It is stated that, in addition to 8 in. of very high grade ore, 2 ft. of 300-oz. ore has been discovered.

**MOLLIE GIBSON CONSOLIDATED MINING AND MILLING COMPANY.**—Mr. J. J. Hagerman, president of this company, said recently in regard to the article in a late issue of the Denver News, respecting present and prospective cash and stock dividends to be paid by the company and alleged strikes in the lower levels of the mines: The regular dividend for March will be \$150,000 and no more, and this fact was publicly announced in the usual way a week ago. There is no talk or expectation of an extra dividend or of any increase in April over the dividend declared for March. A stock dividend has not been thought of and as all the capital stock of the company has been issued the statement is absurd on its face. The report of big strikes in the two lower levels of the mine during February is untrue, as no work at all has been done in these levels for the last forty days. Work therein was suspended during the time named, in order to enlarge the No. 2 shaft. There is only \$500,000 in the reserve fund, instead of \$700,000 as stated by the News. Mr. Hagerman considers the extravagant and unfounded statements in the report published by the News as misleading and damaging to all interested in the company.

A start was made last week by the Mollie Gibson concentrator under its new management on ore from the Smuggler dump. The run did not prove a success, owing to freezing water and the poor working of the tables. Daniels & Co. have bought the Mollie Gibson dump and will start on it next week, when it is expected the conditions will be more favorable. Meanwhile new tables of the Copeland pattern will be put in.

A petition in proceedings to perpetuate testimony was filed at Aspen on the 11th inst. by Brown, Downing, Wolcott and Vaile, attorneys of J. B. Wheeler, of New York, in the District Court preparatory to the commencement of suit in equity for 194,450 shares of stock in the Mollie Gibson Consolidated Mining & Milling Company. The petition states that a combination existed between J. J. Hagerman, C. E. Palmer and R. J. Bolles for the purpose of inducing J. B. Wheeler, the petitioner, to sell the above-mentioned stock at a price far below what it was actually worth at the time of transfer. The petition asks that testimony relative to certain telegrams alleged to have passed between Hagerman, Palmer and Bolles be taken from T. J. Thom, manager of the Western Union office in Aspen. In the absence of Judge Rucker, of this district, Judge Rising ordered that a *subpoena duces tecum* be issued by the clerk of the ninth judicial district commanding T. J. Thom to appear and testify in accordance with the prayer of the petition. The features of the case are substantially the same as in the suits previously instituted against Mr. Hagerman by H. B. Gillespie and Byron E. Shear.

Mr. Wheeler was seen in his office in this city with reference to this matter and stated that the foregoing was correct. He could not add anything more to it. A hearing will be had on the 21st inst.

#### FLORIDA.

##### LEE COUNTY.

(From an Occasional Correspondent.)

A company has lately been organized to mine phosphate on the Caloosahatchie River, above Fort Myers. The phosphate in this river is largely intermixed with shell.

##### MARION COUNTY.

(From Our Special Correspondent.)

**CENTRAL FLORIDA PHOSPHATE COMPANY.**—This company has recently been organized to operate near Anthony. Most of its members are New York capitalists, D. C. Scovill being its president, Julien Hawthorne, the author, its secretary and Prof. Cox, its consulting engineer. H. S. Kedney, of Winter Park, Fla., the only Florida member of the company, is resident director. The main office will be at 120 Broadway, N. Y. The company is capitalized at \$250,000 and the theoretical capacity of its plant will be 100 tons of rock a day ready for shipment.

**PEBBLE AND SOFT PHOSPHATE COMPANY.**—This company will operate near Kendrick on the Florida Southern Railroad. Capt. H. E. Anderson is its president, and A. H. Agnew, president of the Standard Phosphate and Chemical Company, a prominent member; the other two members are of New York. The capital stock of this company is \$60,000. Its attentions will be directed for the present entirely to grinding phosphate for local markets, and its grinding machinery will soon be in operation. The theoretical capacity of the grinder will be sixty tons a day.

**PLATE ROCK PHOSPHATE COMPANY.**—This company is shipping rock from its Sparr works for the London market. This is the third shipment that has been made from the Sparr works. The Plate Rock Company put in operation at its Anthony works a few days ago the first log washer tha

has been used in this region, and it seems to serve an excellent purpose for washing phosphate.

**POLK COUNTY.**

(From an Occasional Correspondent.)

Phosphate matters have been dull in this section during the winter, investors being deterred by the low price of phosphates. In consequence the price of these lands has decreased.

**AMERICAN MINING COMPANY.**—This company, of Bartow, has just leased for 30 years, on a royalty of 50c. per ton, to New York parties, a tract of 640 acres of pebble phosphate land on the Alafia River. A plant of 100 tons daily capacity is to be erected within 90 days.

**IDAHO.**

**BOISE COUNTY.**

**BOULDER.**—The Moriarity Brothers have cleaned up about \$4,200 from a 35 days' run to their five stamp mill. Their tunnel is in some 250 ft. in ore all the way. The ledge averages about 30 ft., all of which is said to pay.

**ELMORE COUNTY.**

**COMFORT CONSOLIDATED MINING COMPANY.**—The property of this company near Rocky Bar has been sold at sheriff's sale for \$35,000 to Hopper & Wheeler, who had obtained judgment for \$53,000. They will now work the property.

**OWYHEE COUNTY.**

**DE LAMAR MINING COMPANY, LIMITED.**—The manager reports: We have cut an important vein on the 8th level (Wahl Tunnel) 35 ft. south of the "77 ft. vein." The average width of the new vein is 8 ft.; average value \$70 per ton, about equally divided in gold and silver.

It is stated that the 205,000 shares of this company owned by Captain De Lamar has been bonded by the owners of the balance, 195,000 shares, at 23 shillings a share, 40% above par. Captain De Lamar, who is now in Washington, is said to have been much dissatisfied with the interference in the management of the English stockholders, who had the voting control, notwithstanding their minority interest.

**SHOSHONE COUNTY.**

**MINERAL POINT.**—This mine at Osburn, which was bonded by Col. I. N. Muncey a few months ago, for \$40,000, has been stocked at \$300,000 under the name of the Mineral Point Mining and Milling Company. The organization was made under the laws of West Virginia. Samuel McClure, of Stillwater, Minn., is president; A. T. Lindholm, secretary; David Tozier, Treasurer; I. N. Muncey, general manager.

**SPOKANE & COEUR D'ALENE MINING COMPANY.**—This company has bonded a group of seven prospects near Osburn. The claims are the Empress, Emperor, Daisy, Last Chip, Illinois, Monitor and Corcoran, and are owned by E. A. Bevis, Carolle, Bevis and Dr. I. H. Kelley. On March 1st, a force of men was put to work upon the Empress and Corcoran.

**KANSAS.**

**CHEROKEE COUNTY.**

During the week ending March 12th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,024,600; rough ore, pounds sold, 1,780,750; zinc ore, pounds sold, 762,240; lead ore, pounds sold, 217,150. Sales aggregated a total value of \$12,400.

**KENTUCKY.**

**WHITNEY COUNTY.**

**WELCH COAL MINING COMPANY.**—This company is about to open a coal mine near Williamsburg, Ky., on the McCarty spur of the Jelico Mountain range. The vein is said to be from 38 in. to 40 in. thick, and convenient to the railway.

**MAINE.**

**SAGADAHOOC COUNTY.**

**SMALL POINT.**—The prospecting drill recently lost at this mine has been recovered and is again being used in the search for coal.

**MARYLAND.**

B. F. White & Co., of Scranton, Pa., have bought 5,000 acres of coal and timber land in Maryland, and will develop their purchase.

**MICHIGAN.**

**GOLD.**

**FIRE CENTER GOLD MINING COMPANY.**—This company has increased its capital stock to 20,000 shares and has placed \$10,000 additional working capital in the treasury.

**COPPER.**

**CENTRAL COPPER MINING COMPANY.**—This company will have on exhibition at the World's Fair a model of its hoisting plant in use at shaft No. 2. The mine is said to be looking well.

**IRON—GOGEBIC RANGE.**

**SUNDAY LAKE AND GOGEBIC ORE COMPANY.**—These properties near Wakefield are being explored and developed with unusual zeal. Diamond drill testings are in operation on the line between the Sunday Lake and Iron Chief properties. The Sunday Lake is said to have about 20,000 tons of ore in stock and the mine to be looking well.

**IRON—MARQUETTE RANGE.**

**RIVERSIDE IRON MINING COMPANY.**—This com-

pany has succeeded in getting a reduction of the royalty from 50 to 30 cents per ton.

**MINNESOTA.**

**IRON—MESABA RANGE.**

According to press dispatches yesterday a scandal involving several men in state offices has been developed in connection with the filing of leases on Mesaba iron lands. It appears, it is said, that on January 29th the Duluth & Iron Range Road had, by an agreement with State Auditor Bierman, released from its grant certain iron land, the title to which was not wholly clear.

Immediately a prominent real estate dealer of St. Paul made application for leases on a large share of the land made eligible for leasing by the relinquishment. This application was made only a few moments after the land had been relinquished, and just prior to the closing of the office for the day. The application was carefully scrutinized and the information was given that the document could not be considered, as it was not made out in proper form, but the applicant was told to be there the next morning with a proper application and his business would be attended to. Early the next morning, before the office was open, the applicant was on hand, and when he gained access to the office, to his consternation he learned that of the entire tract the greater and more valuable parts has been leased.

When the office was closed on the evening of January 29th, that page of the lease book pertaining to Township 53, Range 16, was a spotless blank, while at the opening of the office on the morning of January 30th, the first line showed one entry recording a lease to H. V. Rutherford and a line of ditto marks running clear down the page and covering half of the next. Then followed 68 entries in the name of Matt Jensen, assistant book-keeper in the State Treasurer's office, and a number of other "preferred creditors."

Interested persons decided to bring an action against Rutherford, in whose name the leases were granted, to compel a restoration of the land to the public domain, where the original application of the plaintiff would naturally take precedence over all others. That too much attention might not be attracted to such dealings, many newspaper men were "let in on the ground floor," and as a matter of fact the records show that about eighty "forties" stand leased to proprietors and attaches of leading St. Paul papers.

**IRON—VERMILION RANGE.**

**CHANDLER IRON COMPANY.**—The No. 4 shaft, 7½ ft. x 16 ft. in the clear, was sunk 116 ft. in February. Since the fire the mine has been hoisting about 1,000 tons a day.

**MONITOR.**—The Illinois Steel Company has secured control of this mine. All the miners to whom the old company was indebted will be paid off by the new and operations will be resumed at once.

**MISSOURI.**

**JASPER COUNTY.**

(From our Special Correspondent.)

**JOPLIN, March 14.**

The past week opened under the most favorable conditions, and the pumps of the entire district were worked to their full capacity in draining the mines of water from the heavy rains of the previous week. There was a large and steady output of ore and good average sales from the different camps. Zinc ore still remains at an average price of \$21 per ton throughout the entire lead and zinc belt. Lead ore ruled strong at \$23.50 per thousand. Following are the sales from the different camps: Joplin mines, 1,137,910 lbs. zinc ore and 393,190 lbs. lead; value, \$21,188.

Webb City mines, 357,400 lbs. zinc ore and 35,810 lbs. lead; value, \$4,579.35.  
Carterville mines, 2,123,720 lbs. zinc ore and 100,100 lbs. lead; value, \$24,601.35.  
Zincite mines, 108,668 lbs. zinc ore and 8,440 lbs. lead; value, \$1,393.65.

Lehigh mines, 58,720 lbs. zinc ore; value, \$675.30.  
Oronogo mines, 9,430 lbs. lead; value, \$226.90.  
Carthage mines, 318,330 lbs. zinc ore; value, \$3,526.

Galena, Kan., mines, 876,450 lbs. zinc ore and 211,180 lbs. lead; value, \$13,621.65.  
Districts, total value, \$69,812.20.

Aurora, Lawrence County, mines, 191,470 lbs. zinc ore, 588,000 lbs. silicate, and 275,000 lbs. lead; value, \$11,388.  
Lead and zinc belts, total value, \$81,200.20.

This Carterville mining district has certainly taken the lead as a zinc producer now for over one year, as the value of the output seldom falls below \$20,000 per week. The principal mines of this district are the Tracy, Carterville, Daugherty, Davy & Co., Richland, Cornfield, Eleventh Hour, Motley, Troup, Perry and Victor. These are all well developed and equipped with modern machinery, thus enabling them to keep up a steady production. There are several new companies that have spent from one to two years in prospecting and exploration work and will soon come into the list of large producers. Mr. Louis Helm, of the Mound City Mining Company, is operating a 40-acre tract on which he has put down eight prospect drill holes and found ore in every one of them, and is now sinking his development and working shaft and opening his ore body at a depth of 185 ft. Another shaft cut the ore body at 140 ft.

