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VOLUME LXVII.

JANUARY TO JUNE

1899.

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See Pages 754, 769 and 19 of Engineering and Mining Journal, Dec. 24, 1898.

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NEW YORK, Dec. 23, 1898.

DIVIDEND NO. 61.

A dividend of Three Dollars and Fifty Cents per share will be payable February 15th next, to registered holders January 20th. Transfer books will be closed January 20th in the afternoon, and opened January 30th, 1899.

WILLIAM R. TODD, Treasurer.

NEW YORK AND HONDURAS ROSARIO MINING COMPANY,
No. 18 BROADWAY, NEW YORK, Jan. 3, 1899.
DIVIDEND NO. 50.

The Trustees of the Company have this day declared a dividend of TEN CENTS per share on its capital stock, payable January 20, 1899. Transfer books will be closed from January 10 to 20.

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CONTENTS.

The "Engineering and Mining Journal" sends cordial greetings and good wishes to all its readers. The third of a century in which it has addressed them every week has developed a mutual confidence and esteem that is akin to personal friendship, so its good wishes are those of a friend who has labored for their welfare and rejoices in their prosperity.

The limitations of space and late arrival of mails compel us to leave out this week several interesting and important reviews, which we hope to present to our readers next week. This does not affect the completeness of the statements of production which we give in this number.

For the first time in the history of the zinc trade the European market has become dependent upon the United States for a considerable share of its supplies. This condition of the industry should not be regarded as due to merely exceptional and temporary causes, but as one which is likely to hold and which, by affording an outlet for the surplus zinc which our mines can always produce above the existing local requirements, ought to give stability to the market.

The production of copper in the United States in 1898 was 243,914 gross tons, worth $64,244,326. The significance of this statement will perhaps be more clearly appreciated if it is considered that it means that this country is now producing two-thirds of the world's copper. In 1898 we were able to spare to foreign consumers about 138,000 long tons. It is not so very long ago that our imports and exports of copper about balanced each other; now the movement is all one way, and it is of great importance in adding to the prosperity of the country.

One of the notable advances which we have to record in this review of a satisfactory year is the heavy gain in the output of pig iron. In 1897 the United States produced 9,650,000 long tons; in 1898 the outturn was 11,712,000 tons, worth $102,000,000—an increase of no less than 21 per cent. If trade conditions were what they were formerly, this might be regarded with a complacency moderated by consideration of what was to be done with this sudden increment to domestic stocks of iron, but the outward movement has much more than kept pace with the production. For the first ten months of 1898 the value of the exports of iron and steel and manufactures of iron and steel was $62,290,000, or, at the rate estimated for the last two months, about $80,000,000 for the year. This means an export trade in iron and its product 30 per cent. better than in 1897.

Roughly speaking, the total market value of the copper shares dealt in at Boston has about doubled during the past year, advancing from, say, $100,000,000 to $200,000,000 in round figures. The shares of some properties newly floated help, however, to swell the increase. Speculation in that market has been very active, consequent upon the proposed consolidation of interests and the favorable position of the copper industry, but there has been reason for large legitimate transactions apart from this speculative feeling. Many of those who have had large dealings in Boston copper stocks lately probably never had turned their attention in that direction before. As has always been the case, Boston's holdings of gold, silver, quicksilver and other mining shares have been of much less importance.

Our mineral resources are the greatest known. Fully 100,000,000 tons of the bituminous coal produced in the United States in 1898 was sold on the railroad cars at an average price of less than 65 cents a ton, though the official State reports put it higher than this, and this is the coal produced in the great industrial center of the country.

Our railroads carry bituminous coal to tidewater ports at ¼c. per ton-mile, and on the Great Lakes, which extend a thousand miles in length, and reach many great markets, the average cost of carrying one ton of coal or iron ore was 1c. for 20 miles—in some instances a ton was carried 45 miles for 1c.

Since our labor cost of producing almost anything is less than in any other country in the world, we have here the full and sufficient explanation of our demonstrated ability to compete in all the markets of the world.

"Good times" are largely a matter of sentiment. Just now there are substantial reasons why the recent improvement in business should continue; but entirely apart from any solid basis of the kind is the curious psychological fact that things go very much as they are expected to. In other words, the markets depend upon the prevailing popular opinion. There must of course be something at the bottom to rest upon. This alone does not always suffice, as we have so often seen in the tardy recovery from periods of depression when all conditions might be favorable; but if not wholly realized by the public—the consumers—the reaction is delayed until the general drift of opinion points upward. Timidity, which is contagious, makes bad times in the face of all natural conditions. Confidence, almost equally contagious, makes good

times. The expectation affects and effects the result. At present it is a hopeful sign that the best opinion points toward a prosperous year in 1899. This in itself will be a potent factor, superadded to conditions in themselves encouraging.

Potential capacity is not quite the same thing as actual trade; but there is no question but that the United States are now in a position to supply the world with all the steel and most of the manufactures of steel required. There are two principal competitors, Great Britain and Germany, followed by Belgium and France. As to Great Britain, it is evident that the production has about reached a maximum, as can be understood by looking at the situation as regards raw materials. This year the supply of ore from outside has greatly fallen off and the home resources are strained to the utmost. Coke of metallurgical quality is also growing dearer, costing nearly $4 a ton, which alone is a serious handicap. The position of Germany is worse. With a tariff intended to be prohibitive and reaching about $7.50 a ton, American steel products have, in a moderate measure hitherto, it is true, been able to compete in the German home markets, which without this fictitious aid could not long be held by domestic manufacturers. But it is rather in the higher products of steel—such as machinery, hardware, arms, etc.—that for the present a large foreign market should be looked for. It is certainly better in every way for the United States that its exports of any commodity should be in the most finished stages, rather than as a raw product.

The mineral industry of the United States, though exceeding that of all Europe, is still in its infancy. To-day with our large exports we still stand only on the threshold of the world's markets with the products of our mines and our factories. We have demonstrated our ability to compete in price and quality in every market in the world, and since we can produce more than our own people can consume we now need "the open door" to the markets of the world, and we can open our own doors to the free raw materials of all other countries, fearing no competition.

The lessons which the development of our industries and their present condition have taught are important, and some of them startling to those who are not familiar with the facts. Thus we have learned that high wages promote rather than prevent the lowest cost of production, for they encourage the introduction of labor-saving appliances and increase the intelligence and the efficiency of workmen. As proof of this proposition we have shown that though the wages we pay are the highest in the world, the total cost of production, and especially the labor item in the cost of production, for nearly everything we produce, is lower here than it is anywhere else in the world, and this is especially noticeable in the case of the products of our highest priced labor. This lesson is worth remembering.

The London metal markets during the past year were constantly disturbed and interrupted by political complications and labor troubles. When 1898 opened the unfortunate deadlock between the engineers and their employers in England was still keeping trade in all its branches from going ahead as it should have done, considering the great demand that was waiting to be satisfied. At the termination of this disastrous dispute manufacturers had work to overtake which was almost beyond their capabilities. Then the American and Spanish War loomed in sight, and during its whole course unsettled finance and trade, creating uncertainty on every side; but, on the cessation of hostilities the political horizon seemed to have cleared. During this period strife was waging between the colliery owners and their men in South Wales, causing many tin plate and smelting works to shut down, or to work on a greatly reduced scale. This dispute ended in a complete victory for the masters, and the men returned to work on practically their old terms.

When everything again looked rosy British relationship with France unfortunately became strained to a very grave extent, and rumors of war were the order of the day. Happily these were soon dispelled by France withdrawing the Marchand Mission from Fashoda, but the financial outlook in Germany and the rise on the Bank of England rate of discount to 4 per cent. caused a feeling of doubt to assert itself again.

Notwithstanding all these difficulties the metal markets improved in every branch, and on the year show a substantial improvement in values over those ruling at the end of 1897.

The table given in another column shows that the gold production of the world reached a total of $286,218,954 in 1898. The increase since 1886, when it amounted only to $99,250,877, has been so enormous and the increase in the known and immediately available gold resources has been so immense, that the question must now come up, what will be the effect of this increase, especially in view of the prospective continuation in the expansion at accumulative rate?

One great reason of the increase has been that the cost of producing gold through improved methods of mining and metallurgy, together with the steady decrease in the cost of materials, has been reduced to a figure that was not dreamed of 20 years ago; and to-day in most parts of the world, even some of them remote, $5 ore is generally profitable, and some mines pay dividends on ore of only half that value. When it is further considered how large a proportion of the world's production at the present time is obtained from 12 districts, whose areas comprise only a few square miles, the Witwatersrand in South Africa, Coolgardie and Kalgurlie in Western Australia, Ballarat and Bendigo in Victoria, Charters Towers and Mount Morgan in Queensland, the Colar field of Mysore in India, Cripple Creek in Colorado, the Black Hills in South Dakota, the Mother Lode of California, Douglass Island in Alaska, and the Klondike in the Canadian Northwest, and when it is remembered what vast areas of the world's surface remain unexplored, there is no hazard in the forecast that under existing conditions the world's stock of gold is going to be added to immensely in the next 20 years, and there will be no lack of the yellow metal.

CORRESPONDENCE SCHOOLS.

One of the most remarkable and useful developments of modern educational methods is the "Correspondence School," where instruction is given by mail. These schools appeal especially to all persons who are engaged in occupations where greater knowledge makes them more valuable to their employers and fits them for higher positions and duties; that is to say, they appeal to those engaged in almost every human avocation, for where is there an occupation in which greater intelligence and more knowledge do not increase the efficiency of the worker and enable him to do more or better work, and consequently to earn more?

How many of our readers there are who would find it of immense advantage to have the opportunity, without loss of time or earnings, and at a very small cost, to acquire very thorough instruction in almost any subject they may desire.

We have examined into the courses of instruction of several of the existing correspondence schools and find most of them to be highly creditable and practical, and some of them to be excellent. The courses of these, and we refer especially to the example cited below, are kept up to date, cover the ground quite thoroughly and are very accurate in the information they give. The drawings used are admirable and the attention paid to students prompt and painstaking. The instruction papers are prepared by thoroughly competent experts. The information is given in simple, clear, direct and concise language which all can understand and is practical and useful; the courses are complete in themselves, requiring no reference to other text books or authorities, and they cover the ground with substantial fullness, though they do not pretend to be exhaustive, for no treatise, however elaborate, can ever be exhaustive in subjects which are being developed so rapidly as are those in the field of science to-day.

The method of instruction consists in sending instruction papers, usually two, to a student. A question paper, referring to the first instruction paper, is also sent, and when these questions are answered correctly, a third instruction paper is sent, and a second question paper. and so on. The student is urged to study, and in general does study diligently.

What an incalculable benefit it would be if all engaged practically in prospecting, mining, metallurgy, mechanics and electricity would take these courses and learn the many things which are given in them. Many men, who would not think of going to college, even where their means permit, would be glad to make themselves familiar with geology, with mineralogy, and with rocks (actual specimens of which are supplied to the students); and many engineers and others would like to "brush up" their knowledge of electricity and its applications and keep up with the times in mechanics, in metallurgy, or in other subjects that interest them. This they can all do by following these correspondence school courses, and can do it at a very slight cost and without in any way exposing their own ignorance of the subjects, for the instruction is confidential. We believe that this system of instruction constitutes a veritable epoch in educational methods and is calculated to be of immense benefit to our industries and to the workers in them.

Distance offers no hindrance; students in Australia, in Africa, in South America, in every country, in fact, are enrolled in these new schools and we have a large number of their testimonials before us, which are unanimous in their commendation of the courses and in their thanks for the benefits they have derived from them.

We have not the space in this well filled issue of the "Engineering and Mining Journal" to enter at further length into the methods of instruction, to te special courses or to the coast of instruction, which varies from $20 to $60 for a course or scholarship; but we would reiterate our opinion that correspondence instruction, when well conducted, is an excellent thing and well worth the attention and investi-

gation of all our readers. We refer for further and fuller information to the United Correspondence Schools, 156 Fifth avenue, New York, whose announcement will be found in our advertising pages. This school embodies the lessons of the most extensive and successful practical experience in correspondence schools that we have, and it addresses especially the clases interested in the various departments of the mineral industry.

THE MINERAL AND METAL PRODUCTION OF THE UNITED STATES IN 1898.

In the subjoined summary we present a preliminary statement of the production of the more important minerals and metals in the United States in 1898, compared with the corresponding figures for 1897. These statistics are subject to revision in future numbers of the "Engineering and Mining Journal," as more direct returns are received, and the final statement will be published in "The Mineral Industry," Volume VII., early in the Spring. In general the statistics herewith given have been compiled from direct returns from the producers and from railway companies. In some cases where complete returns have not been received at this writing the totals have been estimated on the basis of reports in hand covering a large proportion of the output, compared with corresponding reports for the previous year. With respect to the statistics of aluminum, antimony, gold, pig iron, lead, nickel, quicksilver and zinc the final statistics probably will not vary much from those here published, reports having been received from all the producers, a large number of these reports covering the entire year and the remainder covering all except the last week or two of December, with estimates by the producers themselves of their probable production during this period. The statistics given for copper production are those collected by John Stanton, Esq., statistician for the Associated Copper Producers, to which we have added our own estimate of the copper produced in the form of copper sulphate, which is not included in Mr. Stanton's figures. Our revised statistics of copper production are usually somewhat larger than Mr. Stanton's, and such an increase is to be expected this year. The statistics of gold production are based on reports of the refiners of crude bullion and exporters of argentiferous matter and ingot copper. The statistics of silver production are also based on reports of the refiners and exporters, but owing to the great difficulty of tracing the silver reported by them to its original sources of production our statistics of domestic production this year, as in 1897, are based on the aggregate reported, irrespective of attempted division as to the domestic or foreign origin; from this total is deducted the silver imported in ore and bullion, as reported by the Bureau of Statistics of the Treasury Department.

The total production of metals in the United States in 1898 was $307,422,953, against $264,538,485 in 1897. Of non-metals the production of 1898 was $503,233,070, against $485,773,870 in 1897, the production of "other substances" in 1898 being in part estimated as having increased at the same rate as did the aggregate of those substances for which direct returns were obtained. Included among "other substances" in this tabulation are corundum, crushed steel, diatomaceous earth, emery, garnet, grindstones, quartz crystal, tripoli, whetstones, alum and aluminum sulphate, ammonium sulphate, asphaltum and bituminous rock, borax, calcium carbide, cement, clay and clay products, copperas, feldspar, fullers earth, grahamite, gypsum, magnesite, manganese ore, mica, mineral wool, natural gas, ocher and oxide of iron, precious stones, salt, silica, sand and quartz, slate manufactures and pigment, soapstone, natural soda, stone for building purposes, sulphuric acid, talc, and uranium ore. Deducting certain duplications, such as the lead used for making white lead, coal used for coke, etc., etc., which amounted to $57,728,976 in 1898, against $56,455,031 in 1897, it appears that the grand total of mineral production in the United States in 1898 amounted to $752,927,047, against $693,857,324 in 1897.

UNITED STATES MINERAL AND METAL PRODUCTION.

	Products.	Customary Measures.	1897. Quantity. Customary Measures.	1897. Quantity. Metric Tons.	1897. Value at Place of Production. Totals.	1897. Value at Place of Production. Per Metric Ton.	1898. Quantity. Customary Measures.	1898. Quantity. Metric Tons.	1898. Value at Place of Production. Totals.	1898. Value at Place of Production. Per Metric Ton.
	NON-METALLIC:									
1	Asbestos	Short Ton.	770	698	$15,400	$22.06	900	816	$18,000	$22.06
2	Barytes	Short Ton.	27,316	24,781	109,264	4.81	30,000	27,220	130,928	4.81
3	Bauxite	Long Ton.	20,590	20,919	41,180	1.97	20,000	20,321	40,032	1.97
4	Bromine	Pounds.	487,149	221	136,402	.....	491,681	223	138,376	.....
5	Carborundum	Short Ton.	621	563	153,812	.....	795	721	159,000	.....
6	Coal, Anthracite	Short Ton.	52,645,133	47,759,665	85,857,717	1.79	49,947,571	45,312,139	84,952,170	1.87
7	Coal, Bituminous	Short Ton.	147,557,599	133,864,599	120,505,982	0.89	158,955,931	144,203,875	125,311,783	0.90
8	Cobalt oxide	Pounds.	19,300	*j* 8,754	32,810	.....	9,640	*j* 4,382	16,433	.....
9	Coke	Short Ton.	12,742,340	11,563,673	23,367,879	2.02	14,000,000	12,680,226	31,920,000	2.52
10	Copper sulphate	Pounds.	51,012,945	23,139	2,040,518	88.19	60,000,000	27,166	2,700,000	99.37
11	Fluorspar	Short Ton.	9,025	8,188	74,456	9.09	8,000	7,257	48,000	6.61
12	Graphite, Amorphous	Short Ton.	1,200	1,090	11,400	10.45	1,200	1,088	11,369	10.45
13	Graphite, Crystalline	Pounds.	993,138	*j* 450,487	44,691	.....	1,400,000	635	63,503	.....
14	Iron ore	Long Ton.	18,316,967	18,610,038	31,138,844	1.67	20,400,788	20,728,370	29,377,135	1.42
15	Lead white	Short Ton.	103,235	93,654	9,291,150	99.21	95,886	86,989	9,780,576	.....
16	Limestone flux	Long Ton.	4,247,688	4,315,651	1,868,983	0.43	5,154,000	5,236,759	2,319,320	0.44
17	Litharge	Short Ton	9,900	8,981	899,100	100.11	5,000	4,539	475,000	104.65
18	Monazite	Pounds.	40,000	18	2,000	111.11	50,000	23	2,500	111.11
19	Pumice	Short Ton.	1,700	1,542	8,500	.....	144	131	722	.....
20	Petroleum	Barrels.	56,985,643	7,972,579	44,804,962	5.62	53,800,000	7,526,400	49,227,000	6.54
21	Phosphate rock	Long Ton.	906,080	920,577	2,718,240	2.95	1,107,513	1,125,090	4,540,369	.....
22	Pyrites	Long Ton.	128,468	130,523	379,699	2.83	185,293	188,234	574,401	3.05
23	Slate	Squares.	895,372	.....	2,695,580	.....	1,082,605	.....	3,074,638	.....
24	Soda	Metric ton	.....	277,072	3,671,204	12.00	.....	265,000	3,498,000	10.00
25	Sulphur	Long Ton.	1,690	1,533	34,814	22.70	2,680	2,430	61,640	25.37
26	Zinc ore, Exported	Long Ton.	9,251	9,399	211,350	22.48	11,000	11,131	307,000	27.58
27	Zinc white	Short Ton	26,262	23,825	1,686,020	70.80	32,747	29,707	2,226,796	74.96
	Other substances	.....	.....	.....	146,971,913	.....	.....	.....	152,258,477	.....
	Total non-metallic	.....	.....	.....	$485,773,870	.....	.....	.....	$503,233,070	.....
	METALS.									
28	Aluminum	Pounds.	4,000,000	*j* 1,814,400	1,400,000	.....	5,200,000	2,358,704	1,690,000	.....
29	Antimony	Pounds.	1,500,000	680	107,250	157.72	2,200,000	*j* 997,913	188,298	.....
30	Copper (*m*)	Pounds.	510,190,719	231,421	56,325,055	243.39	545,367,793	247,332	64,244,326	259.80
31	Gold	Ounces F.	2,864,576	*j* 89,092	59,210,795	664.60	3,110,788	952,007	64,300,000	.....
32	Iron, Pig	Long Ton.	9,652,680	9,807,123	92,677,312	9.45	11,712,903	11,900,981	111,858,254	9.39
33	Iridium	Ounces	20.25	.....	606	.....	2,025	.....	606	.....
34	Lead, value at New York	Short Ton.	197,718	179,368	11,784,093	65.73	217,067	196,886	16,410,265	83.35
35	Nickel	Pounds.	33,700	*j* 15,286	11,668	.....	33,700	*j* 15,286	11,121	.....
36	Platinum	Ounces F.	200	*j* 6.21	3,000	482.39	200	*j* 621	3,000	482.39
37	Quicksilver	Flasks G.	26,079	965	991,002	1,026.94	31,000	1,076	1,128,400	1,048.70
38	Silver, Commercial value	Ounces F.	56,457,272	*j* 1,756,004	33,755,815	.....	64,060,000	*j* 2,059,542	37,321,356	.....
39	Zinc	Short Ton.	100,387	91,070	8,271,889	90.83	112,334	101,890	10,267,327	100.76
	Total metals	.....	.....	.....	$264,538,485	.....	.....	.....	$307,422,953	.....
	Grand totals	.....	.....	.....	$750,312,355	.....	.....	.....	$810,656,023	.....