The most important development is the Cherokee Mining Company's 40-acre lease. This com-

pany is composed of Commodore Herrold and others of St. Louis. They commenced development by sinking a prospect shaft to a depth of 200 ft., which opened a good body of ore from the bottom of the shaft. Two levels, or drifts, were driven, one 100 ft. south and one 175 ft. east, which proved up the continuance of the ore body each way. At this point the exploration work was stopped, and a contract let for the erection of a 100-ton concentrating plant, at a cost of \$15,000. This plant will include all of the latest improvements for cleaning zinc ore, and is almost completed.

With these, and several other smaller companies coming into the line of producers, the output of Carterville district alone will be not less than 1,500 tons of ore per week.

Mr. E. L. Monser, Vice-President and General Manager of the Wenona Zinc Company, Wenona, Ill., was in Joplin last week looking after the purchasing of ore for the new smelter. We are informed that the smelting works of this company, which were started December 12th, 1891, are running smoothly and satisfactorily.

Mr. E. Hooper, a prominent mining engineer, formerly of Nevada but now located at Salt Lake, is making an examination of the zinc mines of Joplin and Webb City in the interest of capitalists.

**MONTANA.**

**BOSTON & MONTANA CONSOLIDATED SILVER AND COPPER MINING COMPANY.**—The Great Falls works of this company have been started up on a small scale.

**DEER LODGE COUNTY.**

**DEER LODGE QUEEN.**—A strike of good grade carbonate ore has been made at a depth of 50 ft. on the property.

**LEWIS AND CLARKE COUNTY.**

**BELL BOY.**—Some of the officers of the Montana Company, Limited, have secured an option on this mine.

**MEAGHER COUNTY.**

**CONFEDERATE PIONEER MINING LAND AND IRRIGATION COMPANY.**—This company has filed articles of incorporation with the Secretary of State to do business in Confederate gulch. The incorporators are T. H. Kleinschmidt, James King, E. D. Edgerton, Massena Bullard, J. B. Sanford. The capital stock is \$600,000 in 120,000 shares of \$5 each.

**SILVER BOW COUNTY.**

The following gives an idea to what depths the principal mines of Butte have been worked: Alice, 1,500 ft.; Lexington, 1,465; Anaconda, 1,000; St. Lawrence, 1,000; Mountain View, 1,000; Gagnon, 1,000; Mountain Consolidated, 800; Moulton, 800; Parrot, 800; Blue Wing, 700; Magna Charta, 600; Rising Star, 600; Silver Bow, 700; East Gray Rock, 800; West Gray Rock, 500; Belle of Butte, 500; Parrot Colusa, 500; Ramsdell Parrot, 600; Amy and Silversmith, 500; Rarus, 600; East Colusa, 500; West Colusa, 500 (new shaft 600); Blue Bird, 700; Matte, 500; Harris Lloyd, 500; Speculator, 400; High Ore, 600; Wake-Up-Jim, 500; Green Mountain, 500; Original, 500.

**ALICE MINING COMPANY.**—The driving rod of the Cornish pump has broken and in all probability the mine will be closed down for a number of weeks. This necessitates shutting down the 20-stamp mill which was alone running at the time of the accident.

**COMANCHE MINING COMPANY.**—This company has won its suit with the Boston & Montana, through a decision of the United States Supreme Court on March 14th. This was a very important suit, the Comanche Company winning the Smelter Lode. Heavy damages will be claimed, it is said.

**NEVADA.**

**ESMERALDA COUNTY.**

**MOUNTAIN QUEEN MINING COMPANY.**—A dispatch from Candelaria states that several warrants have been issued for the arrest of the manager of this mine on the charge of misappropriating some \$3,000 worth of bullion, the result of the maiden run of the new mill.

**STOREY COUNTY—COMSTOCK LODE.**

The following is the weekly statement of ore extracted from Comstock mines and milled, with the average battery assay values:

Mine.	Tons extracted.	Tons milled.	Assay Values.
			Feb. 27. Feb 20.
Con. Cal & Va....	957	980	\$20.14 \$19.45
Hale & Norcross...	*468	420	21.00 23.37
Overman.....	1334	..	16.78 16.06
Savage.....	*743	682	20.00 20.73

\*Cars. †Car sample assay \$21.88.

**CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.**—The total shipments of bullion received during February were valued at \$73,470.29. There was worked at the Morgan Mill 4,020 tons of ore which produced bullion—gold, \$37,693.88; silver, \$35,776.41; total, \$73,470.29. Yield in bullion per ton—gold, \$9.37; silver, \$8.89; total, \$18.27. Assay value of the ore per ton per battery samples—gold, \$12.30; silver, \$11.95; total, \$24.25.

**HALE & NORCROSS SILVER MINING COMPANY.**—The largest annual meeting of stockholders in the annals of the company took place on Wednesday, there being about 75 stockholders present, representing 109,233½ shares out of a total number of 12,000. J. L. Flood controlled 75,245¼ in the vote

for directors, the combination of brokers, 33 758 shares, and independent, 200 shares. Nat. T. Messer, George R. Wells, W. S. Lyle, C. H. Fish and W. H. H. Hart were elected directors in the interests of Flood, and W. Edwards and A. G. Gwinnett in the interest of the brokers' combination.

After the result of the election was made known J. H. Tingman, secretary of the Mining Stock Association, offered the following resolution:

"The undersigned, a stockholder in the Hale & Norcross Silver Mining Company, in behalf of himself and other stockholders, members of the Mining Stock Association, protests as follows:

"It having been proven by the testimony in the case of M. W. Fox vs. the Hale & Norcross Silver Mining Company that mills to whom the ores from that mine were and now are intrusted for reduction, feloniously withheld and continue to withhold from the company the precious metals contained in the ores so reduced, thereby injuring and defrauding the stockholders thereof.

"And it having been proven that the parties composing the milling company to whom these mills belong debauched, conspired with and led astray certain officers of the Hale & Norcross Silver Mining Company by paying them large sums of money that the mill owners might be permitted to defraud the stockholders of the Hale & Norcross Silver Mining Company by withholding the precious metals contained in the ores of that company and intrusted by it to the said mill owners for reduction and extraction;

"And, it having come to the knowledge of this association that the present directors of the Hale & Norcross Silver Mining Company have illegally, fraudulently, and without right or authority, taken from the treasury of that company certain sums of money amounting to about \$3,000, and used the same in paying the attorneys and the expenses of witnesses who were employed in defending and testifying in the interest of the thieves who have been systematically robbing said company; therefore we protest:

"First—Against the delivery of the ore taken from the Hale & Norcross mine to the men who own the mills, and who have in the past robbed, and are now robbing, the mine by retaining the precious metals contained in the ores of said company intrusted to them for reduction and thereby defrauding the stockholders thereof.

"Second—Against the appropriation of the money of the stockholders of the Hale & Norcross Company for the purpose of defending the thieves who have looted the mine, and by that act caused the levying of assessments, the proceeds of which are now spent by the directors in the defense and protection of those who robbed the property—in other words, the paying of money obtained from the stockholders by assessments to defend the very rascals who robbed those who paid the assessments.

"We demand: First—That all ore taken from the Hale & Norcross mine shall be reduced in mills leased or owned by the company, and that the directors thereof shall deliver no more ore to the nefarious mill ring to be looted.

"Second—That full car sample and battery assays of all ores taken from the mine shall be furnished stockholders under oath, as the law requires.

"Third—That the board of directors elected this day shall take immediate steps to recover the sums of money fraudulently paid attorneys and witnesses as hereinbefore stated.

"And we still further protest against the ratification of any and all acts of the board of directors of the Hale & Norcross Silver Mining Company for the past. And we still further protest against the unlawful and unnecessary employment of an assistant superintendent at \$250 per month or any other amount in addition to the sum of \$500 per month paid to the superintendent, and we demand that a suit be brought against the present board of directors to recover the amount so unlawfully and unnecessarily expended.

"And we further demand that suit be brought against the present directors and the owners of the mills and supply companies for the exorbitant and unlawful prices charges for milling the ore of this company and for the supplies furnished the mine under the infamous Credit Mobilier system."

A. N. Griswold moved that the protest be adopted and be spread upon the minutes of the meeting, and this motion was carried by a unanimous consent.

In executive session the directors elected the following officers: President, N. I. Messer; vice-president, George R. Wells; secretary, A. B. Thompson, and superintendent, J. R. Ryan.

Nat. Messer, elected president, is one of Flood's right-hand men and is president of Andes Mining Company; Ryan, the superintendent, also being in charge of the Andes mine.

As heretofore pointed out, Flood, Mackay and Jones are in control of the Comstock Mining and Milling Company, and it remains to be seen whether the Hale & Norcross stockholders will benefit by the change of masters. Any change from the old régime must, however, be considered for the better.

The report of Secretary Thompson showed that the total receipts during the fiscal year amounted to \$240,676.29, divided as follows: Bullion, \$12,086.60; assessments, \$169,480.48, and miscellaneous, \$59,109.21. The entire sum was disbursed, the main items being: Overdraft at Nevada Bank, \$5,064.02; wood, \$24,168.27; lumber, \$24,865.61; salaries, \$121,838.75; royalty on ore, \$13,810; powder, etc., \$7,936.

law expenses, \$3,297.35; hauling and milling ore, \$7,140; water, \$3,000; hardware, iron, etc., \$3,934.75; assays of ore, \$2,387.40.

In the suit of M. W. Fox against the directors of the Hale & Norcross Company *et al.*, the plaintiff's motion to amend his complaint came up for hearing on the 10th inst. before Judge Hebbard. Attorney Baggett submitted to the Court two amendments, with the purpose in view of having the complaint conform to the evidence elicited during the trial of the suit. The first amendment making Messrs. Hayward & Hobart stockholders in the Nevada Mill & Mining Company instead of lessees, as originally alleged, brought out a cross fire of argument. The defense contended that plaintiff had no right to amend, and demanded time to answer or demur. Attorney McKisick, for plaintiff, argued that Messrs. Hayward & Hobart were sued as individuals; it turned out during the hearing of the case that they were stockholders in a milling corporation. Further, it turned out that they made an individual agreement with Mr. Levy, president of the Hale & Norcross Company, that they would divide with him if he would send the Hale & Norcross ore to their mill. This was an individual agreement between them, and they simply used the Nevada Mill & Mining Company as a cloak, but the agreement was made by and between them individually.

The Court did not desire to hear any further argument, but allowed the amendment, the motion of the attorney for the defense that time be granted to plead or demur to the amendment being denied, on the ground that it was really not an amendment in substance.

The second amendment fixed the cost of milling ores at the Nevada mill at \$2.60 per ton. The Court inquired whether, in allowing this amendment, the Court would not be bound in its findings to that sum? Counsel for plaintiff explained that the amendment was not offered with any such purpose, but only with the end in view that the Court might more readily arrive at the actual cost of milling the ores, the original allegation as to \$3.50 per ton being a "reasonable" price being in this manner sustained, and a profit of 90 cents per ton clearly shown.

In reply to an interrogatory of the Court counsel for the defense said that the cost of milling ore was calculated by them at \$4.50 per ton, and that \$2.50 profit made the total of \$7 per ton, the amount charged, and which they considered a reasonable figure.

The Court is deciding on the point embodied in the last amendment said: "I have not said that the cost of milling was \$2.60 per ton, or, indeed, any sum. In the form in which the amendment is offered it is denied without prejudice." Continuing in answer to certain demands of the defense that further proofs might be submitted by them, the Court said: "If after the case is submitted and if I should conclude for the plaintiff no further proof on this subject will be necessary from the defense."

Argument on the case is set for Wednesday, 16th inst.

#### NEW MEXICO. GRANT COUNTY.

The Silver City & Northern Railroad Company has cancelled the through rate on iron shipments from Hanover. This will prevent all shipments of iron from that camp, except from the railroad company's mines, says the Silver City *Southwest Sentinel*. It is possible that this action on the part of the railroad company will result in the resumption of operations in the iron mines on Legal Tender Hill.

SUNSET MINING COMPANY.—Superintendent Nestor is pushing developments on the Ann Arbor mine. Contracts for a tunnel 300 ft. and a shaft 100 ft. were given in January. The adit level is now in 100 ft. The exact width of the vein at this point is unknown, as the breast is all in mineralized quartz with no hanging wall visible. On the foot wall side there is a pay streak of sulphides. The shaft, now at a depth of 60 ft., is being sunk in ore. The management has also started a shaft on the Oakland lode which runs parallel with and about 100 ft. to the south of the main vein, which is showing some good sulphide ore. As soon as the present contracts are finished others will be let as it is the company's policy to thoroughly develop its property before considering the question of a mill.

THE GRANT COUNTY MINING AND MILLING COMPANY.—This company has put in gold amalgamating plates for five stamps in the Bremen mill, and hereafter will be able to treat gold as well as silver ores. Five stamps were started lately on ore from the St. Helena mine in the Central district, and 10 stamps were started on silver ore. It is expected, says the Silver City *Sentinel*, that the mill will be kept running steadily as sufficient ore is assured. Mr. Frank Milstead has sold his interest in the company to his associates and has no further connection with it.

#### SANTA FE COUNTY.

CERRILLOS IRON AND COAL COMPANY.—This company is expending large sums in building railroad spurs and erecting new buildings.

SANTA FE COPPER COMPANY.—This company has shipped 14 carloads of 18 tons each of copper matte to an electrolytic refining plant. The shipments yielded 300 oz. of gold, 5,672 oz. of silver, and 465,000 pounds of ingot. This is the first time

the company has realized on any of the gold or silver in the matte.

#### NEW YORK.

At a meeting of the principal bluestone quarries of the Upper Delaware River Valley held at Port Jervis last week a combination was effected for regulating the prices of their product and other matters of common concern. The quarrying industry of the valley has been under a cloud for several years. The unorganized producers of the region have suffered from injurious competition among themselves and from their inability to cope single-handed with the big Union Bluestone Company, which controls almost the entire output of the quarries of Ulster and Greene counties. The organization of producers perfected at the Port Jervis conference is to be known as the Delaware River Bluestone Company, the principal officers being A. H. Woodward, of Newark, N. J., president, and C. W. Martin, of Middletown, N. Y., secretary. The more prominent producers interested in the combination are C. W. Maxwell & Co., Manny & Ross, Kirkpatrick Brothers, W. E. Scott, representing the quarries formerly owned by J. F. Kilgore, C. W. Martin and Samuel Coles. Mr. Coles is to be the company's sales agent in New York. The company owns or controls about 150 of the more productive and valuable bluestone quarries along either bank of the Delaware River between Port Jervis and Hancock, together with mills and machinery for shaping and dressing the stone for cornices, coping and other building or flagging purposes. The output of these quarries is of the value of \$700,000 to \$800,000 a year, and is expected to be increased under the new management. Shipments are principally made by the Erie Railroad or the Delaware & Hudson Canal. There is an increasing demand for the stone in all the cities along the Atlantic coast, which enjoy the advantage of moderate transportation rates.

#### PENNSYLVANIA.

##### COAL.

It is stated that the Philadelphia & Reading is to build mills for the manufacture of the blasting powder used in the collieries owned by the company.

The annual report of the mine inspector for the sixth anthracite district for 1891 shows the total production of coal was 6,419,302 tons, an increase of 182,748 tons over 1890. The fatal accidents for the year were 66, being the same as in 1890; non-fatal, 9, a decrease of 5 as compared with 1890. The total amount of coal produced per life lost was 95,757 tons, as against 94,491 tons in 1890.

WILKES BARRE & EASTERN RAILROAD COMPANY.—A charter has been granted to the Wilkes Barre & Eastern railway company, the line of which runs from Wilkes Barre to Delaware Water Gap, Monroe County, about 70 miles. The capital is \$3,000,000, and the incorporators are W. P. Ryman, J. W. Hollenbrick, G. R. Bedford, Ira E. Hartwell, George H. Butler, E. Troxel, F. C. Sturges, Henry A. Fuller, Tuthill R. Hillard, Albert S. Orr, all of Wilkes Barre; Dewitt H. Lyon, Greenwich, Conn.; Charles B. Copp, New York City. The number of shares is 60,000, of \$50 each, and of the amount subscribed, Lyon and Copp each have 4,900 shares. The line has already been located, and is to be completed during 1892. It is to extend from Wilkes Barre, where the best of terminal facilities have been secured, to Stroudsburg, Pa., and will have a grade not exceeding 52 ft. to the mile. It will have control of several large tracts of anthracite coal lands. There is said to be little doubt that the Susquehanna & Western Railroad will get the connection, although other roads are hiding for it.

##### OIL.

The Chief of the Bureau of Statistics reports the total value of the exports of mineral from the United States for the month of February, 1892, and during the eight months ending February, 29th, 1892, as compared with similar exports during the corresponding periods of the preceding year as follows: February, 1892, \$3,217,578; February, 1891, \$3,159,025; eight months ending February 29th, 1892, \$30,515,596; eight months ending February 29th, 1891, \$36,483,516.

#### SOUTH DAKOTA.

##### LAWRENCE COUNTY.

GOLDEN REWARD.—The recent tests of the McArthur-Forrest cyanide process at the chlorination works were very unsatisfactory, it is said.

#### TENNESSEE.

##### ROANE COUNTY.

FROZEN HEAD.—This coal mine, near Harriman, is to be developed.

#### UTAH.

##### JUAB COUNTY.

BLACK EAGLE CONSOLIDATED MINING COMPANY.—This company was incorporated recently with a capital stock of \$1,500,000, divided in 150,000 shares. The property consists of the Queen Snowdrift, Bonnie Dundee, Grand Prize, and Mohawk lodes, located in the Tintic mining district.

PRIDE OF THE HILLS MINING COMPANY.—This company was recently incorporated with a capital stock of \$500,000 by D. A. Shiley, John W. Smith, James L. Zundt, J. E. Ogelesby and H. B. Wind, to operate in the Tintic mining district.



FOREIGN MINING NEWS.

BELGIUM.

A terrible accident occurred in the Anderlues colliery near Charleroi on the 11th inst., at 8 o'clock in the morning, in a gallery 400 ft. below the surface. The explosion was so violent that the fan over the air shaft was shattered. There were 270 men working in this portion of the pit at the time. Of this number 40 escaped and 16 were rescued, though many of the latter were in a fatally injured condition. The remainder of the men in the mine were killed, either by the explosion or the succeeding choke damp.

UNITED KINGDOM.

ENGLAND.

The great coal miners' strike which has been talked of for a month past was inaugurated on the 12th inst. The collieries in all parts of the Kingdom are now idle. The men are orderly, no trouble having been reported anywhere. Coal is being brought in from Belgium in considerable quantities, but the stocks in England are already much reduced and in some industries works have been obliged to close down on account of the scarcity of coal. At a meeting of the miners on the 17th inst. it was voted to go to work again next Monday.

CHEMICALS AND MINERALS.

The market for heavy chemicals has not undergone the change that was expected by many. With the exception of caustic soda the effect of the English coal strike (which it is reported to-day will be terminated on the 19th inst.) has not been especially marked, owing to the fact that supplies were abundant. Caustic soda advanced somewhat; for goods on the spot or on the way, 70-74%, 3 20@3 25c. was asked. There has been a fair demand for the majority of the heavy chemicals, both for prompt and for future delivery. Quotations for the various chemicals are as follows:

Caustic soda, 60%, 3 12 1/2@3 25c.; 70%, 2 95@3 10c.; 74%, 2 97 1/2@3 12 1/2c.; 76-77%, 3 1@3 1 1/2c. Carbonated ash, 48%, 1 65@1 75c.; 58%, 1 50@1 62c. Alkali, 48%, 1 57 1/2@1 65c.; 58%, 1 47 1/2@1 60c. Sal soda, English, 1 05@1 12 1/2c.; domestic, 95c. @ 1.05.

Acids.—The healthy condition of the acid market reported in our last issue continues unchanged. The demand is good both for prompt and future delivery, and in some cases prices have ruled slightly higher.

We quote this week for 100 lbs. of acid in New York, in lots of 50 carboys or more: Acetic, \$1.60 @ \$2, according to quality; alum, lump or ground, \$1.55@1.80; muriatic, 18", \$1; 20", \$1.12 1/2@1.25; 22", \$1.25; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 90c. @ \$1.10; oxalic, \$7.25@7.75. Blue vitriol is quoted all the way from \$3.25@3.50.

Brimstone.—A further decline is to be reported of Sicilian brimstone. Quotations are as follows: Goods on the spot, \$25 for best unmixed seconds and \$24 for best unmixed thirds. To arrive (March), \$23.50 for best unmixed seconds and \$22.50 for best unmixed thirds. The market is very dull. Consumers are buying from hand to mouth, as they believe that the bottom has not yet been reached. The steady decline of the past month lends an air of probability to this opinion, and buyers very naturally desire to take advantage of still lower figures, if they can.

Fertilizing Chemicals.—The market for fertilizing chemicals has undergone no change since our last report. There has been but a fair demand for raw materials, and there have been accumulations which preclude any advance in price—indeed, in some instances quotations are slightly lower. The fertilizer men long ago lost hope of a good year in the South, owing to causes specified at various times in this column; but the Northern trade thus far has not proven what was expected. We hear of some small sales, which are devoid of any special significance. Quotations show but little change. Sulphate of ammonia, 2 95@3c. for spot. Dried blood, \$1.80 per unit for high grade and \$1.70 for low grade. Acidulated fish scrap, \$13.50 f. o. b. factory. Dried scrap \$23.50@24. Azotone, \$1.80. Tankage, \$16.50@20, according to grade. Bone meal, \$22@23.

Double Manure Salts.—Quotations are about as follows for winter shipments, ex-vessel New York, in lots of 10 to 50 tons: 48%-53%, 1 18 1/2@1 23 1/2c.; 90-95%, 2 18@2 23 1/2c.; 96-99%, 2 21@2 23 1/2c.

Kainit.—The trade in kainit thus far this season has been very satisfactory. Sales for future delivery at various ports aggregate about 2,000 tons at the syndicate prices. Quotations at New York are \$8.75 for invoice weight and \$9 for actual weight. These figures are, of course, for cargo lots.

Muriate of Potash.—There is a fair jobbing demand for muriate. The arrivals this month have been rather heavy. Since March 1st there have been received at various ports in the United States 1,650 tons. Syndicate prices rule.

Phosphates.—There is nothing doing in the market for phosphates. Prices remain unchanged as follows: Charleston, f. o. b., \$5@5.50, dried, with freights at \$1.75@2.

Mr. Paul C. Trenholm, of Charleston, S. C., furnishes us with the following statistics of the shipments of phosphate rock from Charleston during February, 1890, 1891 and 1892:

Domestic:	Crude		
	1890.	1891.	1892.
Baltimore.....	2,240	7,110	3,796
Philadelphia.....	*	1,201	2,938
Weymouth, Mass.....	1,295	1,385	825
Barren Island.....	515	600	*
Richmond, Va.....	300	1,890	700
Wilmington, N. C.....	1,123	576	*
Elizabethport, N. J.....	449	*	*
New Town Creek.....	1,074	*	*
Carteret, N. J.....	*	1,450	1,650
Seaford, Del.....	*	600	*
Savannah, Ga.....	*	295	*
So. Ca. R. R.....	436	*	1,167
C. & S.....	2,201	1,325	1,338
N. E.....	*	622	1,497
Total.....	9,633	17,064	413,960

\* Ground. † Including 50 tons to Gothenburg (foreign).

Several articles have recently been printed in the Charleston News and Courier, in which statements were made to the effect that the shipments of fertilizers by the South Carolina Railway were in excess of those in the corresponding period of 1891, and that there was prospect of further increase. With reference to these statements Mr. Frank E. Taylor, of Robertson & Taylor, large manufacturers of fertilizers in Charleston, wrote a letter to the Charleston News and Courier on the 8th inst., of which the following is an abstract:

"Statements such as these, however honestly made, create, in the first place, a very wrong impression in regard to the extent of the fertilizer business that is now being done at this port, and have a very depressing effect upon the future values of cotton. If in Charleston, which is considered the headquarters of the phosphate trade in this country, bullish articles are published in regard to the consumption of fertilizers, how is it possible to convince the public mind that the consumption of fertilizers will probably be from 40% to 50% less than last year? And yet at the present writing, from reliable statistics, this decrease appears to be a coming fact. Messrs. Hubbard, Price & Co., in their circular of February 29th, state that their Charleston correspondent, in reply to their inquiry regarding the movement of fertilizers from that city, informed them: 'Fertilizer figures from the beginning of the season to the end of February show that the South Carolina Railway is 1,200 cars behind last year, the Charleston & Savannah Railway, to the end of January, is 1,300 cars behind last year, the Northeastern Railroad cannot give exact figures, but is a good deal behind last year.'

"The simplest plan to show that the shipments of fertilizers from this port are very much decreased from those of last year is to furnish some statistics which have been carefully compiled by Mr. P. C. Trenholm. This statement covers the shipments of last season, say from September, 1890, to March 1st, 1891, and also shows the shipments of this season from September, 1891, to March 1st, 1892, over the various roads and by the river steamers:

Charleston & Savannah Railway—Shipments from September, 1890, to March, 1891.	56,790
Northeastern Railroad—Shipments from September, 1890, to March, 1891.	45,258
River Steamers—Shipments from September, 1890, to March, 1891.	3,841
Total tons.....	105,889
Charleston & Savannah Railway—Shipments from September, 1891, to March, 1892.	36,575
Northeastern Railroad—Shipments from September, 1891, to March, 1892.	35,827
River Steamers—Shipments from September, 1891, to March, 1892.	2,801
Total tons.....	75,203

"Deficiency in shipments up to March 1st, 1892, as compared with period up to March 1st, 1891, by the above transportation lines of 30,686 tons.