Metals.

Aluminum.—The production in 1898 was 2,600 tons ($1,690,000), against 2,000 tons ($1,400,000) in 1897. The production of this metal continues to be made by one company.

Antimony.—The production in 1898 was 1,100 short tons ($188,298), against 750 tons ($107,250) in 1897. There were two producers, one at San Francisco and one at New York, who obtained their ore supply partly from abroad and partly from Utah, Idaho, Nevada and California.

Cobalt Oxide.—The production by one producer was 9,640 lbs. in 1898, against 19,300 in 1897. This came chiefly from Mine la Motte, Mo., matte.

Copper.—The production of copper in the United States reached the great total of 546,367,793 lbs. (243,914 long tons), an increase of 36,177,074 lbs. over 1897. This is nearly two-thirds of the copper production of the world. The exports of copper for the year reached a total of 138,100 long tons, or 56 per cent. of our product. The demand for cop-

per, both at home and in Europe, continued very heavy during the year, and prices increased steadily.

Copper Sulphate.—The production is estimated at 60,000,000 lbs., against 51,012,945 in 1897.

Gold and Silver.—The domestic production of gold in 1898 was $64,-309,000, against $59,210,795 in 1897. In addition to this, American refiners turned out a large amount of gold from foreign bullion, obtained especially from Mexico, British Columbia and the Klondike. Their total production of refined gold, domestic and foreign, amounted to $85,-362,730, against $71,302,394 in 1897. The domestic production of silver amounted to 64,060,000 troy oz., against 56,457,292. Consequently it appears that the production of silver in the United States has nearly attained the maximum that was recorded when the metal sold at its highest price. The increase in 1898 is attributable to the great increase in the production of silver-lead and silver-copper ores, from which the silver is obtained largely as a by-product. The total production of silver from domestic and foreign ores by American refiners was 106,058,726 troy oz., against 96,776,068 in 1897. Our statistics are based on reports from every refiner and the reports of importations by the Bureau of Statistics of the Treasury Department. Smelters and refiners are no longer able to make an accurate distribution of their product according to origin, domestic and foreign.

Iron and Iron Ore.—The production of pig iron in 1898 was by far the largest on record, reaching a total of 11,712,903 long tons, which is greater than that of 1897 by 2,050,220 tons, or 21.2 per cent. The greatest increase was in pig for steel making, about 72 per cent. of the total production being of that class of iron. The production of iron ore was 21,388,136 tons; but the consumption was nearly 1,000,000 tons greater, owing to the reduction of stocks on hand. Near 75 per cent. of the pig iron made was from Lake Superior ore.

Lead.—The total production of lead in the United States in 1897, including that which was derived from foreign ore and bullion, was 305,459 short tons, against 289,835 in 1897. The production was distributed as follows, the corresponding figures for 1897 being given in brackets: Desilverized domestic lead, 166,036 (144,649); soft lead, 43,652 (45,710); antimonial lead, 7,379 (7,359); total domestic, 217,067 (197,718); foreign, 88,392 (92,117). The domestic production was stimulated by the high price ruling for the metal. The Coeur d'Alene and Bonne Terre, Mo., districts were the largest producers, the output of the latter being 36,995 tons. Our statistics are based on returns from all the producers, except two, whose output was estimated the same as in the previous year.

Nickel.—We have no statistics of the production of nickel in the United States from domestic ores in 1898, and in the absence of these we estimate it the same as in 1897, i. e., 33,700 lbs. The total production by nickel refiners in the United States, from both Canadian and American ores and including the nickel contents turned out in the form of nickel oxide, was 6,450,000 lbs., against 4,099,300 lbs. in 1897. The average price of nickel in 1898 was 33 cts. per lb., against 34.62 cts. in 1897.

Quicksilver.—The production of quicksilver in 1898 was 31,000 flasks, of which 30,359 is credited to California. The production in 1897, all of it from California, was 26,079 flasks. The California product averaged $36.40 per flask in value to the producer in 1898 against $34.91 in 1897.

White Lead.—The production decreased from 103,235 short tons in 1897 to 86,989 in 1898, the falling off being attributed largely to the effect of the war with Spain, which in the Spring prevented the usual amount of house painting, especially on the Atlantic coast.

Zinc.—The production of zinc in 1898 was 112,344 short tons, an increase of 11,947 tons over 1897. Most of this came from the Joplin region in Southwest Missouri and Kansas. Our own consumption increased largely, and there was a considerable export.

Zinc White.—There was a production of 32,747 short tons in 1898 against 26,262 in 1897. The average value at the works was 3.40c. per pound in 1898 against 3.21 in 1897. Zinc white displaced white lead to a certain extent in 1898; consequently the increase in production.

Non-Metallic Substances.

Asbestos.—The production in 1898 is estimated at 900 short tons, against 770 in the previous year. In each year nearly the whole of the output was obtained from the Sall Mountain Mine, in Georgia. A considerable part of the domestic production of asbestos in 1898 was exported.

Barytes.—The production of crude barytes in 1898 is estimated at 30,000 short tons, against 27,316 in 1897. The increase was due to the same causes which led to an increase in the production of zinc white and a falling off in the output of white lead. At the end of the year it was reported that the American barytes grinders had formed an association to control the market.

Borax.—There was a large increase, prices having been materially higher than in 1897. The output was obtained chiefly from California, but some mineral was dug in Nevada and Oregon. The production of this substance is controlled practically by the Pacific Coast Borax Company, which markets the output of all the producers, with two exceptions.

Bauxite.—The production in 1898 is estimated at 20,000 long tons, against 20,590 in 1897. Each year the output was obtained from two States, Alabama and Georgia, the greater part from the former.

Bromine.—The production of bromine in 1898 was 491,681 lbs., against 487,149 in 1897. Part of this was turned out in liquid form and part as bromide of potassium. There was no material change in conditions, this business being controlled by an association of the producers.

Calcium Carbide.—There was a large increase of production. However, this increase was not equal to the consumption, and at the end of the year the company which practically controls this business in the United States was refusing to take orders for export.

Carborundum.—The production in 1898 is estimated at 795 short tons, average value of $200 per ton, against 621 short tons, worth an average of $247 per short ton in 1897. This substance is no longer used entirely as an abrasive, considerable quantities being employed as a substitute for ferro-silicon in steel making. There is only one producer in the United States, its works being situated at Niagara Falls.

Soda.—The production of artificial soda in 1898 (soda ash, caustic soda and other products being reduced to a common basis of 58 per cent. soda ash) was 265,000 metric tons in 1898, against 277,072 in 1897. Revised figures may increase somewhat the total for 1898. The falling off was due to the fact that stocks in the hands of makers, which were large at the beginning of the year, were drawn upon heavily. The sales of domestic soda ash were greater in 1898 than in the previous year. The electrolytic soda works at Rumford Falls, Me., were closed down. The works at Saltville, Va.; Niagara Falls, N. Y.; Syracuse, N. Y.; Wyandotte and Detroit, Mich., were in operation. The new caustic soda plant of the United Alkali Company in Michigan was not at work, but this company made some chlorate.

Cement.—The Portland cement business experienced a great boom in 1898 and production increased largely, but it was outstripped by consumption and stocks had to be drawn upon heavily. Prices rose materially. The prospect is for a further great increase in production in 1899, since many new works are in course of construction and the older works are being enlarged. The production of natural rock cement will show a small increase, but business was bad both in the Rosendale and the Louisville districts and prices were cut heavily. Several new concerns made plans to go into the slag cement business, but the Portland cement makers apparently do not fear competition from that source.

Coal and Coke.—The total production of coal in the United States in 1898 was 208,952,502 short tons, the largest ever reported, and an increase of 8,692,878 tons, or 4.3 per cent., over 1897. The increase was entirely in bituminous coal, the anthracite—which is about one-fourth of the total—showing hardly any change from 1897. Pennsylvania and West Virginia showed the largest gains. Including anthracite, Pennsylvania furnished about half the total production. The production of coke was 14,000,000 short tons, an increase of 1,237,660 tons, or 9.7 per cent., over 1897.

Corundum and Emery.—Apparently there was no material change in 1898 from 1897. The new deposits in Ontario have not yet become productive.

Fluorspar.—The production in 1898 is estimated at 8,000 short tons, worth $6 per ton at the mines, against 9,025 short tons in 1897. The output was made chiefly in Kentucky. The mines at Rosiclaire, Ill., were operated only in the early part of the year.

Graphite.—The production of crystalline graphite, all of it mined in New York, was 1,400,000 lbs. in 1898, against 993,138 in 1897. Each year there was a production of 1,200 short tons of amorphous graphite in Rhode Island.

Limestone Flux.—The production increased from 4,315,651 long tons in 1897 to 5,154,000 in 1898. The production of this stone increases and decreases according to the production of pig iron.

Petroleum.—The production in 1898 was 53,800,000 bbls., against 56,-985,643 in 1897. The average price of pipe line certificates was 91.5c. against 78⅝c. in 1897. There was a small increase in the production of the Lima field and a large decrease in that of the Eastern Appalachian District. Outside of these, petroleum was produced in Colorado, California, Kansas, Kentucky, Tennessee, Texas and Wyoming. For the first time the American production has been surpassed by the Russian.

Phosphate Rock.—There was a large increase in the output of Tennessee, the total for 1898 amounting to nearly three times that of 1897. The production of South Carolina continued to fall off, chiefly on account of the competition of the Tennessee producers. The production in Florida increased. The total for the United States will show an in-

crease. Both in Tennessee and in Florida the business was stimulated by the improved price for the rock.

Pumice.—There was a small production in Utah, whence an output of 144 short tons was reported.

Pyrites.—The production in 1898 was 185,293 long tons ($574,401), against 128,468 long tons ($379,699). This was mined in Massachusetts, Virginia, North Carolina and Tennessee. There was an increase in the production of each State, the largest increase being in Virginia, which State is to be credited with upward of two-thirds of the total production.

Slate.—The production of roofing slate in 1898 was 1,082,605 squares against 895,372 in 1897. Owing to a difference in the method of collecting statistics (those for 1898 being based chiefly on shipments), the actual increase in production was probably not so large as represented by these figures, stocks having been drawn upon. In 1898, as in 1897, the output was furnished chiefly by New York, Vermont and Pennsylvania. The average value of the product, all kinds, was $2.84 per square in 1898 against $3.01 in 1897.

Sulphur.—The production in 1898 was 2,680 long tons against 1,690 in 1897. The output in 1898 was obtained from Nevada, Utah and Louisinaa. Sulphur mines were worked in Texas and California and an output from those States is expected in 1899.

MINING IN ARIZONA.

By W. P. Blake, Territorial Geologist.

It is highly satisfactory to note that all of the prominent mining properties which were in successful operation at the beginning of the year 1898 are still producing and yielding satisfactory returns to their owners. The growth has been steady and substantial, not ephemeral. As depth is gained on the chief mines the returns are even better than they were at the surface. Not only have the well known mines held their own and generally with increased production, but new discoveries have been made and important prospects have been added to the list of bullion producers.

This is notable in the case of the Allison Mine, in the Babioquivari Mountains, west of Tucson. The shaft has been sunk 100 ft., following the vein, and free gold is visible from the surface and is now under foot in the bottom of the shaft. The rich ore has been sacked and shipped and the cullings are believed to average $30 in value per ton. A crosscut at 100 ft. makes a highly satisfactory showing, and this property takes a place in the list of the paying and promising mines of the Territory.

The Fortuna, in the Gila Range, near Yuma, also holds its place in the front ranks of gold producers. A new shaft has been sunk and the vein cut at a greatly increased depth. The yield of the property has been maintained. Cyanide works are projected for the treatment of the tailings.

The King of Arizona has been tapped by drilling at a considerable depth and proved to hold the power and value of the vein undiminished. The tailings at the mill on the river have been most successfully treated during the year by the cyanide process.

The Commonwealth Mine at Pearce has not only kept up, but increased its large production. The shipments to the smelter continue, and a 20-stamp mill has been added to the plant at the mine. The vein in places has caused astonishment by its increased width and richness in both gold and silver.

A recent discovery of croppings of another large lode in the Graham Mountains, near Willcox, resembling those of the Pearce or Commonwealth in power and value for the precious metals has caused great excitement and the location of claims over an extended area. Much is hoped for and expected of this discovery, but it is too early to make positive statements of its nature and value.

Prospecting a group of gold-bearing claims in the Harquahalas has been resumed.

The Crowned King and other mines in the Bradshaw Mountains are reported as doing well.

In copper, the production for 1898 has been larger than ever before. The pneumatic method of treatment has been practiced at Bisbee and at the United Verde with great success and with important improvements at each place. Great additions to the plant have been made at the United Verde.

The completion of the railroad from the Southern Pacific trunk line to Globe has greatly stimulated the production of copper there. The Old Dominion property has been reopened and large furnaces have been added.

The year has been marked also by the discovery of important veins of the manganiferous variety of wolframite in the Dragoon Mountains at Russellville, about 6 miles north of Dragoon Station. These properties have been purchased by parties from New York and Philadelphia and are being worked, the richest massive ore obtained by hand-sorting being shipped direct, and the lower grade being sent to the Arizona School of Mines, at Tucson, for crushing and concentrating.

Wolframite, an ore of molybdenum, has been obtained in considerable quantity, and has been shipped away from the Mammoth Mine. Arizona shows with the occurrence of several of the rarer minerals such as vanadinite, wolframite and huebnerite in quantity sufficient for commercial exploitation.

An important development of the turquoise industry has been commenced at Turquoise Mountain, in Mohave County. Ancient Aztec workings have been cleaned out and hundreds of prehistoric stone mining implements have been found, such as were recently described by Mr. Frenzel in the "Engineering and Mining Journal."

The Territory contributes to the list of beautiful gems in addition to turquoise. The peridotes are highly valued and are in greater demand; so also the ruby-like garnets of the Navajo country.

The onyx of Yavapai County has not lost its beauty or its measure of appreciation.

THE MINING INDUSTRY OF COLORADO IN 1898.

By Harry A. Lee, Commissioner of Mines.

Colorado's record for 1898 in the mineral and allied industries is one of unequaled prosperity. As a gold producer, everything indicates that the rank of first place in gold production gained in 1897 has been maintained in 1898, and the supremacy is more marked.

The gold receipts at the United States Branch Mint at Denver for 1898 to November 18th are $19,378,000. If the purchases for the remaining two weeks equaled the first two weeks in December, the receipts for the year aggregated $20,250,000, which will be an increase over 1897 of nearly $8,000,000. Fully 90 per cent. of the receipts, or $18,225,000, is safely Colorado product. To this may be added about $4,000,000 as an estimate of gold produced in Colorado but not passed through the Denver Mint. This would give $22,250,000 production in gold for 1898, which estimate at the present time appears conservative. All districts of the State have contributed their quota to this result by an increased production over former years.

The production of silver, lead, copper, iron and manganese ores and their manufactured products; bituminous and anthracite coals, cokes, clays and their manufactured products; building stones, marble, and onyx, so far as compiled, show a marked increase over 1897. The production of petroleum shows little change. Commercially speaking, the new products of 1898 are uranium, gilsonite and sulphur.

The primary cause of the above results is a better appreciation of the State's natural resources, its necessities and a determination by the citizens to manufacture prosperity at home. Incidental to this, readjustment of economic questions to meet present conditions followed. The facilities for transportation have been improved by a number of wire tramways and railroad switch extensions. The mountain streams are being harnessed to electrical motors and the generated power transmitted to various points for consumption.

A notable feature of the past year is the large number of old properties that have, after years of abandonment, been started up and are now working to a profit. The small margin on silver and low grade gold ores and their successful and profitable treatment have brought forward the mining engineer, the union of science and business principles, and the better recognition of mining as a legitimate industry from which profitable returns may be confidently expected. Colorado's present condition augurs well for the future.

COAL MINING IN INDIANA IN 1898.

By Robert Fisher, State Mine Inspector.

Review of Trade for the Year.

As a whole the coal business in the State of Indiana during the year 1898 has been fairly satisfactory. The question of wages as settled by the Chicago Conference of January has been generally complied with in all of the district north of the Baltimore & Ohio Southwestern Railroad, and there has been no general stoppage of work at any number of mines in this territory. The total production of coal in the State will reach nearly 5,000,000 tons, an increase of 1,000,000 over last year—an increase partly accounted for by the fact that during the months of July, August and September, 1897, nearly all of the mines in the State were idle on account of the strike begun on July 4th. Aside from this, there is a large increase in the amount of coal mined in the counties of Sullivan, Vigo, Vermillion and the bituminous mines in Parke County. This is partly offset by very slack work in the Block Coal District during the Summer. The claim is made by the operators in this region that by the Chicago agreement they were placed at a disadvantage with respect to the Pittsburg District in Pennsylvania, and lost a large part of the trade that rightfully belongs to this field. An attempt will be made in the next conference to have the differential between these districts restored to the point existing before 1898. The miners of this district have instructed their delegates to oppose any reduction in the differential between the Block and bituminous districts of this State, which is at present, as for several years past, 10c. per ton for pick mining. This is very likely to cause a serious disagreement in the conference to be held at Pittsburg, and may have serious results on the business here for the next year, as it will be very difficult to increase the price in the East without a corresponding increase in the bituminous fields of the West.

The last three months of the year have been very brisk in all parts of the State, and the production is nearly as large in the Block Coal District as it has ever been, while there is a great increase in the production of the bituminous mines over anything that has ever been known in the State. The only place where there is any complaint of slack work exists on the line of the Pennsylvania Railroad in Greene County, where there is a shortage of cars to move the product, and two-thirds time is about all they have done.

South of the Baltimore & Ohio Southwestern Railroad the United Mine Workers have made but small progress with their organization, and the Chicago agreement has not been in effect. Several attempts have been made to bring the miners there into the organization, but the operators seem to be unalterably opposed to working in harmony with the miners of the competitive district, as they claim that their principal competition comes from Kentucky and the Ohio River mines, and very little of their coal seeks an outlet North. There have been several small strikes in that district as a result of attempts to have the Chicago scale of prices adopted at different mines, but the year ends with all at work, full time, and with prospects of a continuance of the demand for some time to come.

A strike has been in progress at the mines of Babel & Co.,

Washington, during the whole of the year, but the mines have been operated to some extent by men brought from Kentucky; mining machines have been introduced there, so that the company has kept up a fairly good production. The operators claim to be paying scale rates, so that the only question seems to be one of the recognition of the miners' organization. Within the last month the mines operated by the same parties at Martwell, in Pike County, have been drawn into the fight, and an attempt is now being made to operate them with non-union labor. The struggle seems to be no nearer an end than at this time last year. This is one of the few difficulties that the Labor Commissioners of the State have been unable to adjust during the year. The men who are on strike have the sympathy and support of organized labor in their contention and are being generously supported.

More has been done in the way of new developments this year than for a long time previously. New mines have been opened in the different counties as follows: Clay, 8; Daviess, 1; Greene, 1; Parke, 1; Vermillion, 2; Vigo, 1; total, 14. In addition, 3 shafts that had been previously in operation have been sunk to lower veins, and two new shafts are in process of sinking.

Mining machine plants have been installed in three mines, and the use of machines has been temporarily abandoned at two. Electric haulage has been installed at two mines during the year, and is in process of installation at another.

On the basis of the November output, the present capacity of the mines of the State is 6,100,000 tons at mines employing over 10 men; and it is really greater than this, as many more men could have been employed during that month at the mines which were in full operation, and shortage of railroad transportation curtailed production in other localities, as noted above.

COAL MINING IN ILLINOIS IN 1898.

By David Ross, Secretary of Bureau of Labor Statistics.

Returns from the seven mine inspection districts of this State show that the total coal production for the year ended June 30, 1898, was 18,599,299, or, in round numbers, 1,500,000 tons less than that reported for 1897. This shortage is accounted for when the magnitude and the duration of the suspension of last year is considered. It is probably a smaller shrinkage than would have been expected. It is explained by the fact that, while many mines were idle, a few were running night and day, and by the further fact that, after the suspension, all mines resumed operations with unusual activity.

An inquiry into the productive capacity of the 811 mines in the State develops the fact that with present equipment, figured on the basis of full time, these mines are capable of producing nearly 42,000,000 tons of coal, or 120 per cent. more than the actual output for the present year. Assuming that the normal output for this year would have been something over 20,000,000 tons, it appears that the capacity of the mines of this State is equal to fully twice the demand for their product.

The average running time of the shipping mines for the year is found to have been 174.7 days each, while that of the preceding year was 185.5 days. This difference is also less than might have been expected. It is not, however, inconsistent with the decline in tonnage, which was only 7.5 per cent., while that for days of active operation was 6.4 per cent.; both confirm the excessive activity subsequent to the suspension. A comparison of average values for the last two years shows, for the first time in many years, a slight reaction from the tendency to lower prices, which has so long prevailed. The average value of all coal at the mine, as computed for the State for 1897, was 85.2c. per ton, the lowest ever reported in the State. For 1898 a corresponding average is found to be 91.8c. per ton, and since the close of the year for which this report is made the demand for coal has been firm at advancing prices.

In the matter of prices paid for mining—or the wages of miners—the suspension accomplished a material increase throughout the State, which is approximately expressed by the figures 34.26c. per ton for 1897, and 40.09c. per ton for 1898. These are the averages computed for all gross weight mining for the past ten years. It is impossible to make exactly parallel averages, owing to the establishment, now for the first time, of a uniform gross-weight basis.

An observable feature is the recent increase in machine mining. During the year the number of mines in which machines are used has been increased by 12, and the number of machines in operation by 72. This new interest in mechanical coal cutting is accountable for in part by the impression that the mining rates as fixed by State conferences are specially favorable to machine mining, and partly by the degree of efficiency which is being developed by modern electrical machines.

THE MINES AND QUARRIES OF IOWA IN 1898.

By H. F. Bain, Assistant State Geologist.

The year 1898 has been a good year for the mining interests of Iowa. It has not been a boom year, but there has been a good, steady growth. At the opening of the season the coal mines were all busy and business continued good till well on to spring. The summer months were spent as usual mainly in entry driving and preparations for the fall trade, which came with a rush early in November. The railroad trade has been good, and as half the coal output of the State is sold direct to the railroads, that has kept many mines going through the dull season. At present the mines are working hard to keep even with orders.

There has been little new work. The mines now open are ample to supply the trade, and until the latter is increased or some of the present shafts worked out there is little encouragement to sink new shafts. For several years now the business has been conducted on narrow margins, and except in particularly favorable situations but little money has been made. A valuable and thoroughly prospected coalfield, so located as to have important geographical advantages in reaching the Western market, has lain unopened for nearly a year awaiting an investor. With the better industrial conditions and the steadier trade now developing this will doubtless be opened up.

The quarries were fairly busy in 1898. The increased use of brick in paving and cement in culverts is being felt, but the building-stone business is a little better. The contracts for the new State Historical Building at Des Moines was obtained by the Le Grand Quarry Company over considerable competition from outside quarries. The lime business for the year has been fair only. The Iowa limestones are mainly the gray magnesian, and while the limes furnish a stronger bond, they cannot compete with the modern hard white finishes for interior house work; while at the same time in much building construction their trade is being cut by Portland cements. The industry is, however, an important one, and the Iowa kilns supply a wide district.

The brick industry has had a good year. An important feature of the year has been the introduction of oil-burning continuous kilns, which in some localities effect an important saving. The growth of the hollow brick trade has also been notable. The paving brick trade has been good. The Des Moines plants started as early in the spring as the clay could be handled, and burned their last kiln just before Christmas. They plan to begin work again in February. The plant of the Des Moines Brick Manufacturing Company, the pioneer plant of the region, and one of the largest and best equipped, burned at the close of the season. It is to be immediately rebuilt, larger and better than before. The universal tendency toward the concentration of the bulk of the business into the hands of a few large plants and the specialization of the industry is beginning to be felt here in the brick business. It is announced that the Granite Brick Company, of Burlington, is to go out of the paving trade, and the Northwestern Sewer-Pipe Company, of Sioux City, has for the present quit offering pavers. The last-named plant has passed into the hands of a capable and progressive owner, and careful experiments are now being carried out with the hope of securing greater uniformity of product.

The small iron mine of the Limonite Ore Company at Durango has been closed, owing to a failure to agree to terms of sale to the Illinois Steel Company. The iron ore occurring near Waukon is now being test-pitted and stripped with a view to opening it up. The work is being done by Chicago parties, who desire the ore for a furnace mixture.

The lead mines have done fairly well. Up to the middle of November some 13,000 pigs had been turned out. The Watters Furnace has made a decided improvement by the introduction of a simple arrangement for saving the fumes from the hearth. The saving is said to be nearly 15 per cent.

The zinc mines have been active and an earnest effort is now being made to get at and market the reserves of jack known to occur in the region. Of recent years the only buyers visiting the region have preferred the bone, and there has been little demand for jack. The rise in the price of the latter has sent buyers to Dubuque, and some jack is now being raised. Much more could be marketed if better mining and cleaning plants were put in and a steady market could be assured. While the Dubuque field is small, there are several promising properties and much undeveloped territory.

MINING IN MONTANA IN 1898.

By Prof. F. D. Smith.

Everything in the operation and development of the year 1898 in Montana points to a material increase in the production of at least three staple products of Montana mines—copper, gold and silver. The highest grade of activity has been manifested, and the operations have been entirely free from the disturbances of strikes, etc., and practically free from failures and insolvencies.

At the close of 1897 nearly all of the mines in which silver is the major value were closed down and capital was seeking other lines of mining industry. No additional mines closed during the year, and some have again commenced operations. The fact that the metal industries of this State are so inseparably connected with each other makes it difficult to analyze the conditions of each separately. For instance, nearly all of the silver produced was a by-product of either copper or lead, while much of the gold was likewise a by-product of the copper. Consequently activity in the copper mines means a large output of gold and silver.

Copper.

The copper industry of Montana centers in Butte and Anaconda, since the Butte mines produce the major part of the State's copper. A review of the year's work shows remarkable activity. Though the actual amount of ore lifted cannot be stated now, there has been upward of 8,500 ft. of sinking done and a total of 6,550 men employed in the mines around Butte. With a total of 50,000 ft. of shafts, it is plain that 8,500 ft. for one year means much development. The Green Mountain reached 2,100 ft. depth, the deepest in the State, and there are several now ranging from 1,500 to 1,800 ft. A new era in Butte's mining history will soon be opened up, particularly as concerns hoisting from deeper levels, as well as the question of drainage from levels below that of the drainage basin of the valley. Several of the more important companies have, during the past year, made arrangements to hoist from as deep as 5,000 ft., which means that as far as mining knowledge goes the safe and sure prosperous future of the Butte mines is assured.

The gigantic scale upon which the companies were enabled to construct their plants when the values of the ore were higher, and the general economical and skilful arrangement of their machinery for hoisting, transporting, concentrating and smelting the ore, now make it possible for the operators to work nearly all of the ore of the veins, though some of it is remarkably low in copper. The Anaconda Company operated in all 11 mines, with 10 separate shafts and hoisting plants, employed 3,340 men about the mines, and sunk a total of 3,550 ft. All of the ore was hauled by rail 27 miles to Anaconda, where it was smelted, the copper matte nearly all resmelted, and the copper thus pro-

duced electrolytically refined. That the production should be some 4,000 tons less than for the previous year need give no one any alarm, since the work in the richest mine of the group was arrested by fire, and lower grade ore from other mines taken instead. What is true for the Anaconda property is true of all mines in Butte that produce copper.

In the mines outside of Butte the past year has developed no new district with prospects equal to Butte's, even in its earlier days, yet considerable copper ore has been produced and shipped to Butte or other smelters for treatment. In particular may be mentioned the Garnet Mines, in Deer Lodge County, a new region worthy of note, and from certain districts in Cascade and Jefferson counties.

A most important incident for the future prospects of the copper industry is indicated by the organization of the new company known as the Washoe Company, in which Superintendent Marcus Daly, of the Anaconda Company, is heavily interested. A large number of claims and partially developed mines in the best copper district in Butte have been purchased and smelters and refining plants to cost over $1,000,000 are in process of construction at Anaconda.

Other important events will include the removal of some of the smelting plants to other localities.

The Parrot Company already has under construction a large plant at Gaylord, whither they were driven to transport their ore in order to get better facilities in respect to water, fluxes, fuel, etc. The dense sulphurous fumes from the roasters in Butte, if allowed to increase, must be the means of causing others who have long contemplated a change of location to erect their reduction plants at other points, thus relieving the situation in Butte, and bringing their smelters in closer proximity with many of the newer mines who have custom work.

Silver.

A large percentage of the silver, as stated above, is a by-product from the copper ores. For this reason whatever affects these mines will have its effect on the silver production of the year, and the low price of silver will not have a material effect on the production. Much silver has also come from the ores near the Coeur d'Alenes, which are valuable for the lead they carry, and, on account of the favorable condition of the lead market, were mined to a considerable degree. The fact is, nearly every producer of ore, whether it be copper, gold or lead, recognizes a certain important factor in the silver because it is always saved by the almost universal method of treatment of Montana ores, smelting. For these reasons Montana is not dependent upon the price of silver, and although a number of very promising properties are closed owing to the low price, yet the State as a whole, while praying for higher prices, seems to thrive exceedingly well on the ores.

Some districts where silver is the principal value have, during the past year, shown the first signs of resuscitation since '93. The Granite and the Bi-Metallic of Granite County pooled interests and started up under one management, as the mines are connected and are easily worked together. Another pleasing sign of activity is the construction of a smelter at Basin, Jefferson County, to smelt the silver-lead ores, which must result in the working of many ores that heretofore were too low grade to pay for shipment.

The activity in the Neihart District, Cascade County, where the ore is silver-lead, in which the silver outranks the lead values, goes far to show that even this class of mines pay good profits as operated in Montana.

In Butte the strictly silver mines are not so active, the Alice working at about one-fourth capacity by leases in connection with the Blue Wing properties, and a few smaller mines near Burlington, west of Butte, being the only important producers.

Gold.

The copper ores of Butte carry from $1 to $2 in gold per ton, and nearly all ores from outside mines carry much higher values. As in the case of silver, gold is a by-product. At the same time a large number of quartz mines were worked during this year, where the values were principally gold, and besides these the placer output is significant. In the case of the former it must be admitted that quartz mining in Montana is not so important as it should be. Whenever a mine is opened up that will produce ore which will pay to ship, the ultimate process is smelting. This is because of the good prices paid by the smelters for the proper smelting ores. Such ore as will not pay the high transportation charges and the additional smelting charges are left untouched. While in one sense Montana is fortunate in the preponderance of smelters, yet for the development of the mines of low grade gold values the industry is hampered. The capital necessary for the erection of stamp mills or chemical process reduction works is not forthcoming, or at least very slowly.

Lewis & Clarke County, however, has had a very good year, and the mines in and around Marysville have been prosperous. The cyanide works of the Drum-Lummon (Montana Mining Company) have demonstrated that these ores, like many others of the State, can be worked by this method.

A large amount of work on gold ores by stamp mills and plates has been done in Madison, Fergus and Deer Lodge counties, though none on a scale comparable with the Colorado or Dakota mines. When capital finds fewer bonanzas in copper and turns to other investments less alluring, the gold mines with cyanide and chlorination processes will begin to develop rapidly. This is no more true for gold than for many of the lesser mineral industries.

The placers of Montana, though at first the most wonderful of the mines of the State, have not since their first exhaustion received the attention their former production warrants. The past year, like many of the preceding years, has developed much placer gold, but it came principally from the remnants of famous old workings—for example, along Alder Gulch, Madison County, Grasshopper Creek in Beaverhead County, in old Bear Gulch and Deep Creek in Granite County, and on Cedar and Quartz creeks in Missoula County. A new era is approaching in this line of work which is marked by extensive hydraulic plants and dredges which until lately have not found the encouragement that they should. It is a fact that most of the millions of gold taken from Montana placers was taken by workings needing no extensive outlay of money for plants. Ground that required much outlay of money and work was neglected and abandoned, while much of fair value was left untouched by the drifting on the bedrock. In the last three years much attention has been given to such ground, especially in Missoula County and on Grasshopper Creek, so that now the work has just reached that development where the anticipated results can be attained. The next year will see an increase in the placer output of gold. No new placer localities have been discovered and sufficiently developed to warrant any great claims in increase, though on Hughes Creek, in Ravalli County, near the main range of the Rockies, a promising field is being opened up.

Lead.

The production of lead will probably be less than for 1897. Montana includes only a small part of the lead region of the Coeur d'Alenes. The mines in Missoula County are not as extensive as those of Idaho. We have had the anomalous condition of a State full of smelters sending lead ores to either Denver or Omaha, or to Puget Sound for smelting. Unless the ores are particularly high in silver and in so extensive deposits as to require practically no dead work in mining, the owners of the lead mines are apt to work on a small scale. The close of the Iron Mountain Mine when at the depth of 1,700 ft. is an illustration. A great expenditure of money was necessary to put in a new tunnel or shafts, and although the vein of ore was as strong as ever, it was decided that it was best to abandon the mine as long as the conditions are as above.

Montana needs a smelter for lead ores located near a cheap deposit of coal and with good railroad facilities. With those on the western slope of the Rockies, the production of lead can be doubled, and silver will correspondingly increase. The construction of the new branch of the Northern Pacific Railroad through the Lo Lo Pass to the Clearwater country will, it is believed by many, open up a section in Idaho which will change the outlook decidedly for the lead industry of Western Montana in the Coeur d'Alene and Bitter Root Mountains. Taken in connection with certain developments of the coal fields of that part of the State, one is warranted in predicting an increase in activity in the lead industry.

Coal.

The wonderful increase in this industry has received but scant attention outside of the State, since even now not enough has been produced to satisfy the needs of the factories and houses and the smelters with coke.

During 1897 there were mined 1,647,882 tons of coal, and during the fiscal year ended June 30th, 1898, 69,500 tons of coke were manufactured. Even this was not enough for all uses, and large quantities from the Wyoming mines were imported. The coal production of Montana in 1898 is estimated at 1,367,800 tons; coke, 70,000 tons.

Carbon and Park counties have shown up the strongest during the year, and remarkable developments have been made, particularly at a new point called Gebo and at Bridger in the former county. At Carbonado the first deep vertical shaft of that locality was put down 900 ft. through sandstone. At Bridger a slope will open the ground to a depth of 1,800 ft., and a spur from the Northern Pacific Railroad is being put in to connect with the main line. These three localities will be added to the producers early in '99.

In Cascade County the outlook for the distant future is not so encouraging. At Sand Coulee the mines are being abandoned for the camp known as Stocket, 6 miles distant. The purchase of the Diamondville mines in Wyoming by the Anaconda people, when they already owned extensive interests in the coal mines at Belt, may mean nothing or may mean a great deal. That the purchase was for the new Washoe Company may be the only reason, but one can see in the transaction an indication that the Belt coal-fields do not contain sufficient reserves to insure the fullest dependence upon them for the vast needs of such a concern. It is to be hoped that the pessimistic view is unwarranted. In April, 1898, the washing plant and bunkers at Belt were destroyed by fire, and no coke has been made there since that time.

Montana contains more coal measures than have been developed, though the quality of the coal may be questionable. Veins aggregating 50 ft. in thickness near Columbia Falls, 16 ft. in the Upper Bitter Root Valley, with much at Drummond and unknown quantities at Missoula are as yet untouched. No one can tell at what turn of the wheel these mines may be developed.

With the almost prohibitory freight tariff on Eastern coals, and with the strong call for coal at Butte and Anaconda, the industry in Montana is in a most satisfactory condition.

General.

With an output valued at $55,000,000 in gold, copper, silver, lead and coal for the year 1897 Montana presents a worthy record.

As yet the minor industries have not been fairly started, since capital is attracted by the more alluring investments. The mines of low grade ore now lying idle will continue so until the greater industries are overcrowded. Granite and marble are shipped from Vermont quarries, gypsum from New York, and enough sulphur is going to waste in Butte to furnish all the Western low grade gold mines with a means for cheap extraction of gold by the chlorination process. Only the best of everything is being taken now.

It is a question for students of political economy whether the best interests of the State are promoted by the high price at which all kinds of labor is held, particularly in relation to the development of the minor industries and the opening and working low grade mines. As long as high wages are paid the State will be free from strikes, which, with any outcome, are detrimental to owner, workmen and the State alike. When paying these wages the choice of the miners of the world is at the disposal of the mine-owner, and, moreover, the highest grade of work, both in quality and quantity, can be and is demanded.

ALUMINUM IN 1898.

By Alfred E. Hunt.

The aluminum business in the year 1898 was in a very prosperous condition. All lines in which the metal has been used in the past have been increased in their demands during the present year, and very many new uses have developed. The leading lines in which larger tonnage of aluminum has been used in the year of 1898 have been in the use of aluminum for electrical conductors and in the utilization of the metal to replace brass and zinc for many of the common purposes where those metals have been exclusively utilized in the past.