"The South Carolina Railway is not included in the above statement on account of the fact that it states it is impossible for it for some days to give the number of tons shipped over that road in February. Hence, as far as this road is concerned the comparative statement is up to February 1st:

South Carolina Railway—Shipments from September, 1890, to February, 1891.	51,495
South Carolina Railway—Shipments from September, 1891, to February, 1892.	30,269
Showing a deficiency in tons.....	21,226

"Presuming that this road has shipped during the month of February 30,000 tons, as against 42,000 tons February last year, this would show a total deficiency with it up to March, 1892, of 33,226 tons, making, under this estimate, the deficiency over the various lines of transportation mentioned 63,912 tons, which is equal to a decrease of 32% from last year's shipments at this port.

"It occurs to me, therefore, that these statistics are so plain that it will be clearly understood by even those who may desire to 'bear' the price of cotton that the decrease in the consumption of fertilizers will be extremely marked, and must necessarily decrease the production of cotton, independent of a decrease in acreage.

"All indications point to much less shipments during March and April of this year, as compared with March and April of 1891, and as numbers of the Eastern manufacturers have reduced their shipments to the South very largely as compared with last year, and as some have absolutely declined to offer a ton of goods—notably the well-established house of John Merriman & Co., of Baltimore—it would appear that when the season is ended and statistics are carefully compiled, there will be shown a decrease in the consumption of fertilizers of about 40% or 50% throughout the South."

Nitrate of Soda.—The market for nitrate is fairly strong just now. A good deal has moved during the past fortnight. Quotations for spot are \$1.90 @ \$1.95; and to arrive (all shipments), \$1.85 @ \$1.87 1/2.

Liverpool. March 9.

(Special Correspondence of Joseph P. Brunner & Co.)

In spite of the threatened coal strike, our market for heavy chemicals is very dull, the general impression apparently being that the strike will be of short duration, and is not likely to cause much trouble to manufacturers.

The directors of the Alkali Company at the close of last week announced their intention to declare a dividend on the ordinary shares at the rate of 5% per annum, placing £200,000 to the reserve fund. Although the dividend is what was expected by members of the chemical trade for some time past, it seems to be disappointing to some people, as immediately after the dividend was announced the ordinary shares fell from £7 5s. to £6 17s. 6d., and they are to-day quoted at 2s. 6d. @ 3s. 9d. below the lower figure. The par value of these shares is £10, so that at the present price they are at a discount of about £3 5s. per share.

Soda ash is in moderate demand, and for the commoner qualities, the minimum spot quotations are without change as follows: Caustic ash, 48%, £5 6s. 3d.; 57-58%, £6 7s. 6d. per ton; carl ash, 48%, £5 9s. 9d.; 58%, £6 12s. 9d.; ammonia ash, 58%, £6 7s. 6d. per ton, all net cash. For prime brands a considerable premium on above figures is asked.

Soda crystals in fair demand at £3 10s. @ £3 12s. 6d. per ton, less 5%.

Caustic soda is neglected, and is very slow of sale. The quotations for all quarters except the United States are as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s. @ £12 10s. per ton, all net cash.

For parcels under 10 tons 5s. per ton extra is charged.

The Union declines to make any sales of caustic soda on this market for export to the United States, the control being in the hands of agents at your side.

Bleaching powder is well maintained, but there is little actual business reported. For hardwood packages £7 15s. @ £8 per ton net cash are nearest spot values.

Chlorate of Potash is in a strong position, and the Union has advanced the price for March-April to 7d. per lb., while for contracts to the end of the year 6 3/4d. per lb. is asked. The smart advance seems to have checked business, but at the same time, the article being in such very small compass, buyers have to pay full prices for anything wanted promptly.

Perhaps an odd retail parcel or two could still be picked up at a shade under quotations named. Bicarb soda is in fair demand at £6 15s. @ £7 per ton less 2 1/2% for one cwt. kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia is selling to a fair extent, but the market seems to have got into the hands of the "bears" again, and values are rather easier at £10 7s. 6d. @ £10 10s. per ton for good grey 24%, and £10 15s. @ £10 17s. 6d. per ton for 25%, both in double bags, less 2 1/2% f. o. b. Liverpool. In some cases a shade under the lower figures has been accepted.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Deadwood, Dak., Pittsburg, St. Louis, London and Paris, see pages 342 and 344.]

New York, Friday Evening, March 18. No feature of interest is noted in the market for mining stocks. The same dullness, the same prices, the same everything. It will be noticed in the list of sales that the transactions aggregate a smaller number of shares than has been the case for some time past. This is due to the fact that only actual bona fide transactions have been reported. We understand that the Committee on Mining Securities at the Consolidated Stock and Petroleum Exchange has under consideration a reform in certain methods now in vogue at the Exchange. This is what we have advocated for a long time, and it is probable that our wish—which is the wish of every lover of legitimate dealing in mining shares—is in a fair way of being realized.

The position of the Comstocks shows but little change this week. The reports from San Francisco indicate a slightly improved market there, but this has not been reflected to any extent on this side. The usual reports of a deal in Consolidated California & Virginia are going the rounds just now, but, of course, no one knows anything definite. During the week there were sales of 400 shares of Consolidated California & Virginia, the

price advancing from \$4.30 to \$5. Hale & Norcross was very quiet at \$1.45@1.50. Transactions in Savage aggregated 250 shares at \$1.40@1.50. Of Sierra Nevada 200 shares were sold at \$1.60@1.75. A \$1,000 Comstock Tunnel bond was sold at 25. Of the stock 5,800 shares were dealt in at 17c. We note a solitary sale of 100 shares of Mexican at \$1.90, and 200 shares of Utah at \$1.50.

Of the California stocks there were sales of 300 shares of Bodie Consolidated at 53c@57c. Standard was in some demand, but the stock is closely held, and only 200 shares were sold at \$1.45@1.50. A single transaction of 100 shares at 60c. is reported of Belmont. During the week there were sales of 6,800 shares of Brunswick at 10c@11c.

The superintendent of the Brunswick Consolidated Gold Mining Company telegraphs under date of the 14th inst. "The mine is looking better. The shaft is in good ore in the bottom. The foot wall ledge has widened to 2 ft. This makes 3 ft. of ore with the hanging wall streak."

The Colorado stocks were quiet this week. There were sales of 500 shares of Adams Consolidated at \$1. Chrysolite shows a sale of 200 shares at 25c. Leadville Consolidated still remains the most popular in the Colorado stocks, and this week shows transactions of 5,500 shares at 18@21c.; the last sale was made at 18c.

Of the Black Hills stocks Caledonia was in some demand; there was a sale of 500 shares at \$1.10. Of Deadwood-Terra, 100 shares changed hands at \$2.10.

Horn Silver was slightly weaker; 600 shares were sold, the price declining from \$3.75 to \$3.60. El Christo returned to the Exchange this week with sales of 300 shares at 41@55c.

**Denver.**

Prices and sales for the week ending March 12th:

Company.	Open- ing.	H.	L.	Clos- ing.	Sales.
Mines.					
Alleghany.....	09a	110	110	110	100
Amity.....	02	02	102	102	6,100
Bangkok-C-B.....	01a	05½	04	105½	70
Bates-Hunter.....	65a				
Brownlow.....	01	104½	04	04	5,200
Calliope.....	11	17	15	16½	700
Claudia J.....	02½	03	02½	03	10,700
Cash.....					
Clay County.....	30a				
Emmons.....	45½	48	45½		12,000
Gettysburg.....	33a				
Gold Rock.....	35	45½	40	42	1,100
Leavenworth.....	06			06	
Little Itle.....	50				
Lexington.....	40	40	40	40	800
May-Mazepa.....	60	74	74		500
Matchless.....					
Oro.....	400a				
Pay Rock.....	03½	04	04	03½	1,200
Puzzler.....				02	
Paul Gold.....	15a	109	105	04	16,200
Read-National.....					
Rialto.....	105a				
Running Lode.....	40a				
Whale.....	04			07	
Bal. Smuggler.....	12	12	11	12	1,000
Sutton.....	24			24	
Prospects.					
Argonaut.....				17	
Big Indian.....					
Big Six.....	04	04	04	04	300
Century.....	07	08	07	07½	700
Diamond B.....	03½	04	03½	03½	5,300
Nat. Gas. & Oil Co.....	07	08	08	08	300
Golden Treasure.....	80a				
Ironclad.....	11	12½	12	12	2,700
John Jay.....	01a				
Justice.....	15½	117½	16	16	39,900
Morning Glim.....		39	39	39	5,300
Park Consolidated.....	07			07	
Potosi.....	01½	01½	01½	01½	1,000
Total.....					111,400

\* Buyer 30. † Buyer 60. Asked.

**Boston.**

March 17.

(From our Special Correspondent.)

The week opened with a general desire to purchase the copper stocks, and prices advanced quite rapidly for both the investment and speculative list. The better market for ingot copper, and the feeling that prices have reached the lowest point for the season, added to the existing short interest in the market, is no doubt the cause for the advance. The highest prices were not, however, maintained, and the reaction of the past few days will doubtless bring in new buyers, which will be reflected in higher quotations a little later on.

The Montana stocks have been the most active, Boston & Montana advancing from \$37½ to \$41, with reaction to \$38½, and closing to-day at \$39; about 10,000 shares changed hands during the week. Butte & Boston sold up to \$16 and held quite steady at \$15½. The dealings in this stock were much less in volume, and it did not advance relatively as much as its neighbor.

There was a good demand for Calumet & Hecla, which carried the price up to \$270, reacting in later dealings to \$265. Tamarack advanced from \$160 to \$165, with later sales at \$162½. The stock is strongly held and but little of it comes on the market.

Centennial continues to be the favorite of its class, and shows active dealings at an advance from \$11½ to \$13, closing at \$12½. Kearsarge was fairly active, but did not advance over last week's price; sales were made at \$12½@13½, closing at the latter price.

Franklin sold up to \$13½, a gain of \$1 for the week. Osceola advanced from \$29 to \$30, being

quite strong at the latter price. Atlantic sold at \$11, against \$10 in the early dealings. Allouez sold at \$1½. It is reported that the mine will be closed April 1st.

Wolverine advanced from \$1¼@2¼. This mine, which is under the same management as the Allouez, will suspend active operations, we are told, for the present, or until better prices prevail for ingot copper. National sold at \$1½. Bonanza advanced to 55c.

Quite an active business was transacted in Santa Fe, and price advanced to 45c., with reaction to 37½c. We have not heard of any sales of Quincy this week, but learn that \$112 is bid for it on the street.

The silver stocks are again quiet, with very little doing in them. We note sales of Catalpa at 25c. and Crescent at 15c. Napa Quicksilver is steady at \$5½.

3 P. M.—The market closed steady, but dull.

**San Francisco.**

March 12.

(From our Special Correspondent.)

Pine street is in mourning. For several years past stock trading has been forsaken by substantial business men, until now the handsome Stock Exchange is the resort of curbstone operators, mud-hens and the chipping fraternity, who have, for the most part, had control of the market. Occasionally a heavy operator has stepped in, but only for the purpose of "rigging" the market and stepping out again. The brokers are now, comparatively speaking, a poor class of men, and for some time efforts have been made to sell the Stock Exchange Building. In recent years it has been a white elephant on their hands, and the pettifoggery system of trading—to apply no stronger term—has been quite unworthy the splendidly appointed board rooms. The end has come, the building is to be sold and meaner quarters found. A few weeks hence, if present negotiations are successful, the scene of the excitements of bonanza days will witness quieter and certainly more honest business methods, for the Western Union Telegraph Company is in the field as a would-be purchaser.

During the week past ended the north end Comstocks have fluctuated somewhat, prices ruling lower than on Monday and Tuesday, but much the same as a week ago.

On morning call to-day Consolidated California & Virginia sold for \$4.25; Mexican for \$1.75; Ophir, \$2.80; Sierra Nevada, \$1.55; Union Consolidated, \$1.45, and Utah for 25 cents.

Of the middle group, very naturally Hale & Norcross has been the most active stock. The day of the annual election having passed the price dropped to \$1.05; a week ago it was quoted at \$2.10. J. L. Flood and Nat. Messer left for the Comstock on Thursday to take possession of the mine, and it is currently reported that on their return they will spring a surprise on the street. Of its nature nothing, however, has been divulged. Best & Belcher ruled this morning at \$2, a decline of 30 cents during the week; Chollar at \$1, a decline of 20 cents, and Gould & Curry at \$1.25; Potosi at \$1, and Savage at \$1.40, all showing a shrinkage in values.

The Gold Hill and South End stocks have in common with the balance of the market shown a decline, though to not the same extent. The following were ruling rates at the early session: Alpha, 35c.; Alta, 80c.; Belcher, 90c.; Bullion, 60c.; Caledonia, 20c.; Consolidated New York, 25c.; Crown Point, 95c.; Justice, 30c.; Overman, 45c.; Exchequer, 35c.; Occidental, 30c.; Seg. Belcher, 35c., and Yellow Jacket, \$1.10.