During the year 1898 aluminum was sold in the form of sheet at prices which made it 10 per cent. cheaper than brass sheets for a given purpose and 35 per cent. cheaper than copper sheet. The metal was not sold at as cheap a price as zinc sheets, but for many purposes where zinc has been utilized in the past special precautions have been necessary to protect the metal from corrosion by the substances with which it came in contact, and especially was this necessary as many of the zinc salts thus formed were very deleterious. Under these conditions, with the use of aluminum, the corrosion being much less in amount and the salts that are produced being non-poisonous, it is not necessary to take the precautions to protect the metal that have been necessary with zinc sheets. In this way, for many uses where zinc has been previously required, aluminum has been found more economical. To-day zinc sheets are not much cheaper than aluminum sheets. The tonnage of aluminum, which has thus replaced zinc and similar metals in the past year, has been fully equal to 500 tons. The amount of aluminum which has been used for electrical conductors during the past season has been fully 650 tons.

The total aluminum produced during the year 1898 has been 2,600 short tons, and arrangements are now being made for increasing the plant at Niagara Falls for the production of aluminum, which is expected to be in operation by May, 1899, which will about double the capacity.

During the first four months of 1899 every effort will be made to increase the output of aluminum with the apparatus now on hand, including the installation of some additional machinery which has been in stock with the Pittsburg Reduction Company for some years, since the shut-down of the manufacture of aluminum with steam-power at New Kensington.

The ruling prices for aluminum during 1898 have been uniform and steady for ordinary uses of the metal. For electrical conductors, the price for aluminum in the form of bars, plates, sheet and wire has been between 28c. and 29c. per pound at the point of consumption, according to the size of the order and the point of delivery to which the metal has been destined, as shown by the current price lists for the metal published by the "Engineering and Mining Journal."

ANTIMONY.

There were two producers of metallic antimony in the United States in 1898, the Mathieson Smelting Company of New York (works at Chelsea, Staten Island), and the Chapman Smelting Company of San Francisco. The latter was a new concern, or rather a reorganization of an old concern, the Chaps Smelting Company. The total domestic production of antimony metal was 1,100 short tons, against 750 in 1897. By far the greater part of this was smelted at the Staten Island works.

As in the previous year the domestic make of metal was derived chiefly from imported ores, although there was increased activity in antimony ore mining in the United States and probably an increased production. Antimony ore was mined in 1898 in California (especially near Mojave, whence 55 per cent. ore was shipped), in Nevada, at Kingston, Idaho, and in the Coyote District, Garfield County, Utah, shipments from the last being made via Belknap. Probably as much as 160 tons were obtained from the Utah mines. The Idaho Antimony Company, at Kingston, Idaho, was reported as running its plant at full capacity, employing 25 men. Renewed attention has been given to the antimony mines of Sevier County, Arkansas, and a syndicate is now engaged upon an investigation of some of the lodes opened there, with the intention of developing them if prospects appear satisfactory. A new discovery of antimony ore was reported from the State of Washington.

In Mexico increased attention has been devoted to antimony mining, and probably there was an increase in production. At present the ore is exported entirely, for the most part to the United States, England and France, but it is rumored that the erection of smelting works in Mexico is contemplated. The Mexican ore averages 55 per cent. antimony.

The old antimony mines at Rawdon, Nova Scotia, were reopened during the Summer of 1898 with a view of resuming operations in a more systematic manner than ever before. These mines are said to be opened on two fissure veins averaging nearly a foot in width, which often show solid stibnite, in places highly auriferous. Some of the old dump, which contains several thousand tons of low-grade ore, was shipped to England for treatment. This material contains from 10 to 15 per cent. antimony and sometimes assays as high as $18 gold per ton.

From France was reported the discovery of several veins showing a considerable quantity of ore which, after sorting, assayed 15 to 18 per cent. antimony, 30 to 35 per cent. lead, and over 30 oz. silver per ton. The most appropriate metallurgical method for the reduction of this ore is uncertain and French chemists are now engaged upon the problem, which presents features of great interest.

The New York Antimony Market in 1898.

Inasmuch as the production of refined star antimony in this country is not as yet sufficient to supply the demand, the course of the market during 1898 was again more or less dependent on prices ruling in Europe. Japan was not quite so important a factor as it used to be. On the other hand, fair quantities of Hungarian antimony are reported to have been imported. Consumption, although quite satisfactory, remains rather limited.

The year opened with Cookson's quoted at 8c., Hallett's 7⅞c., U. S. Star 7⅞c., and Japanese 7⅞c. to 7½c. Old stocks being quickly cleared off and the foreign market advancing, new supplies could only be laid over at higher prices, and, consequently, during February prices advanced to 8⅛c. for Cookson's, 7⅝c. for Hallett's, U. S. Star and Japanese. Then, owing to a good consumptive demand, prices advanced steadily during the next six months, until in October the highest point was reached: Cookson's 9¾c., Hallett's, Japanese and U. S. Star 9c. to 9⅛c.

At the end of the year European, as well as home producers, were more anxious to sell, and values declined. December closed quiet, with the ruling quotations 9c. for Cookson's, 8¾c. for "C" antimony (produced on the Pacific Coast and brought on the market within the last few weeks), 8¾c. for Hallett's, 8⅝c. to 8¾c. for Japanese, 8¾c. for U. S. Star and 8⅜c. to 8½c. for Hungarian.

The London Antimony Market in 1898.

By Our Special Correspondent.

The market has been affected throughout the whole year by a great scarcity of suitable raw material, and good ore has been in great request. The market opened firm at £30 to £30 10s., and remained steady thereat until the middle of February, when there was an advance to £31 to £31 10s., followed in March by a further improvement to £31 10s. and £32. This price was quoted until nearly the end of April, when there was another rise to £32 to £33, but early in May sellers were much higher in their views, asking £34 10s., and then rose almost weekly until at the beginning of July the price was called £36 10s. to £37, and remained stationary at this until the end of the year.

CHROME IRON ORE.

The chrome iron ore industry of the United States, which for many years has been confined to California, came almost to a standstill in 1897, when the production amounted to only 50 long tons. In 1898 the business ceased completely, at least there was no production. However, there was some exploration for this kind of ore and a discovery was reported on the property of the Tehama County Chrome Company, at Red Bluff, but the low grade of the ore and the existing low price prevented its exploitation. In general this may be said to be the reason for the cessation of the chrome industry in California.

The domestic supply of chrome ore was obtained chiefly from Turkey (Asia Minor) in 1898 as in previous years. Some was also imported from Newfoundland, where the Halifax Chrome Company has had its concentrating works in full operation. The existence of chrome ore in Cuba is reported, and probably some attention will be given to these deposits in the near future. Elsewhere in the world there were no important developments.

COPPER IN 1898.

The production of copper in the United States in 1898 reached the great total of 546,367,793 lbs. (243,914 long tons), an increase of 16,177,074 tons, or 3.2 per cent., over 1897. The figures given in the accompanying table have been furnished us by Mr. John Stanton, who acts as statistician for the companies, the month of December being partly estimated; and we have added to his totals an estimated amount of 15,000,000 lbs. for the copper used in making copper sulphate. The latter product shows a very considerable increase during the year.

Copper Production of the United States.

	1897. Pounds.	1898. Pounds.		Changes. Pounds.
Montana	237,158,540	219,249,102	Dec.	17,909,438
Lake Superior	145,839,749	159,147,492	Inc.	13,307,743
Arizona	81,019,022	111,183,199	Inc.	30,164,177
Other sources	33,170,172	40,788,000	Inc.	7,617,828
Copper used in sulphate	13,003,236	15,000,000	Inc.	1,996,764
Totals	510,190,719	546,367,793	Inc.	15,177,074

The table shows that, as in 1897, Montana, Michigan and Arizona were the three leading producers, but there was a difference in the course of their production. The Montana output showed a decrease of 7.5 per cent., due chiefly to the falling off in the Anaconda shipments, which was the result in part of a lessened extraction of ore and in part of a somewhat lower tenor in copper. The other Butte mines maintained their production well. The Anaconda promises increased returns in 1899. A new copper producer, the Washoe, the capacity of which is believed to be very large, may come into active operation in 1899, but this is somewhat uncertain, though it is understood that arrangements for building smelting works have been made.

The Lake Superior copper mines showed an increase in production of 8.9 per cent., which was divided between the Calumet & Hecla and the smaller mines. Mining in this region has been very active; some old mines have been reopened and a number of new companies organized to operate new properties; but none of these contributed to the output of 1898.

The feature of the year was the great increase of 37.2 per cent. in the output of the Arizona mines, which in 1898 was 20.4 per cent. of the total, against 15.8 per cent. in 1897. The large increase was due entirely to the activity of the old and well-known mines. The Arizona Copper Company, the Detroit, the Copper Queen Consolidated and the United Globe were all large producers, and the United Verde especially was exceedingly active. Improved transportation facilities and the higher price of the metal joined in stimulating production. A number of new mines are being brought forward, but none of these were active producers in 1898.

In the production from other sources, which includes the copper mines of other States than those already mentioned and the copper made in the various smelting works from ores mined chiefly for their

gold and silver contents, there was an increase of 23.1 per cent. in 1898. Some of this came from new mines, but the greater part from more active exploitation of old propositions. The list of new producers thus far is a very moderate one. The Mountain Copper Company in California has continued to be a producer. The Highland Boy Mine in Utah, owned by the Utah Consolidated Gold Mines, Limited, an English corporation, is a very promising property. The company is now putting up smelting works to make matte from the ores.

A large number of new mines have been brought forward, not only in Michigan—as noted above—but in other parts of the country. A year in which the price of copper ranged from 12 to 13c. a pound naturally stimulated production and exploration, especially when there is reason to believe that this range of prices will continue for some time to come.

The United States in 1898 produced over 60 per cent. of the copper supply of the world. Our exports for 11 months of the year were 131,893 long tons, indicating a total for 12 months of about 145,000 tons. On this some allowance will have to be made for the product of the Boleo Mine in Mexico, which is now mainly shipped through United States ports. Making this allowance, the exports of copper mined in the United States will reach a total of 135,000 tons, or 55 per cent. of our production. These figures indicate a home consumption considerably exceeding that of 1897.

Abroad there has been comparatively little change in production. The great Rio Tinto mines in Spain produced somewhat less than in 1897, though other Spanish mines did well. The Mansfeld Mine in Germany is not increasing its production. The Cape Copper Company has worked its mines in South Africa and Newfoundland very actively. A small increase is expected from British Columbia and a larger one from Mexico. The opening of the Inguaran and other mines in that country will probably result in a still larger gain in 1899.

The consumption of and demand for copper in 1898 was large throughout the world, the causes being fully set forth in the articles on the copper markets below. There is every reason to expect a still larger production in 1899.

Copper Mining in Arizona in 1898.

By James Douglas.

The statistical records show from Arizona a notable but steady increase for some years past, namely:

	Pounds.		Pounds.
1893	43,773,675	1896	73,745,321
1894	44,531,108	1897	81,019,922
1895	48,329,403	1898	111,183,199

This growth in our copper industry will be maintained, and its average increase probably exceeded during 1899.

Arizona's greater prominence, among the three great producing districts of this country, is due to the utilization in her principal mines during late years of sulphide ores. As long as operations were confined to the treatment of oxidized ores they were limited, not only by the comparatively scanty supply of that class of ores, and their inevitable exhaustion at no very distanct date, but by reluctance to incur the waste of 1½ to 2½ per cent. of copper in the slags, which loss seemed to be unavoidable under the most expert furnace management when making copper direct by one fusion in the cupola. The oxidized ores were most plentiful in the Southern groups of mines, where the ore occurs in limestone or associated with limestone. The United Verde deposits are lenticular masses in slate, and, therefore, atmospheric agencies, not having penetrated to great depth, the copper carbonates, though rich, were shallow, and were exhausted early in the mine's history. This company therefore has for years past relied exclusively on altered or unaltered heavy sulphurets, which have been heap roasted preparatory to matting.

But in the Bisbee and Clifton groups there remain resources of oxidized ores sufficient, by mixture with the sulphurets, to make a matte of Bessemerizing grade for years to come. The carbonates, however, even in these mines, exist in quantities so much less than the sulphurets that the managements are impelled by caution to restrain their operations within moderate bounds if they would postpone as long as possible the evil day when roasting must be resorted to. Nevertheless, greater freedom of action was obtained as soon as the companies which control these groups of mines decided to handle the sulphurets that had been developed during the exploitation of the oxidized ores, and which have been since exposed.

The resources in sulphurets are, of course, far greater than the visible supply of carbonates ever was, and, therefore, the Copper Queen, the Arizona Copper and the Detroit companies have all felt emboldened to extend the scope of their mining and smelting. All three have adopted the pneumatic method of concentrating mattes. It is one of the advantages or disadvantages of this process that a converter to be run economically must be fed up to its capaciay, and as this amounts to from 1,000,000 to 1,500,000 lbs. of copper per month, any decided increase of plant of necessity involves a considerable leap in production.

Another source of increase from the southern mines during 1899 will be the copper bullion from the two Globe companies. Both have been inactive of late, pending the arrival of the Globe, Gila Valley & Northern Railroad. It has now reached its terminus in the town of Globe, and both companies will, therefore, during the coming year resume operations and add notably to Arizona's sum total.

Though for several months past the United Verde has been running its large plant more nearly up to its capacity than formerly, this has been only during the closing months of 1898, and therefore the contribution of this, the largest mine in Arizona, for 1899 will be considerably in excess of what it has been in previous years. Many other properties are being explored, but none have as yet developed into active producers, nor are any of these new competitors likely to swell the aggregate to any appreciable extent during the coming year. The larger product, however, of the United Verde, the Globe Mines, and the two Clifton companies will probably represent an increase in Arizona's production to the world's supply of over 30,000,000 lbs. in 1899. But there is no reason to apprehend this increase will be repeated in successive years.

The New York Copper Market in 1898.

Unprecedented activity and great prosperity prevailed in the copper industries during the year 1898. While the United States heads the list, both as to increase in production and consumption, the activity has not been confined to this country. It has ruled the world over and has made itself felt to the very furthermost parts of the globe. The demand for electrical purposes has been enormous. Electric traction in this country has expanded still further, and in Europe has been introduced on a large scale. In England and Germany great numbers of electric lines have been installed this year. The superiority of this method of locomotion over that of the horse and cable, both as to speed and economy, has been established beyond a doubt, and the day is not far distant when the horse car will be a thing of the past. Some steam roads have made successful trials with electric motors, which are constantly being perfected. Rumors have been current during the year that certain large systems would adopt electricity, and we should not be surprised to find this become a certainty at any time.

The demand for engineering and shipbuilding purposes has been unprecedentedly large. The engineers' strike in England of 1897 left large arrears of work, and, with the big appropriations for warships, especially by England, Germany, Russia and the United States, the shipyards were kept busy night and day. Besides, the carrying trade has been very prosperous for a number of years past and all shipbuilders have large orders for merchantmen on their books.

The consumption of copper wire has been very large and has increased in all directions, as has also that of brass and sheet copper. Trade was somewhat disturbed by the war with Spain. After the blowing up of the "Maine" in the harbor of Havana, in February last, it became apparent that war could not be avoided and buyers became very cautious. Money became dearer, and it looked as though copper would be adversely affected. The Government, however, placed orders calling for large quantities of copper; Europe became afraid that supplies from here might be cut off and shipments were rushed forward. Besides, business here continued excellent, so that copper did not decline in price. On the contrary, it advanced and continued to rule steady throughout the war. It was evident in the early stage of hostilities that shipments would not be interfered with, thus making improbable either a famine of copper in Europe or a glutting of the market here.

It is estimated that in the United States the consumption of copper during 1898 has been 20 per cent. larger than during 1897. In Europe consumption has also increased, though not to the same extent, and statistics showed a smaller visible supply than for many years.

The production in this country increased about 10 per cent., but the foreign mines put out 5 per cent. less than last year.

Shipments from Australia to Europe increased, as did those from Chile. Spain did not increase its quota, while the other countries, excluding the United States, shipped smaller quantities. The exports from this country have increased 12 per cent., and the total change is a decrease of about 5 per cent.

The mining companies had a very prosperous year, and large dividends have been paid. Copper shares have greatly enhanced in value and investors have reaped handsome profits. The Calumet & Hecla stock sold at $640, and Boston & Montana as high as $249, while investors took unusual interest in smaller companies, and several new mines were successfully floated.

The year opened with a fair business doing at 10⅞c. for Lake copper and 10⅝@10¾c. for electrolytic sorts. The very first month the market developed strength and advanced to 11c. It would already then have gone higher had not the Calumet & Hecla remained free sellers at that price, and the month closed with none of the other Lake companies sellers at 11c. The visible supplies at the end of January showed a decrease of 1,300 tons, which made buyers still more eager to cover their requirements, and when, the middle of February, the Calumet & Hecla Company refused to sell further quantities at 11c., the market advanced steadily to 11⅝c. for Lake, and 11⅛@11¼c. for electrolytic. The demand was so urgent that copper sold abroad for February and March delivery had to be bought back to supply the domestic demand. Buying continued early in March, in spite of the threatening political situation, and toward the middle of the month large quantities changed hands at 12c. The demand during these winter months was quite unusual. In former years buyers had generally not taken hold in this way until the spring. April was rather a dull month. Manufacturers were well supplied, and not ready, owing to the gathering war clouds, to continue purchasing at the higher figures producers were asking. Toward the end of the month, however, some transactions were consummated at 12¾c. Early in May the large shipments made from the mines at the opening of navigation began to arrive, and stocks in the hands of consumers, which had been very low, were replenished. When, however, at the end of the month the Calumet & Hecla Company offered to sell at 12c., for any shipment until August, manufacturers again bought heavily.

During June and July there was little new business, buyers being well covered and holding off. Prices suffered accordingly, and the market declined to 11⅞c., then to 11¾c., and finally to 11½c. At this price the Calumet & Hecla Company, following the previous policy of trying to keep prices down, offered freely and for any delivery over the exceptionally long period of six months. Home manufacturers, becoming frightened by this unusual proceeding, took but small quantities, and mostly for August and September shipment, while very little was bought for the later deliveries.

Accordingly, early in August, the company offered abroad on that basis and readily marketed very large quantities. When this became known here, there was a scramble to cover, and in a few days the market advanced to 12c. The cessation of hostilities at the end of August had a stimulating effect on the already active business, and the still available quantities offering were eagerly competed for; and 12⅛c., then 12¼c., and at the end of August 12½c. was paid. What with the tremendous consumption here and continuing large export stocks in this country had been reduced to a minimum, and refiners could hardly keep up with their orders.

There was not much new business done in September and October, but the undercurrent continued very strong, and spot and near-by copper exceedingly scarce. At the end of October buyers had again exhausted their supplies and under very heavy buying the market advanced to 12⅝c. In November business was limited only by the comparatively small quantities offering, and these were eagerly competed for at advancing prices, the market closing with Lake at 13c. and electrolytic at 12⅞c.

Manufacturers having covered their wants, the market during the first half of December was very dull, and prices declined to 12¾c. for Lake. However, the middle of the month, Europe bought heavily; home

AVERAGE MONTHLY PRICES OF LAKE COPPER IN NEW YORK.