Scattering sales have been made of outside stocks, but no healthy or continued demands exist for any of them. Bodie Consolidated rules at 50c. Monday at 85c., Commonwealth at 15c. and Peer at 5c.

In the afternoon's regular session until the close trading was very dull and prices shaded off a trifle from the above quotations.

The following statement shows the financial condition of the principal mining companies having offices in San Francisco on March 1st, 1892.

SAN FRANCISCO, March 18—(By Telegram.)

To-day's opening quotations are as follows: Best & Belcher, \$2.30; Bodie, 45c.; Belle Isle, 20c.; Bulwer, 35c.; Chollar, \$1; Consolidated California & Virginia, \$4.80; Eureka Consolidated, \$1.50; Gould & Curry, \$1.40; Hale & Norcross, \$1.40; Mexican, \$1.90; Mono, \$80c.; North Belle Isle, 10c.; Nevada, 15c.; Ophir, \$2.90; Savage, \$1.40; Sierra Nevada, \$1.65; Union Consolidated, \$1.55; Yellow Jacket, \$1.05.

**St. Louis.**

March 16.

(From our Special Correspondent.)

The local market was very quiet up to Monday, when some good trading was carried on, restricted, however, to low price stocks. While most quotations remained at about the opening, some few show a decided decline.

Silver Age opened at 4c., on a sale of 400 shares, but from then on was dead, closing very weak at 1c.

Of Bimetallie 10 shares sold at \$21, at the opening; there was, however, but small demand for the stock at that figure and while holders were ready to sell, \$20 was the best bid to be had. The market closes at that figure.

Central Silver opened at 15c., 700 shares going, and later 500 shares sold at 12½@12c. On Friday 500 shares sold at 11½@11c., and on Saturday 100 went at 11c. Monday found the stock still declining, and sales of 3,700 shares brought it down

to 9@9½c. On Tuesday a boom set in and sustained prices, 15,200 shares selling at 9@10c. The market closes weak at 9c.

Elizabeth opened at 55c. and closes at 50c. On the opening 200 shares sold at 55@50c., the stock declining to 45c. On Monday 200 shares sold at 52½@53½c., and the market closes firm at 50c.

American & Nettie shows quite a decline for the week. Opening at 86½c., 200 shares sold at 87½c., 100 on Saturday at 83½c., and closes quiet at 70c. bid, 90c. asked.

Two sales of Silver Bell at 5c. of 500 share lots were made. The stock is now quoted at 23½c.

There was a little business in Granite Mountain, opening at \$16, 20 shares sold at that figure, and 35 shares on Friday at \$16.25, followed the next day by 10 shares at the same figure, and later by 10 more at \$16.25, closing at \$16.25 on a sale of 25 shares.

Of Little Albert 8,000 shares brought 4¼c. The market is now slow at 3¼c.

Yuma's plan to secure \$40,000 to put into the development of the property seemed to have failed and to the call only \$2,400 responded. It looks as though nothing can be done in the matter. The stock is quoted at 6c.

**DIVIDENDS.**

Argyle Gold Mining Company, dividend No. 2 of one cent per share, \$10,000, payable March 28th, at the office of the company, 410 Chamber of Commerce, Chicago, Ill. Transfer books close March 25th, and reopen March 30th.

Daly Mining Company, dividend No. 61, of twenty-five cents per share, \$37,500, payable March 31st, at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York.

Homestake Mining Company, dividend No. 164 of ten cents per share, \$12,500, payable March 25th, at the office of Messrs. Lounsbury and Co., Mills Building, New York. Transfer books close March 21st, and reopen March 26th.

Ontario Silver Mining Company, dividend No. 190, of fifty cents per share, \$75,000, payable March 31st, at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York.

**ASSESSMENTS.**

COMPANY.	No.	When levied.	D't'nd't' in office.	Day of sale.	Am't. per share.
Andes, Nev.....	38	Mar. 8	Apr. 11	Apr. 29	.25
Belcher, Nev.....	43	Mar. 8	Apr. 12	May 3	.50
Best & Belcher, Nev.....	51	Mar. 3	Apr. 7	Apr. 29	.25
California, Cal.....	2	Feb. 10	Mar. 12	Mar. 28	.03
Fall River Cons. Cal.....	7	Feb. 24	Apr. 2	Apr. 25	.02
Guanacatan & California, B. C.....	6	Feb. 9	Mar. 15	Apr. 5	3.00
Lew Wallace, S. Dak.....	3	Feb. 16	Apr. 18	May 7	.001½
Little Pittsburg, Utah.....	1	Feb. 23	Mar. 28	Apr. 13	.01
Middle Creek Gold, B.; Col.....	2	Jan. 16	Feb. 10	Mar. 22	.05
Vodoc Chief, Idaho.....	1	Jan. 28	Mar. 21	Apr. 11	.00½
Montreal, Utah.....		Feb. 17	Mar. 26	Apr. 13	1.0½
Norway, Utah.....		Dec. 24	Feb. 1	July 21	.02
Overman, Nev.....	63	Feb. 10	Mar. 16	Apr. 6	.50
Peer, Ariz.....	12	Feb. 24	Apr. 6	Apr. 28	.10
Pennsylvania Con., Cal.....		Feb. 23	Mar. 21	Apr. 9	.05
Pine Hill.....	1	Feb. 11	Mar. 24	Apr. 15	.04
Savage, Nev.....	78	Feb. 2	Mar. 8	Mar. 28	.50
Sierra Nev., S. Nev.....	101	Feb. 1	Mar. 4	Mar. 24	.30
Teresa, Mex.....	7	Feb. 19	Mar. 21	Apr. 6	.10
Utah, Nev.....	14	Mar. 8	Apr. 12	Apr. 29	.25
Weldon, Ariz.....	5	Feb. 2	Mar. 15	Apr. 14	.05
Yellow Jacket, Nev.....	5	Feb. 8	Mar. 4	Apr. 2	.50

**PIPE LINE CERTIFICATES.**

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.					
	Opening.	Highest.	Lowest.	Closing.	Sales.
Mar. 12.....	59½	59½	59½	59½	5,000
14.....	59½	59½	59½	59½	5,000
15.....	58½	58½	58	58½	15,000
16.....	57½	57½	56	57	52,000
17.....	56½	57	56½	57	45,000
18.....	56½	56½	56½	66½	10,000
Total sales in barrels.....					132,000

NEW YORK STOCK EXCHANGE.					
	Opening.	Highest.	Lowest.	Closing.	Sales.
Mar. 12.....	58½	58½	58½	58½	3,000
14.....	58	58	58	58	4,000
15.....	57½	57½	57½	57½	9,000
17.....	19½	19½	19½	19½	.....
18.....	19½	19½	19½	19½	250
Total sales in barrels.....					16,250

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, March 18  
PRODUCTION OF BITUMINOUS COAL for week ending March 12th, and year from January 1st.

	1892.		1891.
	Week.	Year.	
Pittsburg, Pa.....	21,132	259,475	216,887
Westmoreland, Pa.....	32,754	352,690	415,891
Xonongahela, Pa.....	5,910	88,119	120,845
Total.....	59,796	700,284	753,623
Grand total.....	345,057	3,867,241	4,296,227

	1892.		1891.
	Week.	Year.	
Phila. & Erie R. R.....	1,826	18,117	30,935
Cumberland, Md.....	0,051	613,875	789,258
Barclay, Pa.....	3,147	42,934	33,281
Broad Top, Pa.....	9,697	113,659	132,880
Clearfield, Pa.....	69,903	711,310	917,819
Allegheny, Pa.....	24,333	227,322	275,563
Beech Creek, Pa.....	141,273	455,784	486,485
Poconantas Flat Top.....	44,957	500,622	448,760
Kanawha, W. Va.....	*40,074	480,294	427,623
Total .....	285,261	3,163,957	3,542,604

\*Week ending March 7th.  
 †Estimated.  
 Statement of shipments of anthracite coal (approximated), for week ending March 12th, 1892, compared with the corresponding period last year:

Regions.	March 12, 1892.	March 14, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region..	410,780	329,097	Inc. 81,683
Lehigh Region..	130,879	115,660	Inc. 15,219
Schuylkill Region..	248,827	224,552	Inc. 24,275
Total.....	790,486	669,309	Inc. 121,177
Total for year to date.....	7,362,273	6,778,481	Inc. 583,792

Statement of shipments of anthracite coal for month of February, 1892, compared with the corresponding period last year:  
 Compiled from the returns furnished by the mine operators.

Regions.	February, 1892.	February, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region..	1,625,521	1,235,191	Inc. 390,330
Lehigh Region..	532,233	374,726	Inc. 157,507
Schuylkill Region..	1,059,219	767,285	Inc. 291,933
Total.....	3,216,972	2,377,201	Inc. 839,771

Regions.	For year 1892.	For year 1891.	Difference.
	Tons.	Tons.	
Wyoming Region..	3,146,448	2,919,488	Inc. 226,960
Lehigh Region..	885,580	874,147	Inc. 11,432
Schuylkill Region..	1,994,811	1,722,517	Inc. 272,293
Total.....	6,026,839	5,516,163	Inc. 510,676

The stock of coal on hand at tide-water shipping points, February 29th, 1892, was 885,653 tons; on January 31st, 1892, 790,932 tons; increase, 94,721 tons.

PRODUCTION OF COKE on line of Pennsylvania R. R. for the year ending March 12th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 118,113 tons; year, 1,181,458 tons; to corresponding date in 1891, 703,117 tons.

**Anthracite.**

The shipments of anthracite are steadily increasing over those of 1891, although the market has been no better. During February the increase over the same month of 1891 amounted to 839,771 tons, 716,972 tons in excess of the allotments. The stocks at tide water shipping points February 29th increased 94,721 tons over those of January 31st. The increase for 1892, up to March 12th, amounts to 583,792 tons, as there was a falling off in shipments in January.

During the week the market has been quiet, though firm. The action of the sales agents in raising the price of chestnut 25c. to \$3.65 excited much comment, as it was thought to be indicative of a probable increase all along the line. This is not necessarily true, however, as chestnut has been selling at a relatively low figure for some time past.

During 1891 the prices for chestnut were as follows: January, \$3.75; April, \$3.50; June, \$3.65; July, \$3.75; September, \$4.00; October, \$4.15; November, \$4.15. There is always an increased demand for chestnut in the autumn, while in the spring the price falls, though rarely below the recent quotation of \$3.40. This action therefore does not necessarily indicate a general advance due to the Reading deal, although it seems highly probable that it is but the forerunner of that.

The New York Senatorial committee to examine into the Reading deal met again March 12th. President McLeod, of the Philadelphia & Reading, President Maxwell, of the New Jersey Central and President Baker, of the First National Bank of this city, and a director of the Delaware, Lackawanna & Western, were important witnesses.

President McLeod testified that the allied roads convey but 57% of the anthracite product, whereas it had been claimed that nearly 70% would be controlled by the combination. President McLeod said that the object of the deal was not to raise the price of coal, but to equalize it. It had been selling in some places lower than it ought and in others much higher.

The object therefore was to put things on an equal basis, and to do away with middle men and commissions of all kinds. In reply to a question whether any of the companies were selling at a loss, he said in several instances they were, and that the price at the seaboard was frequently less

than in Philadelphia, and that this was due to the excessive competition of middle men. President McLeod claimed, moreover, that owing to the consolidation more freight could be handled at less cost per ton to the people. It transpired likewise that President McLeod has conducted his negotiations with great secrecy neither of the leased companies knowing of his plans for the consolidation of the three roads with the Reading.

Mr. McLeod's statements regarding the undue profits and disturbing influence of the middle men were hardly liked by those gentlemen, though taken *cum grano salis*. Instead of the profit of \$1.80 a ton which President McLeod claimed had sometimes occurred they say they are likely to make 15c and it is hinted that sometimes on large contracts they are willing to part with a portion of this. That, of course, is considered legitimate.

The Senatorial Committee has made a preliminary report, in which it states that from the testimony of witnesses it is unable to determine how far amicable relationships exist between the roads mentioned in connection with the combination, including the Delaware, Lackawanna & Western, and the Erie, with the Reading combination, that it was plain to the committee, however, that under existing laws it would be impossible to protect the consumer, if all the roads mentioned should come into the deal. The committee then introduced a resolution asking that it be empowered to sit during the recess to continue the investigation. This resolution was adopted.

The situation in Pennsylvania is unchanged. The matter is stagnant, and no decision will be reached within a year. The one unfavorable feature of Attorney-General Hensel's suit is that it is brought before the same court and judge which decided unfavorably the question of the Pennsylvania Railroad's agreement with its parallel and competing line, the South Pennsylvania.

The Arnot suit is not deemed of much consequence. It is not thought probable either that the Pennsylvania will attempt any active measures against the Reading deal, but if it passes successfully will make amicable arrangements, as it cannot afford to fight, carrying as it does such a small proportion of the anthracite production.