Year.	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
1893..	12.13	12.00	11.88	11.38	11.00	11.00	10.88	10.00	9.88	9.75	10.00	10.25	10.75
1894..	10.13	9.63	9.81	9.50	9.80	8.94	9.00	9.13	9.40	9.88	9.60	9.80	9.56
1895..	10.00	10.00	9.75	9.75	10.25	10.63	11.25	12.00	12.25	12.00	11.00	10.50	10.76
1896..	9.87	10.64	11.03	10.98	11.15	11.67	11.40	10.98	10 66	10.66	11.25	11.28	10.88
1897..	11.75	11.92	11.80	11.48	11.03	11.11	11.11	11.16	11.30	11.13	10.88	10.78	11.29
1898..	10.99	11.28	11.98	12.14	12.00	11.89	11.63	11.89	12.31	12.41	12.86	12.93	12.03

manufacturers had also run down their stocks, and large quantities changed hands at constantly advancing figures. The year closed with Lake copper at 13¼c. and electrolytic sorts at 13@13⅛c.

The London Copper Market in 1898.

By Our Special Correspondent.

At the commencement of the year the visible supply stood at 31,955 tons, and the market opened with English consumers holding off, but on the Continent there was a good demand, which was met principally by direct sales made by American producers. Later in the month English users bought rather more freely, and the Americans stiffened in their prices. There was also rather more speculative buying, based on the probable early termination of the engineering strike. The opening values were £48 1s. 3d. cash, £48 10s. three months, and rose steadily until £48 2s. 6d. and £49 8s. 9d. were touched for these positions, but after a temporary reaction to £48 16s. 3d. and £49 2s. 6d. the tone again became firmer, and the final rates were £48 18s. 9d. and £48 6s. 3d.

During the last part of the month large purchases of "put" and "call" options were made, sellers accepting 22s. 6d. per ton on the current three months' prices. A large line of single call options were also taken at 12s. 6d. per ton. India was inquiring rather more freely for brazier sheets, and the demand for the home trade was steady.

February started well, with a large decrease in statistics, the visible supply being reduced to 29,746 tons, and prices advanced accordingly, especially for consumers' copper. The earliest values were £49 5s. for cash and £49 11s. 3d. for three months, from which point they advanced steadily to £50 2s. 6d. and £50 8s. 9d., and these were the closing prices of the month. The market was greatly influenced by the strong positions in the United States, where values were considerably above the parity ruling on this side, and stuff sold by American producers was not forthcoming as the time of shipment arrived. In addition to these facts some Lake, which had been sold to consumers on the Continent, was bought back and reshipped to America. India was quite passive and remained out of the market.

March commenced with higher prices quoted from America, which stimulated European consumers to cover their requirements, and this demand was met by the English producers, who obtained good prices. The speculative market opened at £50 8s. 9d. spot, £50 13s. 9d. three months, rising 2s. 6d. further, but G. M. B.'s were then rather depressed, owing to profit-taking on the part of weak holders. Statistics published showed a further decrease of 1,259 tons in the visible supply, and this, coupled with the fact that 550 tons Chile bars were shipped direct to the United States, caused a very bullish feeling, and G. M. B.'s were soon pushed up to £51 2s. 6d. cash, £51 10s. forward. At this point politics were considerably disturbed and caused a good many realizations, bringing the price down to £50 7s. 6d. cash, £50 15s. three months. America, however, continued to send over good advices, and this turned the tide, values again moving upward. India came into the market and bought copper and yellow metal sheets.

The month of April commenced with a great scarcity of consumers' copper, and the margin between refined and G. M. B.'s, notwithstanding the appreciation of value in the latter sort, was wider than it had been for a long time. The visible supply at this time was 28,023 tons, which was a decrease of 1,239 tons, compared with the stock at the beginning of March. Cash metal started at £50 9s. 9d., with three months' prompts fetching £50 16s. 3d., from which point they crept up to £51 3s. 9d. and £51 10s. The prospect of the colliery strike, which was thought might have interrupted smelting operations in England, counteracted the political uncertainty that was prevailing, and after a temporary setback to £50 17s. 6d. spot and £51 5s. forward, a strong speculative feeling was evident, and on good buying values were easily carried up to £52 11s. 3d. cash and £53 2s. 6d. three months. At the end of the month, however, offers of forward copper were rather pressed by Americans, and this caused a decline, the closing rates being £52 2s. 6d. and £52 12s. 6d.

The stocks at the beginning of May showed an increase of 868 tons, and this, aided by a domestic sale in the United States of 5,000 tons Lake at 12c., caused the G. M. B. market to break away, and prices soon fell to £51 7s. 6d. cash, £51 16s. 3d. forward. At this level things became somewhat steadier, but when it was found that other American producers had followed the lead of the Calumet & Hecla Company and were making rather free sales a good deal of bear selling was noticeable and values receded to £50 18s. 9d. cash, £51 7s. 6d. three months. This position suddenly changed and prices began to soar upward, and in a day or so there were buyers at £51 15s. spot, £52 2s. 6d. three months, but on the publication of the American production figures which showed an increase of about 2,600 tons, compared with April, holders got somewhat scared, and, with the assistance of the bears, depressed the market until £51 was accepted for cash and £51 5s. for forward. Spot stuff then became very scarce, and the contango on forward prompts almost disappeared; the covering by shorts then led to a more active business, and values improved to £51 7s. 6d. cash, £51 10s. three months. The final rates were about this figure. The demand from consumers was unimportant throughout, but India bought on a small scale.

The market was treated to the well-known and oft-repeated rumor of fire in the Anaconda Mine, but this news was received with general inattention. At the commencement of June stocks again showed a decrease of 1,102 tons for the previous month, and the price of G. M. B.'s opened at £51 2s. 6d. cash and £51 10s. three months, from which point they reacted to £50 17s. 6d. and £51 1s. 3d., but steadily improved to £51 6s. 3d. cash, £51 10s. three months. Consumers were only buying in a very half-hearted way, and reports coming to hand of a largely increasing American production caused rather a severe onslaught by the bears, and values speedily gave way until £49 7s. 6d. was accepted for cash and £49 12s. 6d. for three months, which were the lowest figures that had been seen for some considerable time. The position then—which was evidently stronger than most people thought—attracted outside speculators, and at the end of the month prices had recovered, and closed at £49 16s. 3d. cash, three months selling at £50 3s. 9d.

Consumers, both in England and the Continent, abstained from buying until English and American producers lowered their prices, which they did when almost the lowest point was reached, and a large business was done, particularly in electrolytic and tough. India remained quiet, and only a few orders for yellow metal and copper were forthcoming.

The statistics published at the end of this month showed an increase of 312 tons since the previous stocktaking, which was, however, caused by the arrival of a large parcel of ore that had been sold to consumers and waited delivery. The statistics, however, were regarded as satisfactory, and this led to a continued good inquiry, and during the early part of July values steadily improved to £50 16s. 3d. cash, £51 2s. 6d. three months.

There was then some disposition to realize profits, and the fact that some of the Lake producers had reduced their price to 11⅝c. and that the Calumet & Hecla Company were selling to Continental consumers, caused holders of G. M. B.'s to become rather more pessimistic in their views, and they sold freely, soon bringing the price down to £49 10s. cash, £49 15s. three months. Trade on the Continent also seemed to have slackened off somewhat at this time, but toward the end of the month the prospect of peace between Spain and America, and the reports that the sulphate of copper makers intended to combine, improved that market and caused the bears of G. M. B.'s to get scared, and they, in covering their sales, drove the market up to £50 3s. 9d. cash, £50 11s. 3d. three months, at which figures the month closed. The demand for manufactured and refined copper was quiet throughout, and the prices from India were below market values.

August opened with a decidedly good tone and this quite counteracted the bad statistics, which showed an increase of 1,760 tons for the month. The opening value was £50 8s. 9d. cash, £50 15s. three months, from which point there was an advance, with minor fluctuations, to £52 2s. 6d. cash, £52 7s. 6d. three months. There were then some moderate sales, which were probably due to profit-taking and possibly to some bear selling, which caused the market to decline to £51 15s. cash and £51 17s. 6d. three months. There was rather more demand during the month from the home trade, principally for shipbuilding and kindred work, and the home and export trade seemed to be improving. India and China were rather more disposed to buy, but it was not until the end of the month that they came up in their prices.

September opened with a visible supply of 28,397 tons, which was a decrease of 1,464 tons compared with the first preceding month. The opening figures were £51 12s. 6d. cash, £51 15s. three months, and the rise was then almost uninterrupted to £52 5s. and £52 7s. 6d., respectively. There then seemed more disposition to sell American copper, and this caused values to sag off, but at £51 13s. 9d. cash, £51 17s. 6d. three months, the fall was arrested and prices improved to £52 2s. 6d. cash, £52 6s. 3d. forward, and for the remainder of the month moved up and down within a fraction of these figures. The demand from home consumers was only moderately good, and those on the Continent held off to a great extent. September closed with a decrease of 814 tons for the month, which reduction exceeded expectations, and this, in conjunction with a better demand from the Continent, caused a good advance in the early part of October to £53 2s. 6d. cash and £53 6s. 3d. three months. After easing off to £52 15s. and £52 2s. 6d., values took another spurt and rose to £54 5s. cash, £54 11s. 3d. three months, which prices were practically the closing ones. Buying on behalf of speculators and interested parties was very persistent and the consumptive demand was remarkably good, especially taking into consideration the fact that the political outlook at the time was in a very unsettled condition. A good business was done in sulphate, and Eastern buyers were inquiring, although they had not yet made up their minds to meet the higher prices ruling here. English consumers bought more freely, and producers, having made good sales at high prices, withdrew.

Statistics published on November 1st showed a visible supply of 25,798 tons, which was again a record, and was lower than at the same time of the previous month by 1,785 tons. The political situation at the commencement was rather unsettled, and the improved statistical position did not have its fair share of attention. The opening rates were £54 8s. 9d. cash, £54 13s. 9d. three months, but there was a drop to £54 2s. 6d. and £54 10s. There was then some very good buying, and this, coupled with strong reports and advancing prices from America, caused the prices here to bound up to £56 15s. for all positions. At this time there was a backwardation of 10s. per ton on forward metal, brought about by the continued uplifting of warrants and the free selling of three months' prompts. The close was rather easier, with buyers of cash at £56 2s. 6d. and £56 three months.

December opened with stocks showing an increase of 1,099 tons, but this was attributable to the fact that about 1,000 tons argentiferous bars had been put into stock. They were, however, sold, but had been shipped earlier than consumers wished, and were consequently put into public store. This surprise led to rather active selling and prices soon fell aday, three months prompt being particularly pressed for sale, but after falling to £55 1s. 3d. cash and £54 18s. 9d. three months there was a sharp reaction to £55 15s. and £55 17s. 6d., respectively; but this improvement was not maintained and prices became very irregular. After touching £55 for cash and £55 3s. 9d. for three months, there was an almost gradual rise to £56 5s. spot and £56 11s. 3d. for three months.

GOLD AND SILVER.

There was a large increase in the world's gold production in 1898, the total for the year amounting to $286,218,954, against $237,332,456 in 1897. The Transvaal, which was a little behind the United States in 1897, far outstripped us in 1898. The United States itself showed an increase contrary to expectations earlier in the year, when it was known that there would be a falling off in the production of California; but this proved to be more than outweighed by the increase in other States, especially Colorado and South Dakota. Australasia manifested a large increase in production, and so did Russia, Canada and Mexico. In British India there was also an increase, although it was not large. Rhodesia appeared for the first time as a gold producer. From South America the returns are incomplete, but the statistics already received by us indicate that there was certainly an increase in the production of Brazil, while in British Guiana there was a falling off. French Guiana showed an increase and Dutch Guiana a decrease. The countries from which we have received complete statistics for the 12 months of 1898, or 11 months with December estimated (except Mexico, for which our returns cover only the first semester), in 1898 produced 88 per cent. of the total.

GOLD PRODUCTION OF THE WORLD.

Countries.	1897.			1898.		
	Fine Ounces.	Kilograms.	Value.	Fine Ounces.	Kilograms.	Value.
North America:						
United States	2,774,935	84,870.5	$59,210,795	3,110,788	95,200.7	$64,300,000
Canada	299,467	9,164.0	6,190,000	686,502	22,071.1	14,190,000
Newfoundland	3,000	93.3	62,010	3,000	93.3	62,010
Mexico	344,498	10,715.0	7,121,189	365,032	11,354.0	7,668,866
Central America	25,399	789.9	525,000	25,399	789.9	525,000
South America:						
Argentina	15,235	473.8	314,907	15,235	473.8	314,907
Bolivia	3,144	98.0	65,000	3,144	98.0	65,000
Brazil	70,732	2,200.0	1,462,120	84,633	2,591.0	1,750,000
Chile	68,096	2,118.0	1,407,544	68,096	2,118.0	1,407,544
Colombia	188,679	5,868.7	3,900,000	188,679	5,868.7	3,900,000
Ecuador	6,430	199.9	132,900	6,430	199.9	132,900
Guiana (British)	101,505	3,156.9	2,098,098	88,617	2,756.0	1,861,393
Guiana (Dutch)	32,983	1,025.8	681,748	28,273	865.3	584,421
Guiana (French)	59,859	1,861.7	1,237,310	66,593	2,038.0	1,376,477
Peru	5,787	180.0	119,628	5,787	180.0	119,628
Uruguay	6,880	214.0	114,600	6,880	214.0	114,600
Venezuela	39,384	1,224.9	814,067	39,384	1,224.9	814,067
Europe:						
Austria-Hungary	105,397	3,278.2	2,178,556	105,397	3,278.2	2,178,556
France	10,513	327.0	217,304	10,513	327.0	217,304
Germany	90,921	2,780.9	1,879,357	90,921	2,780.9	1,879,357
Italy	10,325	316.0	213,431	10,325	316.0	213,431
Norway	650	20.0	13,508	653	20.0	13,508
Russia	1,046,965	32,408.2	21,538,490	1,216,100	37,217.0	25,136,994
Sweden	3,702	133.3	76,524	3,702	133.3	76,524
Turkey	387	12.0	8,000	387	12.0	8,105
United Kingdom	2,032	62.5	42,001	2,032	62.5	42,001
Asia:						
China	321,296	9,992.8	6,641,190	321,296	9,992.8	6,641,190
India (British)	353,147	10,983.4	7,299,554	369,018	11,479.3	7,753,150
Japan	34,509	1,073.3	713,300	34,509	1,073.3	713,300
Korea	34,918	1,086.0	721,765	34,918	1,086.0	721,765
Malay Peninsula	25,000	777.6	516,750	25,000	777.6	516,750
Borneo	4,837	150.6	100,000	4,837	150.6	100,000
Africa:						
Witwatersrand	2,511,544	78,112.6	51,913,607	3,554,746	108,790.0	73,476,600
Other districts, S.A.R.	232,406	7,230.0	4,805,072	229,528	7,024.3	4,744,350
West Coast	24,276	755.0	501,793	24,276	742.9	501,793
Rhodesia	.....	.....	.....	10,000	306.3	206,700
Madagascar	19,351	601.8	400,000	19,351	601.8	400,000
Australasia, 7 colonies	2,520,333	77,130.6	52,095,338	2,945,426	91,024.7	61,480,763
Totals	11,399,475	351,486.2	$237,332,456	13,805,407	425,333.1	$286,218,954

The reasons for this further great increase in output are to be found chiefly in the great gains in three districts, namely, the Witwatersrand, Coolgardie and the Klondike. Of these the gain in the last was largely fortuitous. The gold from this source is entirely derived from alluvial deposits, which are quickly worked out, and there is not, consequently, the same prospect of a permanent increase in production as there is in the cases of the Witwatersrand and Coolgardie, where the mines are opened exclusively on lodes. However, the increase in production in 1898 cannot be wholly accounted for by the three districts before mentioned, and in the other parts of the world, where the statistics show an advance, especially in the United States, British Columbia, Mexico, Queensland, Russia and British India, the increase can be attributed only to the causes cited in "The Mineral Industry," Volume VI., for the increase in 1897, namely, the cheapening of production by improvements in mining methods and metallurgical practice; the diversion of attention from silver mining to gold mining, on account of the decrease of profit in the former; the increased profit in gold mining in countries whose finances are on a silver basis; and the growing tendency of capital to seek investment in gold mining as an industry which aims at the production of a metal that, nominally at least, is not subject to market fluctuations.

With respect to the world's production of silver, sufficient statistics are not yet available to show the result of 1898. Of the leading silver-producing countries the Mexican statistics for the first semester, during which the production was 926,484 kg. (29,786,651 Troy oz.), indicate an increase in 1898 over 1897, when the production was 54,052,647 oz. The United States produced 3,110,788 oz. in 1898, against 2,774,935 in 1897. As to New South Wales, Germany and Bolivia, which follow in the order named in importance as silver producers, returns are very incomplete. There was probably an increase in each case, but it should be mentioned that the silver production of Bolivia has been largely overestimated in all recent statistical publications, with the exception of "The Mineral Industry," Volume VI., wherein the production in 1897 was reported as 10,500,000 oz., which was modified but little by the revised returns received by us later in the year.

The United States.

The production of gold in the United States increased from $59,210,795 in 1897 to $64,300,000 in 1898; the production of silver increased from 56,457,272 troy oz. to 64,060,000 oz. The increase in the production of gold was due especially to Colorado, South Dakota and Utah. A precise distribution of the production by States is never feasible, and at this early date is quite impossible. However, there is data for the belief that the production of Colorado in 1898 amounted to $24,000,000, against $19,579,637 in 1897. The total for South Dakota promises to reach $5,800,000, against $5,300,000 in the previous year. The production of Utah rose from $1,845,938 in 1897 to $2,194,000 in 1898. Montana reports a gain from $4,496,431 to $5,208,000. California alone shows a decrease. This was attributable to the excessive drought which prevailed during the year, rendering placer mining impossible in many districts and compelling many of the quartz mill men to hang up their stamps. Estimates of well-informed mining men at mid-year indicated a falling off in the output of at least 20 per cent., but it is doubtful if the final figures will show so large a diminution. In December there was an unusually heavy rainfall in the valleys and snowfall in the mountain, so it is thought that an abundant supply of water is assured for 1899.

In Colorado the greater part of the production, as in the previous year, was obtained from Cripple Creek, as to which district reference should be made to the special report elsewhere in this issue. The Cripple Creek mines maintained their previous excellent record as dividend payers, and there is plenty of ground for the belief that this district will continue to be the most important single gold producing district of the United States, unless some great deposits not now known should be opened. Outside of Cripple Creek there was greater activity at Black Hawk and vicinity, at Breckenridge and near Telluride, where the Tomboy Mine was again a large producer. At the end of the year it was reported to be turning out $125,000 per month. At Leadville the Little Jonny Mine made a large output. Promising gold districts have been opened in Conejos and Costilla counties and in the vicinity of Hahn's Peak; also in the valley of the Taylor River, along the Sangre de Cristo range, and in Montezuma County.

In Utah the Camp Floyd or Mercur District continued to be the largest producer, and its output showed a fair increase, some of the new cyanide works which were in course of construction in 1897 having been put in operation in 1898. In Nevada the De La Mar Mine was the largest producer, as in 1897; the April Fool and Magnolia mines, in the same district, were also productive. Arrangements are now being made to rework the accumulations of tailings on the Comstock lode by the cyanide process, and in 1899 an increase in the production may be expected from this source. In Oregon the gold production was obtained chiefly from the vicinity of Baker City, where the Union-Companion, Eureka, Excelsior and Columbia mines were the largest producers. A large mill is being erected at the Golconda Mine, in the Cracker Creek District. Oregon showed no increase in production for the same reasons that obtained in California.

In South Dakota the Homestake Mine was the largest producer, as usual, its output amounting to about $2,500,000. The Deadwood & Delaware Smelting Works were rebuilt and were again in operation, producing an iron matte. The Black Hills Gold & Silver Extraction Company, Golden Reward and Kildonan chlorination mills turned out a large amount of gold by the cyanide and chlorination processes. With an insignificant exception, the entire gold output of the Black Hills is obtained by underground mining from lodes, and nearly all the ore is reduced in the district, the most value in a crude form that goes out being in Deadwood & Delaware matte. In Montana the production was obtained largely from the same mines as in 1897, without noteworthy change in the industry, except perhaps an increase in the amount of gold won by river dredging. In Arizona the Pearce Mine was a large producer.

The output of Alaska was probably somewhat more in 1898 than in 1897, but new stamp mills on Douglass Island not having been completed, ther was not so much of an increase as was hoped for. It is expected that these mills will go into operation early in 1899.

The increase in the production of silver is attributable to the increase in the production of silver-copper and silver-lead ores, especially at Butte, Mont., and in the Coeur d'Alene, from which the silver is obtained largely as a by-product. In Colorado there was as usual a large output at Leadville, Aspen and Creede. In Utah the Ontario and Daly mines at Park City were practically idle throughout the year. In Montana of the important silver mines proper the Alice, Moulton, Bi-Metallic and Granite Mountain were in operation, but only on a small scale as compared with the time whe silver was at 80 cents per ounce.

Foreign Countries.

Australasia.—The production of gold in the seven colonies of Australasia was $61,480,763 in 1898, against $52,095,338 in 1897. New South Wales showed an increase of about $500,000; New Zealand fell off about $300,000; Queensland gained nearly $2,000,000; Tasmania fell off about $500,000. The output of Victoria was a little less in 1898 than in the previous year. In Western Australia there was an increase of upward of $5,000,000. The total production of the seven colonies in 1898, with the corresponding figures for 1897 following in parenthesis, was: Queensland, $14,349,654 ($12,423,584); New South Wales, $5,756,206 ($5,-

276,208); New Zealand, $4,386,990 ($4,067,567); South Australia, $600,000 ($584,134); Tasmania, $935,500 ($1,443,548); Victoria, $15,742,073 ($15,819,677); Western Australia, $19,710,340 ($12,480,621). The production of Western Australia fell off somewhat in the early part of the year, but in the second half there was a steady increase month by month, a maximum of 116,824 crude oz. being attained in October. The phenomenal increase in the production of Western Australia put somewhat into the shade the large increase in Queensland. The gold resources of the latter colony are great, and it is not likely that it will some day attain the premier position among the Australian colonies, notwithstanding the marvelous richness of the Coolgardie and Kalgurlie districts of Western Australia.

Our statistics for the seven colonies of Australia are based on actual returns for 11 months, the output for December being estimated.

Canada.—The great increase in the gold production of Canada in 1898 was due especially to the Klondike. This district was credited with an output of $2,500,000 in 1897. In 1898 the deposits of Klondike gold at the United States Mints and Assay Offices amounted to $10,055,270, and this may be put down fairly as the Klondike output in 1898. J. B. Tyrrell, who visited the district in behalf of the Canadian Geological Survey reported favorably upon the richness of the alluvial deposits, which he considers to be very extensive. So far only two creeks have been really worked. These are El Dorado and Bonanza. Hunker and Dominion creeks have only been scratched, although they are known to be rich. Mr. Tyrrell expressed the opinion that the output in 1899 would be much larger than that of 1898.

In British Columbia there was probably an increase in production. In Nova Scotia and the other gold-producing districts of the Dominion gold mining was conducted without special new features.

Brazil.—Reports from the St. John del Rey and Ouro Preto mines, in the province of Minas Geraes, show an increase in production in 1898. These companies furnish the more part of the yield of gold in Brazil at the present time.

Guiana.—Of the three Guianas, British and Dutch experienced a falling off in gold production in 1898; French showed a small increase. The decrease was especially large in British Guiana, where, according to the official report for the fiscal year 1897-98, quartz mining was almost at a standstill, although in one or two mines development work was carried on. The decrease in production was ascribed partly to the exceptionally bad weather, which interfered with operations, especially in the Potaro District, and partly to the exhaustion of the alluvial workings in the Barima District, while difficulty in obtaining credit, due to a lack of confidence which has been engendered by unchecked dishonesty on the part of individuals entrusted with exploring expeditions, has prevented the opening of fresh ground and the extension of the district generally. Our statistics cover the calendar year 1898, having been forwarded to us by cable by our special correspondent at Paramaribo.

India.—The gold production of British India increased from $7,299,554 in 1897 to $7,753,150 in 1898. The figures for 1898 are based on complete returns, except for December, in which month the production was estimated. There were nine producers during the first 11 months, the most important being, as heretofore, the Mysore, Champion Reef, Ooregum and Nundydroog. It was expected that the Balaghat would resume operations in December.

Mexico.—Estimating the gold production of Mexico for the whole year at the same rate as in the first six months, the total was $7,668,866, against $7,121,189 in the previous year. These statistics include no allowance for exports, which is made by some authority. There are doubtless certain portions of Mexico, such as the territory of Lower California, where it is very difficult to control the output on account of the large extent of sea coast, but the production of gold in these districts is not large, and consequently it does not seem proper to make an important allowance for surreptitious exports. Our statistics for Mexico are probably a little under the mark, but this is the case with all statistics that are based on actual returns.

Russia.—The production of gold in 1898 in Russia and Siberia was $25,136,994, against $21,538,490 in 1897. The statistics for 1898 include the receipts of gold at the Imperial Mint, as cabled to us December 31st. From the total receipts of the year the amount contained in the first convoy of January was deducted, this having been previously counted in the production of 1897. The remainder was increased by 10 per cent. to cover gold disposed of clandestinely, as explained in our previous reports.

Rhodesia.—This British colony appears for the first time as a gold producer, certain mines becoming productive in the autumn. The total output for the year is estimated at $206,700.

Transvaal.—According to our private reports, by cable, the production in 1898 was £16,075,000, of which £15,100,000 came from the Witwatersrand. Reckoning these values at $4.866, the total for the Witwatersrand is $73,476,600, and for the outside districts $4,744,350, a total of $78,220,950. Consequently, it appears that there was a small falling off in the output of the outside districts. However, the increase on the Witwatersrand was about $21,500,000. A production of $73,476,300 in 12 months from one district of only a few square miles area, and practically all of from one lode, is wonderful in the history of mining. This district promises to far surpass the records of Zacatecas, Guanajuato, the Comstock Lode and the other famous gold and silver bonanzas of the past. The output of the Witwatersrand in January, 1898, was about 150,000 crude oz., and only in June, July and October were there setbacks in the monthly increase. There were in 1898 over 5,000 stamps dropping on the Rand, their combined crushings exceeding 650,000 tons of ore per month. The output of the 10 deep level mines during the first three quarters of the year amounted to more than 20 per cent. of the yield of the entire Rand in 1897, and in September was £342,243, or rather more than 25 per cent. of the total output of the fields for that month.

Other Countries.—In estimating the world's production of gold in 1898 the countries for which statistics are lacking have been taken as making the same output as in 1897. Any increase or decrease on their part does not affect materially the total, their aggregate production in 1897 having amounted to only 12 per cent. of the whole.

IRON AND STEEL IN 1898.

In the year 1897 we had a period of activity and progress in the iron trade all over the world. The same conditions were repeated and intensified in 1898. All the iron-producing countries have passed and are still passing through a time of extraordinary activity in almost every branch of production. In the United States we have had to supply an enormous demand for our own people, and also a very considerable quantity for export to make up the deficiencies of the European furnaces. This has applied not only to raw iron and steel, but to finished products of all kinds. Our production has been the greatest on record, and during the closing months of the year taxed the producing capacity of our furnaces and mills.

Iron Ore.—In the following table we show the approximate production and consumption of iron ore in the United States in 1898 as compared with 1897. The total estimated output, as will be seen, was 21,388,136 long tons, showing an increase of 2,183,821 tons, or 11.5 per cent. over that of 1897—an increase considerably less in proportion than that of pig iron. This fact is explained partly by the use of a greater proportion of high grade ores, and partly by the reduction in stocks on hand, a considerable quantity of ore mined in 1897 having been consumed during the twelve months just closed.

IRON ORE MINED AND CONSUMED IN THE UNITED STATES.

	1897.	1898.
Lake Superior	11,500,667	13,950,788
Eastern, Ohio and other local	1,537,600	1,700,000
Southern States	4,283,700	4,750,000
Total	17,321,967	20,400,788
Add increase in stocks	995,000	
Total mined in U. S.	18,316,967	20,400,788
Add decrease in stocks		787,348
Add imported	489,970	200,000
Total consumed	17,811,937	21,388,136

The year has served to emphasize still more decidedly the present supremacy of Lake Superior iron ores in the trade. No less than 75 per cent. of the pig iron made in 1898 was from these ores. The only other single important source of supply was in the iron ores of the Southern States, from which 16½ per cent. of our pig iron was made. Eastern Ohio and other local ores were used for 7½ per cent. of the total make, while the use of imported ores fell to a very low point, the total being sufficient for only 1 per cent. of our pig iron output.

The total shipments of iron ore from the Lake Superior ports by water during the year of navigation was 13,650,788 tons, to which 300,000 tons will have to be added for shipments made from the mines to furnaces by rail. The receipts at the Lake Erie ports for the navigation year were 11,028,321 tons, the balance of 2,622,467 tons going to Milwaukee, South Chicago and other ports on Lake Michigan. The stocks of ore on Lake Erie docks on December 1st, at the close of navigation, were 5,136,407 tons, or 787,348 tons less than at the close of 1897.

The details of this movement of iron ore will be found in the Cleveland market report which follows. The production was divided approximately as follows: The Marquette Range in Michigan supplied 2,894,622 tons and the Menominee Range 2,489,235 tons, the two older ranges thus showing a capacity for continued production which was hardly expected a few years ago. The Gogebic Range, partly in Michigan and partly in Wisconsin, shipped 2,406,374 tons. The Vermilion Range in Minnesota increased its production very moderately, shipping 1,265,735 tons, while the Mesabi Range in Minnesota, the youngest of all the producing districts, was the heaviest shipper, sending out 4,594,622 tons.

The tendency to consolidation and ownership of the mines by the large steel producing companies has continued, the most notable instance being the purchase of the Norrie and other Gogebic mines by the Oliver Iron Company, which represents the Carnegie Steel Company. The same company also extended its holdings of Mesabi ore lands and purchased several tracts on which deposits of iron ore not yet worked are known to exist.

In the South perhaps the most notable incident of the year was the opening of the great brown ore deposits at Leeds, in Alabama, which are to be worked on a very extensive scale and will be utilized chiefly in the manufacture of basic pig for the new steel works at Ensley, in the same State.

In the East there have been no changes of any importance in the iron mines; no new mines of importance have been opened, and no ore producing districts have been developed. As heretofore, the leading districts have been at Cornwall, in Pennsylvania; in Jackson County and in the Hanging Rock region in Ohio, and in the Lake Champlain district in New York. A few mines in Northern New Jersey have been worked steadily and a few also in the Berkshire region in Massachusetts and Connecticut, but no change can be reported. The shipments reported from the Lake Champlain mines for eleven months were 54,028 long tons.

The imports of iron ore for the year were very small. Estimating the month of December, they amounted to only 200,000 tons, against 489,970 in 1897. The principal reason for this was the closing of the Cuban mines, owing to the war with Spain. Toward the end of the year, and since our occupation of Santiago, these mines have been reopened; those of the Juragua Iron Company and possibly some others will be operated on an extensive scale during the coming year, and will add largely to our imports. There has been some talk of importing iron ore from Newfoundland, where extensive beds of high grade Bessemer ore are said to exist, but so far nothing has been done beyond the shipment of one or two trial cargoes.

The production of limestone and dolomite for flux in blast furnaces

reached an estimated total of 5,154,000 long tons, having a total value of $2,319,320.

Pig Iron.—In 1897 our production of pig iron reached a total of 9,652,680 long tons, which was the largest ever reported up to that date. It has been, however, exceeded very considerably during 1898. For this year, taking for the first half the figures of the American Iron & Steel Association, and estimating the second half on the basis of the capacity of furnaces in blast, month by month, our output of pig iron was 11,712,900 long tons, being greater than that of the preceding year by 2,050,220 tons, or 21.2 per cent. The production of pig iron for the year on the old basis of fuel used is shown in the accompanying table:

PIG IRON PRODUCTION, IN LONG TONS.

Fuel Used.	1897.	1898.		
		First Half.	Second Half.	Year.
Anthracite	932,777	635,209	507,719	1,142,928
Coke	8,464,692	5,127,491	5,131,768	10,259,259
Bituminous	255,211	147,003	163,713	310,716
Totals	9,652,680	5,909,703	5,803,200	11,712,903

	1897.	1898.		
		First Half.	Second Half.	Year.
Foundry and forge	3,127,010	1,681,263	1,624,900	3,306,163
Bessemer	5,795,584	3,781,314	3,714,000	7,495,314
Basic	556,391	337,485	348,200	685,685
Ferro and speigel	173,695	109,641	116,100	225,741
Totals	9,652,680	5,909,703	5,803,200	11,712,903

As we have often remarked, this division is not altogether a satisfactory one, the line between the coke and anthracite furnaces being somewhat difficult to draw. Nearly all those which still use anthracite coal (and their number is steadily decreasing) use some proportion of coke in their fuel, and it will probably be only a few years before the use of anthracite will be discontinued. A more satisfactory division is found in the purposes for which the iron was made which is given in the accompanying table, in which the first half of the year is furnished by the official figures of the American Iron and Steel Association, while the second half is estimated on the same basis.

From this table it will be seen that 64 per cent. of our pig iron production was intended for conversion into Bessemer steel. If we include the basic pig, the ferro-manganese and spiegeleisen we find that 72 per cent. of our entire pig iron production was intended for manufacture into steel, leaving only 28 per cent. of foundry and forge iron. Even the high proportion of steel pig will probably be increased still more when the Southern steel works are in full operation.

The production of pig iron showed only moderate fluctuations during the year. January opened with a capacity of furnaces in blast reported at 227,150 tons a week. It gradually increased to a total of 235,350 tons in March. This was the maximum for the first half of the year. At that time the continuance of low prices raised the cry of over-production, and many producers became somewhat alarmed lest there should be a still further fall in quotations. This led to the blowing out of some furnaces, and the average weekly production gradually, though somewhat slowly, fell off until August, when it was 208,150 tons. From that point it commenced to rise again, slowly in September and October, but more rapidly later as stocks of unsold iron diminished and the demand increased rapidly, until at the close of the year it attained its highest point and is now 238,000 tons a week.

It is quite probable that temporarily we have nearly approached the limit of our possible production. It is true that on the lists of the Iron and Steel Association there are reported a number of furnaces out of blast. A large proportion of these, however, are always old furnaces of small size or obsolete type which cannot be operated at a profit, and will probably never be blown in again unless in some such abnormal period as the sudden boom in the latter half of 1895, when a rapid advance in price permitted the operation of some of these furnaces for a short time at a profit. There is no reason, however, to fear a scarcity of pig iron, since there are several furnaces of the largest size and the latest type which are rapidly approaching completion and which will enable us to run up production to 15,000,000 or 16,000,000 tons a year should the demand require it.

The consumption of pig iron in the United States was probably about the same as the production. Estimating the month of December we exported 250,000 tons and imported 25,000 tons, leaving a balance of exports of 225,000 tons. This, however, was fully offset by the reduction in unsold stocks, which were not far from 240,000 tons less on December 31st than at the opening of the year.

Steel.—We have not yet the figures of steel production, but estimating them on the basis of the pig iron produced, and on the known activity of the steel trade, the output must have been between 8,600,000 and 8,700,000 tons of ingots. In 1897 our total output was 7,174,508 tons, which was far in advance of that of any other nation, and 1898 has still further emphasized our supremacy in production. It has also again shown to what an extent steel is replacing wrought iron and cast iron in the markets of the world.

The Export Trade.—The year has been marked by the great activity of our export trade, which first began on any extensive scale only two years ago. The quantity of pig iron sent abroad has fallen off somewhat, chiefly owing to the greater demand and somewhat higher prices at home, but on the other hand the sale abroad of finished products and of steel billets, blooms and tin plate bars has very largely increased. Thus for the ten months ending October 31st our exports of rails amounted to 246,430 tons, against 108,816 tons in 1897. For the same period the total value of our iron and steel exports, including machinery, was $62,290,560, against $51,363,017 in 1897. The total exports of iron and steel and their manufactures for 1896 will exceed $70,000,000. Moreover, during the closing months of the year a very large number of orders have been booked for delivery during 1899, and these, of course, will appear in the exports of that year. Besides rails, there were very large increases in sheets, steel shapes, wire, nails and other products. A notable fact is that these exports are now made not only to countries in which we compete with other foreign producers, but to iron producing countries themselves, Great Britain taking large quantities, and Germany being also a buyer to some extent, notwithstanding the imposition of high tariff duties on our products.

Domestic Demand.—It is difficult to specify any one source of demand which has called for our great increase in production. The railroads have been good customers throughout the year, but the railroad demand is no longer the predominating influence in the trade which it once was. Improved business has enabled most companies to make needed renewals and to add to their stock of equipment. The building of new railroads has been on a moderate scale, reaching, according to the "Railroad Gazette," a total of 3,100 miles, which is an addition of only about 2 per cent. to our railroad mileage, although it is the greatest which has been made in any year since 1892. By itself, however, this extension of mileage would absorb only a very small percentage of our steel production, renewals constituting a very much more important feature in the rail trade. These renewals are of importance also, because of the constantly increasing tendency on all our principal lines to use a heavier rail, made necessary by the constantly increasing weight of locomotives and cars. The 56-lb. sections which were considered a heavy rail only a few years ago, gave place to 70-lb. rails, this in its turn to 80 and 85 lbs., while now several of our trunk roads are using 100-lb. rails on all of their more important lines.

The real source after all of the increased demand is found in the greater prosperity of the people. Two years of large crops at home and demand abroad have brought our sales and exports of agricultural products up to a very high figure, and have made money abundant among their producers. This general prosperity has led to increased purchases of every kind, and the effect in 1898 was very apparent in the iron trade.

Combinations and Consolidations.—During the year 1898 a notable impulse was given to the tendency to consolidation and combination which have prevailed for some time past in the iron trade. During this year, however, it has taken the form rather of actual consolidation and purchase of plants than of associations and agreements. We have already referred to the purchases of iron mining properties and their control and operation under the direction of the companies consuming the ore. The Oliver Mining Company, which is controlled by the Carnegie Steel Company, extended its operations as above noted, and other large consumers have taken steps in the same direction. The Carnegie Company itself is a notable instance of the consolidation of the detached plants under one management and their operation with success and economy.