The situation in a nutshell is this: The State of New York under no consideration can interfere with the deal proper. New Jersey, although Governor Abbott has not signed the bill, is practically settled, for it is tacitly understood that he will soon append his signature, although there were rumors to the contrary in the stock market this afternoon, and with this stumbling block removed there remains but Pennsylvania, where popular opinion is claimed to be so much in favor of the deal that no serious interference is anticipated.

We quote the following circular prices of the Lehigh & Wilkesbarre Coal Company, delivered f. o. b. at Port Johnston:

	Lump.	Broken.	Egg.	Stove.	nut.
Honey-Brook Lehigh.....	\$4.75	\$3.90	\$3.90	\$3.00	\$3.90
Wilkesbarre.....	3.65	3.75	3.90	3.65	
Plymouth Red Ash.....	3.75	3.85	4.00	3.90	

At a meeting of the sales agents on Wednesday, it was voted to restrict the output this month to 2,500,000 tons. In accordance with this, a number of collieries throughout the anthracite regions were closed down temporarily on Thursday and yesterday.

Coal stocks have been dull this week, with the exception of Reading, of which large sales were made, though all were comparatively steady. Reading opened on Saturday at \$57% and rose to \$59%, its closing figure, falling, however, on Monday to \$57%, and remaining steady with heavy transactions during the week, closing to-day at \$56%. Sales for six days amounted to 633,257 in New York, and 203,105 shares in Philadelphia, Delaware, Lackawanna and Western opened on Saturday at \$162% and fell to \$159%. It had but slight fluctuation during the week, and closed to-day at \$158%, with sales of 11,663 shares. Delaware & Hudson was but little traded in. It opened Saturday at 140%, remained fairly steady during the week and closed to-day at \$139%, 7,559 shares being disposed of.

**Bituminous.**

The bituminous market has been weak, influenced to a certain degree by the cutting of rates by sales agents. In fact at one time it looked as if soft coal interests were going to the dogs. Some attempt has been made, however, to make harmonious arrangements between the agents without which it seemed probable that the dissolution of the Seaboard Association would be imminent. It seems that the Clearfield and Beech Creek shippers were cutting market rates, and the others naturally objected. This action, on the part of the rate breakers is considered rather foolish in the face of a market, steady by sympathy at least with the anthracite.

There have been rumors, unconfirmed of course, that the Reading was looking for the control of the bituminous fields through extensions into the Beech Creek country and even into West Virginia, by arrangements with the Baltimore & Ohio, and by the control of the Norfolk & Western. While undoubtedly the Reading may be planning extensions to increase its business in the anthracite fields, there can be no question that the impracticability of controlling the bituminous fields is apparent to President McLeod. In the first

place such a combination would have powerful competitors in the Chesapeake & Ohio and the West Virginia Central. If the Chesapeake & Ohio could be subsidized, which is extremely doubtful, the West Virginia Central, antagonized by long and bitter warfare by the Baltimore & Ohio, would use the greatest efforts to make such a combination unprofitable, and it would seem certain that it would be in a position to do so, possessed of an enormous acreage of coal lands in the Big Vein districts and fair terminal facilities.

While such a combination as this seems highly improbable yet efforts, now confined to the maintenance of the Seaboard Association, will be made in the future by the strengthening of that association to prevent prices being lowered to an unprofitable figure.

There has been but little news during the week. There is an experiment being made at Shaw, W. Va., in the 4 ft. vein, which is being watched with interest by many operators. It is an attempt to work at a profit the smaller veins of that region. If successful, another large available supply of good quality coal will be opened on the line of the West Virginia Central. The Chesapeake & Ohio Canal has been opened for the coal traffic, and it is said a large business is expected from the Consolidation Coal Company. This, while stated, would seem rather improbable as the cost of shipping over the canal to Georgetown, D. C., including the maintenance of additional officers, with increased salary list, amounts to nearly \$1.50 a ton, which is much above the cost of railroad shipments, to say nothing of the delays on the canal, the voyage occupying 14 days, and the lack of vessels and high freight, from Georgetown.

Ocean vessels are scarce at terminal points, high winds prevail, and they are laying huddled together at safe harborage. As a consequence the stocks at shipping points have increased somewhat, although the production this year, to March 12th, is nearly 300,000 tons less than during the same period of 1891.

**Buffalo.**

March 17.

(From our Special Correspondent.)

The long expected bids for lighting this city were opened yesterday. The three gas companies on a three-year contract offered to supply gas at \$1.10 per 1,000 cu. ft., and for a five-year contract at \$1. The two electric light companies made this offer: 37% c. per light per night for a three-year contract or 35c. for a five-year contract. This shows a reduction on the long contract of 20c. for gas per 1,000 ft. and 5c. for each electric light. The electric companies also agree "that in case they should be able to obtain their electricity from the Niagara Falls tunnel, to appoint one expert, the Department of Public Works another, and the two to select a third, and arbitrate on the reduction, if any, in the price which the companies should make, and by which both city and companies should be bound. The companies united in a letter stating that there is no money in electric light at present at less than 40c. per light, but that they expect that improvements will be surely made to lessen the cost of production.

The bituminous coal men have had their turn the past week, as contracts have been awarded by the Canadian Pacific and Grand Trunk Railroad companies at figures which are kept private but said to be five cents per ton less than those of last year's quotations. From the latter company the Bell, Lewis & Yates Company have secured 150,000 tons, Messrs. Brinker & Jones 100,000 tons, the H. K. Wick Company 75,000 tons, Mr. Thomas Loomis 50,000 tons—all these are Buffalo firms—and Mr. O. W. Shipman 165,000 tons. The Canadian Pacific coal went to the Bell, Lewis & Yates Company to the extent of 162,500 tons and to Mr. O. W. Shipman 42,500 tons. The coal is to be delivered at Suspension Bridge, Preston, Brockville, and Messina Springs.

From a report made by the Superintendent of the Buffalo City Water-Works it appears that the difference between burning natural gas as now, and coal in the past, is a saving of \$1,000 per month. The cost of fuel is based upon experiments made with coal costing \$3.48 per ton, grate size. The gas costs about 12 cents per 1,000 cu. ft., about one-half what the householder pays.

The Lehigh Valley Company has ordered 4,000 freight cars within the last few weeks, including 1,500 coal gondolas of 60,000 lbs. capacity.

**Chicago.**

March 17.

(From our Special Correspondent.)

So far March has not gone back on its record as a good coal month. All-rail coal now coming forward is readily absorbed at full circular rates, and if there is any cutting it is kept very close. Country orders are fair for the season, the present weather being conducive to a good consumption of coal of all sizes. Local retail trade is good, and, with such weather conditions, is worth over 1,000 tons a day to the general retail trade over the business done in February. Of course, orders are not large, ranging from one to ten or twelve tons, but they are numerous, and some of the larger retail houses are from one to three days behind in deliveries. Hence it will be seen that a continuation of this kind of business will clean up the docks and larger yards by May 1st. The smaller retailers are supplying themselves very sparingly, such trade being practically of a hand-to-mouth character. There is still a surplus of nut coal, on which there is probably some shading.

Bituminous coal is in poor demand, for which various reasons are assigned. Railroads are not taking their full quota, having less grain to haul on account of the country roads, which have rendered wheeling almost impossible for the past few weeks. Some industrial works are not as active as they will be a little later, and so on. The late congested condition of the soft coal market is gradually being relieved. As rapidly as these "wild" lots are being taken the market improves. Shippers generally are now making absolute sales before ordering large stocks of coal. The attempt of some of the larger operators of Indiana block coal to form a combination to regulate the output, prices, etc., has proved a failure, and production, etc., will be "go as you please." With regard to prices, the figures will be about \$1.35, mine. The adjournment of the meeting at Pittsburg, March 14, without action as to prices on lake shipments for the ensuing season is indicative of a state of friction which may result in low prices and low rates, unless the differences are speedily adjusted.

Coke is less active, either for furnace or foundry. The shutting down of several furnaces in this vicinity will reduce consumption at this point just that much. Still there is a fair increase over that for the corresponding period in 1891.

Quotations are \$4.65, furnace; \$5.05, foundry; Connellsville; West Virginia, \$3.90, furnace; \$2.10 foundry; New River foundry, \$4.90; Walston, \$4.65, furnace; \$5, foundry.

Circular prices are unchanged at the following rates: Lehigh lump, \$6.25; large egg, \$5; small egg, range and chestnut, \$5. Retail prices per ton are: Large egg, \$6.00; small egg, range and chestnut, \$5.75.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.15; Hocking Valley, \$3; Youghioheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.35.

**Pittsburg.** March 17.  
(From our Special Correspondent.)

**Coal.**—The coal operators report the coal trade dull and in a very depressed condition. The river operators refer this state of affairs mainly to the discrimination against them in the differential 1/2 cent in mining in favor of the railroad men. The railroad dealers claim that business is dull by reason of the stagnation in the iron industry, which affects them directly. The present consumption of coal, even for domestic purposes, is by no means up to the average, and large stocks are on hand as a consequence. The local business now is only a semblance of what it ought to be.

Pittsburg operators who supply the New Orleans market reduced prices from 33@35c. per barrel of 2 1/2 bushels to 31@33c. Nine firms have agreed to the cut. The stock of coal in the pools and the harbor is very small.

**Connellsville Coke.**—There is no improvement to note in the trade, although the average in the running orders was increased from 4 1/2 days to a fraction over 5 days last week; yet with this increased average the shipments from the region decreased 305 cars. The decrease was: Western shipments, 98 cars; Eastern shipments, 173 cars, and Pittsburg shipments, 34 cars.

A brighter outlook cannot be expected for this region until the stocks on hand are used up. The Frick company is still reported as blowing out more ovens. The shipments for the week were 129,350 tons, distributed as follows: To Pittsburg, 2,000 cars; east of Pittsburg, 1,543 cars; points west of Pittsburg, 3,652 cars; total, 7,195; previous week, 7,500 cars; decrease, 305 cars. The price of coke is unchanged.

**METAL MARKET.**

NEW YORK, Friday Evening, March 18, 1892.  
Prices of Silver Per Ounce Troy.

March.	Sterling Exchange.	London.	N. Y. Cents.	Value of sil. in \$.	March.	Sterling Exchange.	London.	N. Y. Cents.	Value of sil. in \$.
12	4.87 1/4	41 1/4	90	.696	16	4.87 1/4	41 1/4	90 1/2	.697
14	"	"	90 1/2	.697	17	"	"	90 1/2	.697
15	"	"	90 1/2	.697	18	"	41 1/4	89 1/2	.695

The silver market is without animation. The Government has purchased more than its pro rata for the month. The Continental demand has been light. Shipments to India are taking place in a very moderate way, but it is not the season when bankers are interested in advancing the rate of exchange and therefore the price of silver.

The United States Assay Office at New York reports the total receipts of silver for the week to be 89,000 ounces.

**Silver Bullion Certificates.**

	Price.		Sales.
	H.	L.	
March 12.....	.....	.....	.....
March 14.....	.....	.....	.....
March 15.....	.....	.....	.....
March 16.....	90 1/2	.....	5,000
March 17.....	90	.....	2,000
March 18.....	90 1/2	89 1/2	50,000
Total sales.....	.....	.....	57,000

**Government Silver Purchases.**

Washington, D. C., March 18th, 1892 (By Telegraph).—The Treasury Department purchased today 487,000 ozs. of fine silver at prices ranging from .9015 to .9022 per ounce fine.

**Domestic and Foreign Coin.**

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars.....	.70	.75
Mexican dollars.....	.70	.71 1/2
Peruvian soles and Chilean pesos.....	.68	.70
English silver.....	4.83	.....
Five francs.....	.93	.95
Victoria sovereigns.....	4.86	4.90
Twenty francs.....	3.85	3.90
Spanish doubloons.....	15.69	15.70
Spanish 25 pesetas.....	4.81	4.83
Mexican doubloons.....	15.50	15.70
Mexican 20 pesos.....	19.50	19.60
Ten guilders.....	3.96	4.00
Fine silver bars.....	.90	.91

**Copper.**—The market has all of a sudden exhibited unusual strength, inspired almost solely by the reports regarding the pending negotiations to restrict production, about which we have already reported repeatedly, and are only able to again lay special stress upon the fact that as far as we are acquainted with the details of the project in question, it is, first of all, quite evident that it does not alone mean that there will be no reduction, but rather an increase in production this year as compared with last, at least as far as the principal American producers are concerned, while the Europeans will produce steadily; the latter were first asked to reduce their output 15%, but this clause has been entirely waived.