The most notable of the new consolidations of the year is the Federal Steel Company, which has been formed by the consolidation of the Illinois Steel Company, owning plants at Milwaukee, South Chicago and Joliet; the Minnesota Iron Company, owning mines on the Vermilion and Mesabi ranges in Minnesota, and the Elgin, Joliet & Eastern Railroad, a belt line around the city of Chicago, constructed chiefly for the purpose of serving the different plants of the Illinois Company. This concern purchased the plant of the Lorain Steel Company, at Lorain, Ohio, which includes extensive steel works, built by the Johnson Steel Company, and two large blast furnaces now under construction. The plants of the Illinois Steel Company are or different ages and degrees of excellence, but the Lorain plant is an example of the latest and most improved construction, and is moreover excellently situated for serving the Eastern trade, from which the Illinois Company has hitherto been largely shut out by its geographical location. The consolidated company is apparently very heavily over-capitalized, its authorized issues including $100,000,000 common, and $100,000,000 preferred stock, in addition to the bonded debts of the various companies making up the consolidation. The extent of its capital and other causes gave rise to rumors that the ultimate intention was to absorb the entire steel trade. It was at first reported that the Carnegie Steel Company, the most important producer in the country, was to become the property of the new concern, and when this was emphatically denied, it was said that other plants were to be absorbed, notably those of the Cambria Iron Company at Johnstown, in Pennsylvania, of the Pennsylvania Steel Company, near Harrisburg and Baltimore, and of the Bethlehem Iron Company. There were also statements of negotiations with the Tennessee, Coal, Iron and Railroad Company, the most important of the Alabama producers. None of these purchases have materialized, however, and there is no present probability that they will. The new consolidation, however, puts the steel trade very largely under the control of two companies, the Federal and the Carnegie. From present indications the latter has many advantages in the competition, owing to its closer organization, its lower capitalization, and the superiority of its plants. On the present scale of production there is no need of very active competition between the two, but any slackening of trade may be followed by active hostilities.

Another consolidation of importance was the formation of the American Steel and Wire Company, which included nearly all the important wiremaking plants of the Western and Central States. This company is not an association but a corporation, which has purchased outright the various plants which it controls, and it now has possession of most of the plants making heavy wire, wire fencing and the like. The manufacture of the finer grade of wire is still in the hands of independent concerns, notably the Washburn & Moen Company, of Worcester, Mass. Late in the year this company was approached with offers for purchase by the American Wire Company, but it is understood that these offers were rejected. The wire company, however, has secured several plants in addition to those which it at first owned, and has also bought control of the Cleveland Rolling Mill Company,

at Cleveland, O., from which its supplies of wire rods will probably be drawn.

Another consolidation which was effected late in the year was the American Tin Plate Company. Like the American Wire Company this corporation has purchased and will operate directly the different plants for the making of tin and block plates, and at this date it is understood that it has secured all the plants of that class operating in the United States.

About the end of November an effort was made to organize a steel rail combination to cover at least the year 1899. It was at first announced and generally supposed that this effort had been successful, and the statement was even made that the price of steel rails for the coming year had been fixed at $21 or $22 a ton. The combination, or at least the negotiations therefor, were abruptly ended by the positive refusal of the Carnegie Steel Company to enter into it, and the announcement of this failure was followed by the placing of a very large tonnage of steel rails for next year's delivery at $17 or $18.

Early in the year the furnaces in the Pittsburg district and the Shenango and Mahoning Valleys making Bessemer pig for sale decided upon a combination, which was formed under the title of the Bessemer Association. This combination has thus far been a successful one, on account of the strong demand. These furnaces have probably felt that they occupy a somewhat precarious position, owing to the tendency among all the important steel-making concerns to build their own blast furnaces and control their own supply of pig iron. Whether the combination will be able to hold together when a time of decreasing demand and falling prices comes is an open question.

It is very probable that the ensuing year will see some further consolidations, although it is not possible yet to indicate in just what direction these will be made.

Great Britain.—The iron and steel industry of Great Britain has been exceedingly active during 1898, though in some districts a decrease in production was caused by the Welsh coal miners' strike. The mills have been unable to supply the demand, which is especially large, owing to the interruption of business by the long engineers' strike of 1897, and have been compelled to call upon American plants to help them out. Not only have orders for steel billets, tin plate bars, ship plates and other material been sent to this country, but American shops have sold tools and machinery of all kinds, while our locomotive works were called upon to supply engines for the railroad which was built to assist and support the movement of Egyptian and British troops into the Soudan, and finally, a leading British railroad found it necessary during December to send to American works orders for a number of locomotives, an event unprecedented since the early days of railroading some 60 years ago.

The production of pig iron in Great Britain during the first half of 1898 was 4,250,000 tons, and of steel 2,218,922 tons; and indications point to a total production for the year of not far from 8,800,000 tons of pig iron and 4,800,000 tons of steel. In Great Britain the open-hearth steel process continues to be preferred, and nearly 60 per cent. of the total yield is made in open-hearth furnaces. As in this country, however, the majority of both open-hearth and converter steel is made by the acid processes.

Germany.—The total production of pig iron in Germany for the ten months ending with October was 6,107,717 metric tons, showing an increase of 427,230 tons, or 7.5 per cent. over 1897. The indications are that the total pig iron output for 1898 will reach nearly 7,500,000 tons, the highest figure on record. Nearly 75 per cent. of the German production is converted into steel. There is a radical difference in German practice from our own, however, which is due to the nature of the German ores. Five-sixths of the steel in Germany is made by the Thomas-Gilchrist process, using pig iron high in phosphorus.

In France, Belgium and Austria-Hungary the iron trade has also been very active, and production will show a considerable increase in 1898 over previous years.

A question of much importance, especially in Great Britain, is the supply of iron ores. The production of such ores in Great Britain itself has long been decreasing, and has been entirely insufficient for the use of the furnaces. A large quantity has been drawn from Spain, but the more acceptable Spanish deposits are gradually becoming exhausted. The mines of Northern Sweden have attracted a good deal of attention; the ores are abundant, can be cheaply mined, and are within a convenient distance of the sea-coast. The great objection to them, however, is their high percentage of phosphorus, and their use would necessitate a considerable change in steel-making practice. Some experiments have been made to test the possibility of shipping Lake Superior ores to England, but the freight cost at present is too high. It is quite possible that extensive development may be carried out in Newfoundland, where there are known to be very large deposits of iron ore of excellent quality.

The Course of the Iron Markets in 1898.

The general course of the iron markets is sufficiently well shown in the following reports of our special correspondents at the principal market points. Apart from the strong and steady demand for iron and steel, perhaps the most notable feature has been the continuance of low prices throughout the year, which has entirely confounded the prophets of the old school brought up under narrower conditions, when a comparatively moderate increase in demand was almost immediately followed by rising quotations. Many of these observers of the old school have been puzzled by the situation, simply because they have not realized to what extent productive capacity has increased and the markets generally have broadened. Some of them have advocated a return to agreements and combinations for the purpose of working up prices, but, fortunately, their advice has not, as a rule, been heeded. The fact is that our producing capacity is now so great, and any increase in demand can so readily be responded to, that the new school of iron masters have generally realized that their profits are to be made in extending trade and cheapening production, rather than in any attempt to force consumers into the payment of prices which in the end will certainly limit consumption.

Some increase in prices was manifest during December, but on a moderate scale only, and the longer heads in the trade do not desire it to go much further. There are a number of older plants which have been for years practically out of the competition, but which are liable to be started up again should any unusual or abnormal high prices result from increasing demand. These could so extend production, though at very little profit to themselves, that a fall in quotations would probably follow to an undesirable extent. The experience of the third quarter of 1895 was quite sufficient to show what can be done in this direction, and its repetition is not desired.

The tables of prices given below will fully indicate the general course of values through the year.

The Alabama Iron Market in 1898.

By Our Special Correspondent.

For the first three months of 1898 the Alabama iron men anticipated trade enough to keep all plants busy and give all hands employment throughout the year. The declaration of war with Spain, however, cut short the export trade. From April up to August there was but little iron exported from this district, as compared to the amounts sent out during the same months in 1897, though furnaces remained in blast. However, the year was a brilliant one for the iron trade and allied industries.

When it is taken into consideration that in 1872 the total production of pig iron in the State of Alabama was only 11,171 tons, while to-day it is almost 1,000,000 tons, an increase of 100,000 tons does not cause surprise.

The export shipments have been very heavy and the growth of the trade great. Cheap freight rates to the Gulf and Atlantic ports, and the use of pig iron as ballast for cotton cargoes, enabled the Alabama manufacturers to almost monopolize the export iron trade. The rate on Birmingham iron to Chicago is $3.10 and to New York $3.25. The through rate to Liverpool from the Birmingham District is the same as to New York, while to Genoa, Italy, it is but 55 or 60c. per ton more. To Bremen it is a few cents cheaper than it is to New York, and to far-away Yokohama it is but $8. Up to November 1st the shipments of pig iron from the Birmingham District are estimated to have been about 696,392 tons, snowing an increase over the same length of time in 1897 of over 100,000 tons. It is estimated that during November the shipments amounted to as much, if not a little more, than in October, which would run the amount up to 787,393, while the month of December will show an equal shipment, making the shipments for the entire year something near 800,000 tons. In April the exports were 6,169 tons, in May 2,402 tons, while in October it grew to 37,754 tons. The total amount of iron exported will approach 222,000 tons. This has gone to Germany, Great Britain, Italy, Japan, Holland and other countries.

Not only has there been a good movement of pig iron from the State, but there have been quite large amounts of cast iron pipes, finished iron and machinery sent out. The year has seen work begin on two important plants, a large open-hearth steel plant, representing an investment of over $1,000,000, in which, at Ensley City, the Tennessee Coal, Iron and Railroad Company has large interests, and a steel wire and rod mill, with a capital of $2,000,000, to consume steel directly from the new steel plant. The year 1898 also saw the large Semet-Solvay By-Product coke oven plant at Ensley City begin work.

The domestic trade for pig iron has been good during the entire year, and prices have been satisfactory. There was not so much competition heard of as during the year before, for the various companies seemed to have their own customers. The production of pig iron has been as great as it ever was in the State.

The only misfortune of any consequence was the filing of a deed of assignment by the Birmingham Rolling Mills Company. The mills are the largest south of the Ohio River and have been in full operation for months, continuing after the filing of the deed. A committee appointed by the stockholders is now investigating the condition of the plant.

The Chicago Iron Market in 1898.

By Our Special Correspondent.

The most remarkable feature of the iron and steel trade in 1898 was that an enormous tonnage of business was done, at prices which showed little fluctuation. No pervious year equals the record for tonnage made last year, and few years equal the record for steadiness of prices. The opening of the year was quiet, with no great activity in any branch of the market. Dealers in iron entertained great hopes for the future, however, and it was the general opinion that prices would be considerably advanced over the low level that started in the year. The expectations of a large trade were amply realized, but those regarding higher prices were not. Consumers of all classes used great quantities of material, and the demand increased steadily from the first to the last of the year. In December the rate of consumption in Chicago territory was larger than ever before. All users of iron and steel were running full, and there is every indication that the consumption will not only continue, but will increase. The increase in the use of iron and steel in this territory in the past year has been fully 25 per cent. over that of any previous year. Notwithstanding the large business done, there were no signs of a boom in the market, and no boom sentiment was discernible.

Foundry iron sold very largely throughout the year, sales increasing steadily with nearly every month. The demand was more than sufficient to take the output of the local furnaces, and enabled the outside producers to get a much larger business than ever before. The range of values has been fairly steady throughout the year. Prices of local coke iron in January were on a basis of $10.50 for No. 2 foundry, from which they advanced, in March, to $11. The latter price remained unchanged for the balance of the year. Southern irons experienced rather more fluctuation, but it was within narrow limits. The lowest price named was $10.10 for No. 2 foundry, in July, and the highest was $10.85 for the same grade in December. The local furnaces were in blast throughout the year, with the exception that Iroquois Furnace was out

of blast for a few weeks in the fall for repairs. Foundry interests did a much larger business than ever before, as is evidenced by the large shipments of iron made in the year. The increase in business was steady throughout the year, and in December reached a rate never before approached. Malleable foundries were particularly active. More business was done by this class of foundries than ever before, and had their capacity not been limited much more trade would have been secured. For some time they were unable to take care of all the business offered, notwithstanding the fact that numerous additions to capacity had been made in the year.

In steel and finished material an excellent year's business was done. Sales were heavier, in most lines, than in any previous year, and increased steadily from the beginning to the end of the year. It is remarkable that while orders have been large enough to keep mills busy for the entire year, and in many cases business has been turned away, prices were steady throughout the year, showing very little fluctuation. This is explained by the desire of the mills to secure a large trade at fair prices, which will give a profit, rather than small sales at much higher prices. In bars the tonnage has been very large, and prices have been relatively much lower than on other products. Bar iron has sold from a low price of 1c. up to 1.10c. in the year. Good sales of rails were made at the first of the year, and sufficient business was obtained from time to time to keep the mills fully occupied. Prices were maintained at $20, Chicago, until September. In October no business was done by any of the mills, and prices were withdrawn, pending the result of efforts to form the price agreement. These finally failed, and many railroads, which had been awaiting the decision of the mills to make purchases, came into the market, and bought very large quantities of rails.

In structural material the year has been quiet and steady. Comparatively little large building was done, but general business, in the smaller class of buildings, bridges, railroad work, etc., took enough tonnage to make the year's business larger than that of any previous year. The Drainage Canal also furnished a large tonnage to the structural mills. Business in plates has been heavy through all the year, some months the mills having to refuse offered orders because of inability to meet the shipping requirements of the buyers. Local mills have been in operation through the year, and have closed a larger

MONTHLY AVERAGE PRICES OF IRON AND STEEL, CHICAGO, 1898.

	Jan.	Feb.	Mch.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Northern, No. 2, Foundry.....	10.50	10.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Southern, No. 2, Foundry	10.35	10.35	10.35	10.35	10.35	10.20	10.10	10.25	10.60	10.60	10.60	10.75
Bar Iron.....	21.00	21.00	20.50	21.00	21.00	21.00	20.50	21.00	21.00	21.00	21.00	20.00
Tank Plates....	23.00	22.50	22.00	22.75	23.00	22.75	23.00	23.50	24.00	24.00	24.00	25.00
No. 27 Sheets...	44.00	42.50	41.00	40.25	40.00	39.00	39.00	40.00	41.50	42.00	40.75	39.50

tonnage of business than ever before. Everything considered, the year has been satisfactory to both buyers and sellers.

The range of values during the year is shown in the appended table of average monthly prices in Chicago on leading iron and steel products:

The Cleveland Iron Ore Market in 1898.

By Our Special Correspondent.

Taken as a whole, the season of 1898 has been kind to the producers of iron ore. While the season has not been as successful as some of its predecessors on account of the low prices paid for the ores, the agents declare that they are satisfied. The early opening of the navigation season did not leave the agents and managers for the mining companies any more time than they needed to make arrangements for the season's business. Early in the season an association was formed by the agents handling the "old range" Bessemer ores. Following are the prices fixed for the season: Specular and magnetic ores, Bessemer quality, $3.25@3.65; specular and magnetic ores, non-Bessemer quality, $2.50@2.75; hematite ores, Bessemer quality, $2.55@3.25; hematite ores, non-Bessemer quality, $2.10@2.25. In some instances the prices were advanced over those of 1897, and the average price of Bessemer ores was slightly higher than during the preceding year. At the close of the season, however, the agents found that even the prices which prevailed during 1898 would not protect them for another year, and arrangements have already been made to form Bessemer and non-Bessemer pools for the year 1899.

The season opened early and the agents had made extensive arrangements for breaking all records. As soon as the lower lakes were cleared of ice vessel owners began to ask for charters. For several months, or until it was seen that the shippers would be unable to move all their ores by season charters, there were practically no "wild rates." During the first month of navigation over 1,000,000 tons of ore were brought down to the Lake Erie docks.

IRON ORE SHIPMENTS FROM UPPER LAKE PORTS.

Ports.	1896.	1897.	1898.
Escanaba.....	2,321,931	2,302,121	2,803,513
Marquette.....	1,564,813	1,945,519	2,245,973
Ashland.....	1,566,236	2,067,637	2,391,088
Two Harbors.....	1,813,992	2,651,465	2,693,245
Gladstone.....	220,887	341,014	335,956
Superior.....	167,245	531,825	550,403
Duluth.....	1,988,932	2,376,064	2,630,610
Total by Lake.....	9,644,036	12,215,645	13,650,788
Rail Shipments.....	290,792	253,993	300,000
Total shipments.....	9,934,828	12,469,638	13,950,788

It was conceded early in the season when the basis of prices was agreed to that the producers of ores would have to be satisfied with lower prices on a number of grades, especially non-Bessemers. During the season the operators of the non-Bessemer producing mines had hard work meeting their expenses. Non-Bessemers that sold for from $2 to $2.25 in 1897 were sold at $1.85 during the season of 1898. The Bessemers fared considerably better, but the margin on them has been extremely small. Large transactions and small profits seemed to be the business motto which governed the actions of the agents of the companies during the year. The output of the mines was so much larger during 1898 that on the whole the year may be considered a banner season for all the iron industries. Nearly 1,500,000 tons more of ore were moved than during the preceding year, and even this enormous increase is not up to the evident capacity of the Lake Superior mines. During the height of the shipping season there was a dearth of labor at the mines and ore could not be secured. If the ore had been mined at least 500,000 tons more of it would have been brought down the lakes. The aggregate of the rail shipments have not been compiled, but it is estimated they will reach 300,000 tons, making a grand total of 13,700,000 for the year. The large amount of ores sent to South Chicago accounts for the large increase in the rail shipments.

While the activity of the movement by water to the Lake Erie ports was almost unprecedented, a new record was being established in shipments from the docks forward to the furnaces. At the opening of the season, on May 1st, there were 3,167,915 tons of ore on the Lake Erie docks. On December 1st, 1898, there were 5,136,407 tons on the docks. Adding the receipts of the season and substracting the amount on the docks, shows that the shipments forward to furnaces reached a total of 9,059,829 tons, which is without precedent in the history of the iron industry. The corresponding figures for 1897 were 7,453,648, while for 1896 they were 5,021,146. An analysis of the figures shows that the tendency to ship ores direct to the furnaces is growing rapidly.

The Lake Erie ports received 11,028,321 tons, as against 10,120,906 tons in 1897. Nearly 3,000,000 tons found their way to places other than Lake Erie ports. The receipts of the Cleveland port were 2,645,318, as against 2,456,704 in 1897. The gain by the Cleveland port and the loss by the port of Ashtabula indicates that the latter named city may drop back to second place in iron ore receipts. During the year Conneaut became an important ore port, receiving 1,404,169 tons, while the receipts in 1897 were only 495,327 tons. The increase was due to the heavy shipments by the Carnegie interests.

IRON ORE RECEIPTS AND STOCKS AT LAKE ERIE PORTS.