The principal item which seems to have caught the fancy of the Europeans is that exports are to be limited to a certain figure, said to be about 80,000,000@90,000,000 pounds per annum, but how this can be regulated we are at a loss to understand. It must further be borne in mind that a number of American producers have not been asked to join the combination at all, and their output amounts to somewhat over 25% of the whole production of the United States. Considering, further, that the Michigan companies are, by the laws of that State, under penalty of the forfeiture of their charter, prohibited from entering into any combination which may enhance the price of the commodity artificially, they can have given only verbal adherence to any project, so that the whole thing will no doubt be so loosely knitted that it will break apart at the first convenient opportunity. Anyhow, it has been shown that the consumers are extremely nervous.

Manufacturers have, during the last few weeks, received many orders and are mostly working day and night shifts, and although they had many opportunities of securing all they wanted at 10 1/2 c. they availed themselves thereof to a limited extent only, and when they once became frightened about the market they became eager purchasers at the rise, but very little copper was actually available, as nearly all of the holders have withdrawn from the market. The Calumet & Hecla Company has made some sales at 11@11 1/2 c., but is now out of the market, as are most of the other Lake companies. In casting copper business was done early in the week at 10 1/2 c., but now 11 1/4 c. is the lowest price mentioned. Considerable business has been done in Arizona bars for export at secret prices, and it is also said that further sales of Anaconda matte have been made in England, but of this no official confirmation has been given out.

The London market did not show the same strength, evidently being influenced by the failure of a prominent banker in St. Petersburg and also by the big coal strike now going on in England. Nevertheless, G. M. B. showed a marked advance and close at 46 1/2 s. for spot and 47 s. for three months, prompt. For manufactured we quote: English tough, 48 s. @ 48 10 s.; best selected, 49 10 s. @ 50; strong sheets, 58 s. @ 58 10 s.; India sheets, 54 @ 55; yellow metal, 5 1/4 d. Statistics show a decrease for the first half of the present month of 1,100 tons of copper.

According to the statistics of Henry R. Merton & Co., of London, the stocks of copper in England and France and afloat thereto from Chili and Australia, on February 29th, were 56,781 tons, against 57,462 tons on January 31st. The deliveries in England and France were 8,244 tons in February against 5,587 tons in January.

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

To	Commodity	Units	Value
To Liverpool—	Copper Matte.	Lbs.	391,360 \$25,000
S. S. Kepler.....	3,752 bags.		238,590 14,000
" Euclid.....	2,200 bags.		112,000 \$12,320
To Genoa—	Copper.	Lbs.	112,000 \$12,320
S. S. Fulda.....	100 casks		125,000 \$13,750
To Rotterdam—	Copper.	Lbs.	226,616 22,100
S. S. Amsterdam.....	100 bbis.		596,250 60,850
S. S. North Erin.....	477 bbis.		136,250 \$14,000
To Hamburg—	Copper.	Lbs.	135 casks 22,453 2,500
S. S. Axminster.....	109 casks		259 bars 86,004 9,519
" Dania.....	259 bars		12 bars bullion 763 2,200

**Tin** has again been disappointing and there has been hardly any fluctuations. Some contracts were made for forward delivery at 19 80 c., at which price there are no more sellers. Spot is quoted at about 19 79 @ 19 75 c.

**Lead** is not quite so firm and prices have sagged off. Considerable quantities have been forthcoming

from smelters, which would seem an indication that the Idaho difficulties are at or near an end. Certainly so far there has been no scarcity at all felt. We have to lower our price to 4 15 @ 4 17 1/2 c. There has been a rather better inquiry from consumers which has steadied the market to some extent. Besides, we are informed that ores are rather scarce and held for higher prices. In London prices have been advanced for Spanish lead to £10 18s. 9d.; English lead, £11 @ £11 2s. 6d.

**Chicago Lead Market.**—H. P. Post telegraphs us as follows: "The market opened at 4c., with sales of 300 tons, and then declined to 3 97 1/2 c., with sales of 300 tons. Closing is 3 95 c., with free offerings."

**St. Louis Lead Market.**—The John Wahl Commission Company telegraph us as follows: "Owing to declining seaboard advices our market has dropped from 3 95 c. to 3 90 c., with sales of about 300 tons at the latter price."

**Antimony** is dull; Cookson's at 14 1/2 @ 15 c., L. X., 13c. and Hallett's, 10 1/2 @ 10 3/4 c.

**Spelter.**—The market is quiet, but steady; there are more consumers in the market for supplies and values are maintained at 4 57 1/2 @ 4 60 c., New York.

In London good ordinaries are quoted at £21 and specials at £21 5s.

**Quicksilver.**—The market for this metal continues very quiet. Quotations are: London, £7 2s. 6d; New York, \$42.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, March 18.

**American Pig Iron.**—From our correspondents in the various iron centers of the country the reports come of continued dullness and lower prices. Several iron foundries in Pennsylvania and Ohio have closed down or are contemplating so doing. Lower prices prevail to day than for a very long time. From the South we hear that furnaces have reduced their price in order to meet the reduction announced by the Thomas Iron Company last week. We hear of no very heavy transactions in this market, and, so far as we know, there have been few sales at the exceedingly low figures reported in other cities.

Quotations remain at \$16 for No. 1 X and \$15 for No. 2 X. Northern; The Southern article (standard brands) is quoted variously at \$15.50 @ \$16 for No. 1 X and \$14.50 @ \$15 for No. 2 X.

The consolidation of Southern coal and iron interest about which we published full details in our last issue, has taken place, although it does not embrace one of the companies mentioned. The Sloss Iron and Steel Company did not join. According to Mr. J. C. Maben, one of the directors, the Sloss Company demanded that the three companies be dissolved, and an entirely new concern organized, for the reason among important considerations, that in the opinion of eminent legal authorities such a consolidation of the three companies could not legally be effected under the proposed plan. The Tennessee Coal, Iron & Railroad Company could not acquiesce to the proposal of the Sloss people; therefore only the Tennessee Coal, Iron & Railroad Company and the De Bardeleben Coal & Iron Company pooled their interests, Mr. De Bardeleben being elected a director of the Tennessee company. For further details see our mining new columns.

This consolidation is not of so great moment as it would have been if it included the Sloss Company, but it is nevertheless very important.

**Spiegeleisen and Ferromanganese.**—The condition of this market continues as last reported. A great dullness prevails. During the week no transaction of any magnitude has been reported. Prices remain nominally as follows: 20% spiegeleisen, \$26.50 @ \$27; 80% ferromanganese, \$62 @ \$63.

**Steel Rails.**—The reports of some sales this week have been circulated among the trade, but we have been unable to ascertain positively that any large transaction has occurred within the past few days. Some of the sales reported as being new are really parts of contracts which were signed last fall. The price remains: \$30 f. o. b. mill, and \$30.75 tidewater.

**Rail Fastenings.**—The market for fastenings continues lifeless. No transactions are reported. We understand that low figures have been quoted by a prominent mill to the Pennsylvania Railroad. We quote nominally as follows: Fish and angle plates, 1 70 @ 1 80 c.; spikes, 2 10 @ 2 15 c.; bolts and square nuts, 2 70 @ 2 80 c.; hexagonal nuts, 2 80 @ 2 85 c.

**Merchant Steel.**—Considering the excessive dullness in the general iron market, the business in merchant steel has been quite fair. Some Pittsburg firms, it is reported, have offered various grades at figures lower than are currently quoted. On the whole, prices hold their own pretty well. We continue to quote: Mushet's special, 48c.; English tool, 15c. net; American tool steel, 7 @ 8c.; special grades, 13 @ 18c.; crucible machinery steel, 4 75 c.; crucible spring, 3 75 c.; open hearth machinery, 2 25 c.; open hearth spring, 2 50 c.; tire steel, 2 25 c.; toe calks, 2 25 @ 2 50 c.; first quality sheet, 10c.; second quality sheet, 8c.

**Tubes and Pipe.**—The business in tubes and pipe has been up to the average, neither heavy nor light. There has been no change in price and no features of interest. We continue to quote ruling discounts as follows: Butt, black, 5 1/2 @ 5 1/2 c.; galvanized, 4 7/8; lap, black, 6 1/2; lap, galvanized, 5 1/2

boiler tubes, under 3 in. and over 6 in., 55%; 3 in. to 6 in., 60%.

**Structural Material.**—We hear of no single large transaction during the past week, and the market for structural iron and steel is rather quiet. Our quotations are as follows: Beams, 2'30@2'50c.; angles, 1'90@2'10c.; sheared plates, 1'85@2c.; tees, 2'40@2'60c.; channels, 2'40@2'50c. Universal plates, 2'10c.; bridge plates, 2'10c. on dock.

**Old Rails.**—This market continues lifeless. Nominal quotations are: Old tees, \$19.50@21; doubles, \$21.50@22.50; wrought iron scrap, \$19@20. It is highly probable, however, that lower figures might be obtained.

Chicago. March 16.

(From our Special Correspondent.)

The market here would have a more buoyant feeling were it not that some sellers are obliged to let their pig iron go at extremely low prices. With rare exceptions demand is very light, and all new business offering is eagerly competed for, but most of the sellers are not meeting the inside figures made by the company alluded to, believing that with the large volume of business in sight and a steady restriction in output, a more healthy tone will soon be developed. In the line of railroad work, improvements and extensions locally and outside, there is a rather more than fair demand. Manufactured iron generally is in light demand, but the lull is only temporary, as it is felt that greater activity will certainly ensue with settled weather.

**Pig Iron.**—No new features of consequence have developed during the week. Some few orders for small amounts have been entered at current quotations, and one large contract for 3,000 tons of No. 2 foundry coke was secured by a local furnace company at a fair figure for extended delivery through the year. One unpleasant feature is that some sales are being made of local iron at very low prices for prompt delivery and cash. With stock increasing there is no immediate prospect of improvement in demand or values, though when curtailment of output is fairly started, there is little question as to the ultimate result. Any large business coming into the market for Lake Superior charcoal iron would develop further weakness in that specialty, though at present there is an outward show of strength. Some 700 to 800 tons of No. 2 Southern soft were placed during the week, though at very low prices.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.75@17.25; Lake Superior coke, No. 1, \$14.50@15; No. 2, \$14@14.25; No. 3, \$13.75@14; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@16; American Scotch, \$17@17.50; Southern coke, foundry No. 1, \$15; No. 2, \$14.50; No. 3, \$14; Southern coke, soft, No. 1, \$14.50; No. 2, \$13.75; Ohio silveries, No. 1, \$17.50; No. 2, \$17; Ohio strong softeners, No. 1, \$18; No. 2, \$17; Tennessee charcoal, No. 1, \$17.50; No. 2, \$17; Southern standard car wheel, \$20@21.

**Structural Iron and Steel.**—Inquiry and demand are fair, but there is a large amount of work in sight—elevated roads, viaducts, etc.—and prospects are of a most promising nature. There is still some irregularity in beams and bridge plates. Regular quotations car lots f. o. b. Chicago are as follows: Angles, \$2@2.10; tees, \$2.20@2.30; universal plates, \$2.05@2.15; sheared plates, \$2.10@2.25; beams and channels, \$2.25@2.50.

**Plates.**—Warehouse business is only fair and prices continue weak. Some low figures are being quoted on mill lots. Steel sheets, 10 to 14, \$2.40@2.50; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$3@3.35; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.25; boiler rivets, \$4.10@4.25; boiler tubes, 2 1/2 in. and smaller, 55%; 7 in. and upward, 65%.

**Merchant Steel.**—There is little new to report in this line. Most mills have all they can do and many are crowded to make deliveries on time. New orders are only fair. Tool steel continues active. We quote \$6.50@6.75 and upward; tire steel, \$2.30@2.50; toe calk, \$2.50@2.65; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.90; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

**Galvanized Sheet Iron.**—Business is dull and movement of this article light, and a continuance will result in lower prices. Discounts are weak but unchanged at 7% off on Juniata from mill, and 6 1/2% off from warehouse, and 6 1/2% and 5% off on charcoal—new list.

**Block Sheet Iron.**—Orders are rare for either heavy or light sheets, and mills are running on stock. Mill quantities are quoted at 2'85c. Chicago for No. 27 common, and dealers quote 3c.@3'10c. from stock.

**Bar Iron.**—The Santa Fe system will place a large order for cars, some 4,300, which will give mill agents an opportunity to do some figuring. Some mills are very firm, and decline to meet some of the low prices being made. General demand is only moderate, and quotations are 1'65c@1'67 1/2c. Chicago. Orders from warehouses are filled at 1'75c.

**Nails.**—Demand from factory for wire and steel cut nails is light at \$1.85 for the former and \$1.60 for the latter, Chicago delivery. Johning demand is fair at \$1.90@1.95 for wire and \$1.70 for steel cut.

**Steel Rails.**—There is a fair amount of business coming forward for heavy and light weight sections, but the demand is not so brisk as during January and February, though the outlook continues promising. Price is steady at \$31.50. Other track material is in good demand. Regular quotations are: 1'80@1'85c. for steel or iron; spikes at \$2.15@2.25 per 100 lbs.; track bolts, hexagonal nuts, \$2.65@2.70.

**Scrap.**—Stocks of best grades are excessive and prices are lower. Wrought scrap is hard to move, but there is still a fair demand for cast. No. 1 railroad, \$17; No. 1 forge, \$6; No. 1 mill, \$2.50; fish plates, \$18; axles, \$21; horseshoes, \$17; pipes and flues, \$9; cast borings, \$7; wrought turnings, \$9.50; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$11.50; coil steel, \$14; leaf steel, \$15; tires, \$15.50.

**Old Material.**—There is but little demand for iron rails, and the quotation of \$20 is merely nominal. Movement of steel rails is very light at \$13.50 for short and \$15.55 for selected long lengths. Car wheels are dull at \$16.

Louisville. Mar. 12.

(Special Report by Hall Brothers & Co.)

The same general tendencies still prevail in iron circles. Consumers take hold sparingly and prices have eased off a little. Just what effect the reported consolidation of the two largest Southern companies will have on prices remains to be seen, but it is thought the effect will be beneficial, as the sharp competition that prevailed heretofore between them is now stopped. Some furnaces are carrying large stocks, and the desire to move this surplus has caused very low figures to be made. We quote:

**Hot Blast Foundry Irons.**—Southern coke No. 1, \$14@14.25; Southern coke No. 2, \$13@13.50; Southern coke No. 3, \$12.75@13; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16; Missouri charcoal No. 1, \$17@17.50; Missouri charcoal No. 2, \$16.50@17.

**Forge Irons.**—Neutral coke, \$12.50@12.75; cold short, \$12.25@12.50; mottled, \$11.50@12.

**Car Wheel & Malleable Irons.**—Southern (Standard brands), \$18@18.50; Southern (other brands), \$17@17.50; Lake Superior, \$19.50@20.50.

Philadelphia. March 17.

(From our Special Correspondent.)

**Pig Iron.**—Large orders have been placed for Northern and Southern iron at the recent drop, and this activity will likely continue until the requirements of both forge and foundry iron buyers will have been covered for about 90 days. There is a good deal of irregularity in prices even yet. Large sales of No. 1 have been made as low as \$17 and in some instances inferior No. 1 has gone for less. No. 2 runs from \$14.50 to \$15. Large transactions are going through and it is probable that a great deal of business in No. 2 will be closed by Saturday. Standard forge irons are quoted pretty firmly at all the way from \$14 to \$14.50.

The volume of business is not correspondingly as large as to foundry, so far as Northern irons are concerned. Several lots of hot and cold blast charcoal and of American Scotch have also been taken. This looks like a general improvement, but it would hardly be fair to say so.

Managers in the iron trade think the present movement will result in an early reaction in favor of stronger prices, but it is needless to say this opinion is not shared in by consumers as long as stocks are as large as they are, and while production is kept at such a high point. There is a great deal of talk about blowing out, and shading down, but very little of it is done, the bulk of it being confined to the offices.

**Muck Bars.**—Several good sized lots of muck bars were sold at \$25 delivered; a little more money is asked by makers of good bars, however.

**Steel Billets.**—Several good sized lots of steel billets have been placed at \$25.25.

**Merchant Iron.**—The situation has not improved enough to say there is an improvement. Quotations continue at 1'60@1'70c. Iron men feel rather disappointed.

**Nails.**—A moderate amount of business has been done in nails at 1'65@1'70c.

**Sheet Iron.**—A large amount of business is to be done very soon, according to the makers; mills are by no means crowded. Retail demand shows but little life. Efforts are being made to secure a few large orders for galvanized; discounts, 6 1/2%@7%.

**Plate and Tank Iron.**—Quotations rule at 1'75@1'90c. for iron tank; steel shell, 2'10@2'20c.; flange, 2'40c. There is no prospect for better prices than these ruling for some weeks to come.

**Structural Material.**—One large order for structural iron was placed this week. Manufacturers say there are prospects for a great deal more business coming in. Bridge plates are 1'85c.; angles, 1'90c.; beams, 2'30@2'40c.

**Steel Rails.**—Several large orders have been placed for steel rails in mills East and West, but the local makers still assert that the situation is disappointing. Quotations are given as \$30 and nothing is said as regards large sales at an early day.

**Old Rails.**—Iron rails are wanted at \$21; steel rails at \$16.

**Scrap.**—Scrap sold at \$20@21, and within the past day or two quite a sharp demand sprang up, which leaves the yards rather bare.

Pittsburg. March 17.

The iron and steel trade has shown no improvement in values during the past week, but there has been no further decline, which is certainly a good sign. Last week's sales were liberal, particularly of Bessemer pig and steel billets, the prices of which were the lowest ever reported. Many consumers have made purchases for which the delivery extends until October 2d. Production continues far in excess of consumption.

At many points a large falling off in the demand is reported; add to this the general uncertainty in regard to the immediate course of the market, and it will be seen that the position is one of considerable uneasiness, and likely to remain so until an important reduction in the output is made. This will inevitably occur, many think, in the near future; still the trade seems inclined to wait until it is an accomplished fact rather than to place orders based on something that is still in anticipation. From all that can be learned producers are beginning to recognize the fact and the next few weeks are likely to see production considerably curtailed; although, as yet, there has been no extensive movement in this direction.

Southern furnaces, report says, made some large sales at extremely low prices, for present and future deliveries. Prices in the East are considerably higher than those in Pittsburg. About the situation in the Mahoning Valley, a well informed iron dealer says: "Unless the iron business grows considerably poorer than it is neither the furnaces nor rolling mills are likely to shut down. At present it is dull, but it is the result of over-production and not the lack of demand. I do not contemplate any continued shut-down of furnaces for the reason that the rolling mills are all running and consuming more pig iron than they ever did. One thing that causes the over-production is the improved facilities for an increased output of the furnaces. Eight years ago we were satisfied when one furnace produced 50 tons per day. Now we think there is something wrong when it does not make 180 tons every 24 hours. When repairs are made to furnaces they always have in view an increase of the output, and what is true of furnaces is true of mills. Three years ago the daily output of finished iron at our mill at Niles was 20 tons; now it is 50 tons."

Notwithstanding that overproduction is being credited as the cause of the low price of iron and steel a careful examination shows that, so far, only a limited number of furnaces have closed; some of them have orders booked that will keep them employed the next three months; others purpose to use up the ore they have on hand. All things taken into consideration the closing down of furnaces will not be as large as was expected unless furnacemen change their opinion. We are reported the following sales:

Coke Smelted Lake and Native Ores.	
7,000 Tons Bessemer, June, July, August.....	\$14.75 cash.
5,000 Tons Bessemer, March, Apr., May, June.....	14.50 cash.
3,600 Tons Bessemer, March, Apr., May, June.....	14.50 cash.
2,500 Tons Grey Forge, March, April, May.....	13.00 cash.
2,500 Tons Bessemer.....	15.00 cash.
1,000 Tons Grey Forge, City Furnace.....	13.00 cash.
1,000 Tons Grey Forge, City Furnace.....	13.00 cash.
1,000 Tons Bessemer.....	14.00 cash.
1,000 Tons Grey Forge.....	13.00 cash.
500 Tons Bessemer.....	14.75 cash.
500 Tons Grey Forge.....	13.00 cash.
500 Tons Grey Forge, April, May.....	13.00 cash.
400 Tons Bessemer.....	15.00 cash.
350 Tons No. 2 Foundry.....	14.75 cash.
300 Tons Grey Forge.....	13.00 cash.
300 Tons Mottled and White.....	12.50 cash.
100 Tons No. 1 Foundry.....	15.50 cash.
100 Tons No. 2 Foundry.....	14.50 cash.
100 Tons No. 1 Silvery.....	17.00 cash.
Charcoal.	
150 Tons Cold Blast.....	26.50 cash.
150 Tons Warm Blast.....	18.50 cash.
75 Tons Cold Blast.....	25.50 cash.
75 Tons No. 2 Foundry.....	21.00 cash.
Steel Billets and Slabs.	
9,000 Tons Steel Billets, June, July, Aug., Sept., 23.25 cash.	
3,000 Tons Steel Billets and Slabs, April, May, June.....	23.00 cash.
1,000 Tons Steel Slabs.....	23.00 cash.
700 Tons Steel Billets.....	23.00 cash.
550 Tons Steel Billets.....	23.00 cash.
Muck Bar.	
1,500 Tons Neutral, April, May, June.....	25.50 cash.
1,000 Tons Neutral.....	25.50 cash.
500 Tons Neutral, May, June.....	25.25 cash.
Ferro-Manganese.	
200 Tons 80% Delivery.....	62.80 cash.
100 Tons 80% Domestic.....	63.00 cash.
Skelp Iron.	
550 Tons Narrow Grooved.....	1.57 1/4 4m.
450 Tons Wide Grooved.....	1.60 4m.
300 Tons Sheared Iron.....	1.82 1/2 4m.
Steel Wire Rods.	
500 Tons American Fives (5s.).....	32.50 cash.
500 Tons American Fives, at Mill.....	32.25 cash.
Bloom, Beam, R. and C. Ends.	
1,000 Tons Bloom and Rail Ends.....	17.00 cash.
250 Tons Bloom and Rail Ends.....	17.00 cash.
Old Iron and Steel Rails.	
500 Tons Mixed Steel Rails.....	16.75 cash.
300 Tons Mixed Steel Rails.....	17.00 cash.
300 Tons Old Iron Rails.....	22.25 cash.
100 Tons Old Steel Rails.....	16.50 cash.
Scrap Material.	
200 tons No. 1 R. R. W. Scrap, net.....	19.50 cash.
150 Tons Iron Axles, net.....	24.00 cash.
100 Tons Coil Spring Steel, gross.....	19.00 cash.
50 Tons Leaf Springs, gross.....	21.00 cash.

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

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from March 12 to March 18, and Sales.

\*Ex-dividend. †Dealt at in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. ††Dividend shares sold, 9,950. Non-dividend shares sold 15,100. Total shares sold, 25,050.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names and prices for various dates from March 11 to March 17.

Dividend shares sold, 15,586. Non-dividend shares sold, 14,807. Total shares sold, 30,393.

COAL STOCKS.

Table of Coal Stocks, listing company names and prices for dates from March 12 to March 18.

\*Ex-dividend. Total shares sold, 925,790.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing company names and closing quotations for dates from March 11 to March 17.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date & amount of last). Rows include Adams, Alice, Alma & Nel Wood, etc.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date & amount of last). Rows include Allegany, Alliance, Alton, 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 previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. ¶¶ This company was organized in 1890. ¶¶¶ This company was organized in 1890.

STOCK MARKET QUOTATIONS

Aspen, March 14. The closing quotations were as follows:

Table of stock market quotations for Aspen, March 14. Lists various stocks like Agnes C., Argentinum Junata, Aspen Deep Shaft, etc., with bid and asked prices.

Baltimore, Md. March 17. Bid. Asked.

Table of stock market quotations for Baltimore, Md., March 17. Lists companies like Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Pittsburg, Pa. Prices highest and lowest for the week ending March 17:

Table of stock market quotations for Pittsburg, Pa., March 17. Lists companies like Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas Co., etc.

St. Louis, March 16. CLOSING PRICES.

Table of stock market quotations for St. Louis, March 16. Lists companies like Adams, Colo., American & Nettie, Colo., Bi-Metallic, Mont., etc.

Deadwood, March 12. Bid. Asked.

Table of stock market quotations for Deadwood, March 12. Lists companies like Bullion, Caledonia, Calumet, Cambrian, Carthage, etc.

Helena, Mont.

(Special report by SAMUEL K. DAVIS.) Prices highest and lowest for week ending March 12, 1892:

Table of stock market quotations for Helena, Mont., March 12. Lists companies like Bald Butte (Mont.), California (Castle), Mont., etc.

Trust Receipts.

Sales at the New York Stock Exchange for week ending March 18. (Price-Sales. H. L.)

Table of Trust Receipts sales at the New York Stock Exchange for week ending March 18.

Trust Stocks.

Special report by C. I. Hudson & Co., members New York Stock Exchange. The following are the closing quotations March 18:

Table of Trust Stocks closing quotations for March 18. Lists companies like Am. Cotton Oil, Am. Sugar Refineries, etc.

Foreign Quotations.

London, March 5. Highest. Lowest.

Table of Foreign Quotations for London, March 5. Lists various commodities like Alaska Treadwell, Amador, American Belle, etc.

Paris, March 3.

Table of Foreign Quotations for Paris, March 3. Lists companies like East Oregon Ore, Forest Hill Divide, etc.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Table of Current Prices for various commodities. Lists items like Acid-Acetic, Alum-Lump, Ammonia-Sul, Aqua Ammonia, etc., with prices.

Powdered, # b.

Table of prices for powdered and other materials. Lists items like Marble Dust, Metallic Paint, Mineral Wool, etc.

THE RARER METALS.

Table of prices for rarer metals. Lists items like Arsenic, Barium, Bismuth, Cadmium, etc.