Ports.	Receipts at Ports.			Stock on Docks Dec. 1.		
	1896.	1897.	1898.	1896.	1897.	1898.
Toledo.....	301,794	416,438	414,012	151,959	194,644	146,568
Sandusky.....	58,667	79,792	136,200	59,491	84,786	48,500
Huron.....	226,515	198,231	126,755	200,075	230,029	139,982
Lorain.....	191,445	355,188	536,086	231,288	317,509	324,034
Cleveland.....	2,313,170	2,456,704	2,645,318	1,419,311	1,478,355	1,175,970
Fairport.....	941,446	1,008,340	912,879	773,905	825,312	719,794
Ashtabula.....	2,272,822	3,001,914	2,684,563	1,441,666	1,835,694	1,732,671
Conneaut.....	327,623	495,327	1,404,169	275,800	360,895	288,101
Erie.....	847,849	1,311,526	1,092,364	355,222	484,871	439,167
Buffalo..... / Tonawanda ... \	545,101	797,446	1,075,975	82,267	111,660	121,620
Total.....	8,026,432	10,120,906	11,028,321	4,954,984	5,923,755	5,136,407

Lake Freight Rates.—While the average daily lake freight rates were in the neighborhood of 10 per cent. higher during the season of 1898 than they were during the preceding season, the advance was of no material benefit to the vessel owners for the reason that there were fewer charters on the market. Most of the ore was brought down in the large 6,000-ton ships which were put in commission in 1897, season charters having been given the fleet owners. The smaller vessel owners, therefore, had but few opportunities to secure charters, until very late in the season, when the shippers were in a measure at their mercy. This accounts for the apparent advance in the lake freight rates. The following shows the average daily rate during 1898: Iron ore, Escanaba to Ohio ports, 50.8c.; head of Lake Superior to Ohio ports, 61c.; Marquette to Ohio ports, 59.8c. During 1897 the average daily rates were: Escanaba, 45.3c.; head of Lake Superior, 57.2c.; Marquette, 54.6c. The average daily rate during the past ten years is: Iron ore, Escanaba to Ohio ports, 67c.; head of Lake Superior, 94c.; Marquette, 83c.

Pig Iron.—The feature of the pig iron market during the year 1898 was its stability. During the preceding year pig iron prices varied from $9.25 to $11.40. During 1898, however, the price was never below $9.75 and never above $11.25, a range of only $1.50. Pig iron concluded the year 1898 much stronger than twelve months before. The storm of

PRICES OF BESSEMER PIG IRON AT CLEVELAND DURING 1898.

Month.	Highest.	Lowest.	Average.	Month.	Highest.	Lowest.	Average.
January.....	$10.50	$10.25	$10.37½	July.....	$11.00	$10.50	$10.80
February ...	10.75	9.75	10.30	August....	11.25	10.75	10.90
March.....	10.75	10.25	10.50	September.	11.00	10.60	10.68
April.....	11.00	10.25	10.72	October....	11.25	10.50	10.71
May.....	11.00	10.75	10.87½	November..	11.00	10.75	10.86
June.....	11.00	10.75	10.87½	December .	11.10	10.75	10.85

low prices which attacked many lines in the iron industry did not affect the pig iron market, unless it was to increase the activity. Early in the season the price gradually advanced, and at the time it was thought the strengthening of the market was due to the probability of a war. After the war was concluded, however, and the treaty of peace had been signed, the market strengthened again, and the outlook for the year 1899 is very bright.

The average price paid for Bessemer pig iron during January was

$10.37½. February was a weaker month, but during the remaining months of the year, excepting March, the average price was higher than during the corresponding month of the preceding year. In April the price advanced to $11 a ton, and from that time on till the close of the year the market was firm and the volume of business transacted was larger than during the corresponding months for years

The Pittsburg Iron Market in 1898.

By Our Special Correspondent.

The Pittsburg iron trade in 1898 showed a most remarkable record, both in production and in consumption of iron and steel. All the local furnaces were in blast almost continuously throughout the year, and all the local mills were fully occupied. The year serves to emphasize once more the unrivalled position of Pittsburg in the iron trade. The sales were the largest ever known, especially in the closing month of the year, as shown by the totals given in the accompanying tables.

In Bessemer pig the sales for the year aggregated 2,097,793 tons. The sales of billets and of mill iron were also very large. The total of all kinds of steel and iron shows an increase of 770,672 tons over 1897. Naturally with such demand production has been very large throughout the year.

The outlook for 1899 is extremely favorable, many of the large plants having closed contracts which will extend to April, and even to July. Others are not anxious to take offers for deliveries running far into 1899, being confident that there will be an improvement in prices later on.

Not only have all the furnaces in the Pittsburg District which were available been in blast almost continuously, but arrangements have been made to increase the production on a considerable scale. Laughlin & Company, owners of the Eliza Furnace, are building a new furnace, which will be the largest in the United States, and therefore in the world, exceeding even the great furnaces at the Carnegie Company's Duquesne plant. Other concerns are planning to build large furnaces or enlarge and rebuild their old ones, and at several plants work is now going on. Notwithstanding this great increase in production, the year closed with prices very firm and with an upward tendency.

The range of prices through the accompanying year is shown below. The tables also show the sales in Pittsburg of the principal products—Bessemer iron and steel billets—with the total sales of iron and steel of all kinds.

	Bessemer Pig.	Steel Billets.	Mill Iron.	All Kinds.
January-July	898,318	317,250	100,700	1,776,111
July-December	1,199,475	383,421	137,050	2,406,126
Totals, 1898.....	2,097,793	700,671	237,750	4,182,237
" 1897.....	1,669,700	668,170	240,904	3,411,565

The total sales of all kinds of iron and steel in Pittsburg in 1898, by weeks, were as follows:

Week:	Tons.	Week:	Tons.	Week:	Tons.
Jan. 1	82,125	May 7	52,105	Sept. 10	85,380
" 8	57,600	" 14	67,150	" 17	77,225
" 15	66,965	" 21	73,590	" 24	74,450
" 22	50,600	" 28	81,760	Oct. 1	92,260
" 29	44,050	June 4	62,100	" 8	64,165
Feb. 5	80,015	" 11	69,525	" 15	55,875
" 12	167,845	" 18	50,775	" 22	55,925
" 19	95,925	" 25	47,500	" 29	51,000
" 26	71,470	July 2	49,475	Nov. 5	76,008
Mar. 5	70,530	" 9	60,075	" 12	53,170
" 12	96,725	" 16	54,155	" 19	56,305
" 19	91,330	" 23	66,210	" 26	75,225
" 26	71,340	" 30	53,650	Dec 3	87,935
April 2	83,575	Aug. 6	59,450	" 10	323,675
" 9	26,975	" 13	148,896	" 17	96,150
" 16	39,110	" 20	178,425	" 24	96,875
" 23	38,578	" 27	167,600	" 31	42,525
" 30	46,848	Sept. 3	106,975		

The year's prices for most kinds of products show a wide range of values. Pig iron, billets, finished and other products during most of the year were exported to England and sold at prices below those current in that country. The result was immense shipments of American iron and steel to European ports, particularly from the South. At the same time

DECEMBER PRICES FOR IRON AT PITTSBURG IN FIVE YEARS.

	1894.	1895.	1896.	1897.	1898.
Bessemer	$10.25	$12.75	$11.15	$10.25	$10.80
No. 1 Foundry	11.40	14.25	12.10	10.00	11.10
No. 2 Foundry	10.40	13.50	11.25	10.75	10.75
Mill Iron	9.25	11.75	9.80	10.25	10.65
White Iron	9.00	9.00	9.10	9.00	9.25
Mottled Iron	9.00	9.00	9.10	9.25	9.30
Silvery, No. 1	13.60	14.80	14.50	13.00	13.00
Charcoal, No. 1 Foundry	17.50	17.80	17.50	15.50	16.00
No. 2 Foundry	16.25	17.00	16.00	15.25	15.50
Cold Blast	23.50	23.00	23.25	21.50	21.50
Warm Blast	16.50	16.00	16.10	15.00	15.25
Muck Bar	18.40	21.00	19.75	18.75	18.85
Billets	15.15	16.50	16.00	15.50	16.50
Billet Ends	10.45	14.00	13.00	10 00	11.00
No. 1 Scrap	16.00	14.00	12.75	11.00	12.00
Steel Rails	32.00	28.00	25.00	18.50	17.50
Bar Iron	1.15	1.25	1.30	1.15	1.18
Iron Nails	1.00	1.25	1.60	1.30	1.30
Steel Nails	1.00	1.30	1.60	1.30	1.25
Wire Nails	1.00	1.30	1.55	1.45	1.50
Coke at Ovens	1.00	2.00	2.00	1.75	1.50
F. Mang., 80 per cent	49.50	54.00	48.25	47.00	50.00
Old Iron Nails	12.50	15.00	13.00	14.00	14.00
Old Steel Nails	10.00	13.00	12.75	10.50	10.00

Pittsburg did and is doing an immense trade for many products; sales have been doubled and still larger shipments are only prevented by the scarcity of ocean tonnage and the high rate of freights.

The following are the monthly prices of Bessemer pig in Pittsburg the preseent year: January opened $10.25; closed $10. February opened $9.75; closed $10.25. March opened $10.50; closed $10.65. April opened $10.50; closed $10.85. May opened $10.25; closed $10.35. June opened $10.35; closed $10.40. July opened $10.50; closed $10.30. August opened $10.40; closed $10.60. September opened $10.55; closed $10.55. October opened $10.50; closed $10.40. November opened $10.45; closed $10.40. December opened $10.50; closed $10.90.

The movements of mill iron or gray forge were: January opened $9.25; closed $9.10. February opened $9; closed $9.10. March opened $9.15; closed $9.25. April opened $9.25; closed $9.25. May opened $9.25; closed $9.10. June opened $9.25; closed $9.10. July opened $9.15; closed $9.25. August opened $9.25; closed $9.40. September opened $9.50; closed $9.40. October opened $9.40; closed $9.30. November opened $9.35; closed $9.35. December opened $9.50; closed $9.65.

Steel Billets.—Prices through the year were: January opened $15.25; closed $15.30. February opened $15.20; closed $15.30. March opened $15.50; closed $15.75. April opened $15.50; closed $15.40. May opened $15.25; closed $15.30. June opened $15.20; closed $15.15. July opened $15.10; closed $15.20. August opened $15.50; closed $16. September opened $16.35; closed $16.30. October opened $16.15; closed $15.75. November opened $15.60; closed $15.75. December opened $15.85; closed $16.65.

LEAD IN 1898.

The production of pig lead in the United States showed a large increase in 1898, the grand total of soft, desilverized, and antimonial smelted from both domestic and imported ores and refined from imported crude bullion, amounting to 305,459 short tons, against 289,835 short tons in 1897. The production for 1898 was distributed as follows, the corresponding figures for 1896 being given in brackets: Desilverized domestic lead, 106,036 (144,649); soft, 43,652 (45,710); antimonial lead, 7,379 (7,359); total domestic, 217,067 (197,718); foreign, 88,392 (92,117). The increase in the domestic production is traceable especially to Southeastern Missouri, Southwestern Missouri and Southeastern Kansas, and the Coeur d'Alene in Idaho. However, production was stimulated in all parts of the United States as well as in Mexico and British Columbia by the higher prices for lead.

In the Coeur d'Alene there was great activity and in general these mines are showing up well. The production is made chiefly by nine concerns. The ore, which is low grade, is concentrated mechanically to a grade which yields an average of about 50 per cent. lead and 30 oz. silver; consequently at existing prices its lead value considerably exceeds its silver. There are few statistics as to the dividends of the Coeur d'Alene mines, but it is believed they are generally profitable in spite of the rather unfavorable conditions imposed by the labor unions. The Tiger Mine at Burke is open to a vertical depth of 1,200 ft., while the Helena & Frisco is down 1,600 ft. The showings in the lowest levels are said to be as good as anywhere else in these mines. Several of the mining companies are now driving long crosscut adits to the veins to intersect them at much greater depths. The Coeur d'Alene mines employ about 2,000 men, while fully 3,000 more obtain their living from them indirectly.

In 1897 the Coeur d'Alene and Southeastern Missouri together furnished nearly 44 per cent. of the total production of lead in the United States. In 1898 the percentage was somewhat larger, since the production of Southeastern Missouri also increased, the total amounting to 36,995 tons, against 31,000 tons in 1897. During 1898 there were six active producers in the district, and all of them were dividend payers. A good deal of new exploration work was undertaken and we believe some new and important discoveries have been made, so there is prospect of a further increase in production from this district, which is favored by the natural conditions. The best equipped mines of Bonne Terre and vicinity can produce lead at a cost of 2.25c. per lb. The Central Lead Company purchased the property of the Theodora Lead Company and built a railroad to the Theodora shaft, where hoisting machinery was erected. The National Lead Company and Columbia Lead Company, which acquired properties in the vicinity of Bonne Terre in 1897 and proved their value by diamond drilling, were sinking shafts during 1898. Both companies expect to reach the ore early in 1899. The Desloge Consolidated Lead Company increased its capital stock to $1,000,000 and made various improvements on its property. New companies intending to operate in this district are the Elizabeth Lead Company and the Union Lead Company. The Renault Lead Company purchased the Palmer lead mines in Washington County and made preparations to undertake operations on a systematic scale at greater depths than these mines had been opened heretofore.

At Glendale, Mont., new bodies of lead ore were opened in certain of the mines of the Hecla Consolidated Mining Company, which enabled that company to run two furnaces and continue the smelting of the high grade silver ore, of which it still has a considerable supply. The erection of a 100-ton smelting plant at Twin Bridges, Mont., was begun, and it is expected that these works, which are to be equipped with two furnaces, will be in operation early in 1899.

A large supply of lead ore was imported from British Columbia, a large part of it going to Denver and Pueblo for smelting. The two smelters of Washington had a hard time in competition with the Denver and Pueblo buyers, not only for the British Columbia ore, but also for that of the Coeur d'Alene District of Idaho and the Monte Cristo District of Washington. The Puget Sound Reduction Company put in operation its new refinery and exported a considerable amount of desilverized lead to China. The Trail Smelter in British Columbia was idle, but it is now being reconstructed with the intention of blowing in during 1899. The small works at Pilot Bay, British Columbia, were not in operation in 1898.

The lead miners and smelters of Utah are considerably upset by an increase in the freight rates on ore and base bullion from Salt Lake City to Missouri River points. Previous to January 1st, 1899, the rate on bullion to the Missouri River was $11 per ton and to Chicago $13.50, the rate on ore being $9 and $11.50 respectively. On January 1st the ore rate was increased $1 per ton and the bullion rate $2 per ton; the companies, however, have promised a new adjustment.

In Colorado there were two smelting works in operation at Denver, three at Pueblo, one at Leadville and one at Durango, the same number as in 1897. The lead supply of Colorado was obtained, as formerly, from Leadville, Aspen and the smaller districts in various parts of the State. New developments in certain of the mines on Kokomo disclosed considerable bodies of lead ore, carbonate and sulphide, of a shipping grade, of which the existence had not been suspected previously. These mines were first opened soon after the discovery of the carbonates at Leadville and showed immense deposits of low grade mixed sulphide ores which could not be worked profitably, wherefore the mines were soon closed and remained idle for many years until the successful reopening of the White Quail drew attention to them again.

For more particular notes as to the lead mining conditions in the various districts of Utah, Montana, Idaho, Colorado and Missouri reference should be made to the special reports from those States. The outlook is decidedly for an increasing production of lead, especially from Idaho and Missouri.

The New York Lead Market in 1898.

The range of fluctuations in the lead market during 1898 has not been as wide as that of the previous year, and, although the market was constantly moving, up and down, it was within very narrow limits. While at no time the very high prices ruling during the fall of 1897 were reached, the average price of the metal has this year been higher than last. In 1897 the large advance was due chiefly to the increase in the duty, while during '98 there was no change in the tariff and the market was governed solely by supply and demand. Prices reflect this condition, for while production has increased, consumption has done so to about the same extent, and stocks are now smaller than they were at the beginning of the year.

January opened with large quantities in the hands of producers as well as consumers and the metal was quoted at 3.70c. New York. Some parcels being pressed for sale, the market declined rapidly to 3.65c. and then to 3.60c. However, early in February, buyers' stocks having become depleted, they bought heavily but were unable to secure large quantities on the basis of 3.55c. New York, before the market advanced again to 3.60c. Considerable quantities were still held in the East, while Western stocks had run low, in consequence of which the St. Louis market ruled comparatively higher than the Eastern. The middle of February there was a marked improvement in the demand and the market rose to 3.85c. New York. The higher prices, however, checked business and buyers generally held off, and the market receded to 3.75c. New York and 3.57½c. at St. Louis.

During March the market moved sluggishly. Rather large quantities in the hands of smelters hung over the market, and while higher prices were asked, little business was done, manufacturers buying only from hand to mouth. The New York market during the month was about 3.70c. and St. Louis about 3.52½c.

Early in April the market was decidedly top-heavy and prices crumbled away to 3.57½c. New York and 3.40c. St. Louis. At the end of the month, however, the low prices attracted attention of manufacturers as well as speculators, and there was quite a scramble to purchase May and June shipments. Prices quickly reacted to 3.70c. and 3.52½c. respectively.

In May the higher prices again brought out large quantities, and had it not been for some government orders and speculative purchases, prices would have suffered considerably. As it was they declined to 3.62½c., but reacted to 3.67½c., closing firm at that figure for the month.

June witnessed very heavy buying on the part of consumers, as well as for speculative account, and the market advanced quickly to 3.75c., then to 3.85c., and finally to 3.92½c., with lead selling at St. Louis at 3.82½c.

AVERAGE MONTHLY PRICES OF LEAD IN NEW YORK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug	Sept.	Oct.	Nov.	Dec.	Year
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts
1893..	3.87	4.22	3.96	4.08.	3.89	3.77	3.58	3.41	3.80	3.51	3.41	3.27	3.73
1894..	3.19	3.31	3.37	3.43	3.39	2.31	3.50	3.41	3.17	3.12	3.14	3.10	3.29
1895..	3.10	3.12	3.12	3.08	3.16	3.25	3.25	3.50	3.35	3.33	3.25	3.22	3.23
1896..	3.08	3.19	3.14	3.07	3.03	3.03	2.96	2.73	2.77	2.80	2.96	3.04	2.98
1897..	3.04	3.28	3.41	3.32	3.26	3.33	3.72	3.84	4.30	4.00	3.76	3.70	3.58
1898..	3.65	3.71	3.72	3.63	3.64	3.82	3.95	4.00	3.99	3.78	3.70	3.76	3.78

In July it became apparent that consumers had not yet covered their requirements and considerable quantities of prompt lead changed hands at 3.95@4c. New York and 3.85@3.90c. St. Louis. At the end of the month, however, some second-hand parcels came out, which had a somewhat depressing influence on the market and the metal was quoted 3.92½c. and 3.82½c. respectively.

In August there was great activity and large buying both East and West, and prices advanced to 4.10c. New York and 4c. St. Louis, the highest prices of the year.

During the first half of September the market was quiet with a flattish tendency prevailing, and while quite some business was done, somewhat lower prices were established. There was more buying the middle of the month, but the market soon relapsed into dullness, September closing with sellers at 4c. New York and 3.85c. St. Louis.

During October there was considerable pressure to sell and very little buying. Prices declined steadily and transactions were made at 3.60c. New York and 3.50c. St. Louis. At these low figures, however, consumers again bought largely and in November the market advanced to 3.75c. New York and 3.62½c. St. Louis. But their wants were readily satisfied and further quantities being pressed for sale, the metal declined to 3.65c. New York and 3.52½c. St. Louis.

During the first half of December, the market was quiet and weakish, but the middle of the month a large demand suddenly sprung up, and with large transactions the market advanced to 3.90 New York and 3.75 St. Louis.

The London Lead Market in 1898.

By Our Special Correspondent.

The market opened in January with good soft foreign ruling at £12 7s. 6d. to £12 8s. 9d., English being worth £12 8s. 9d. to £12 11s. 3d., but buyers came in and the price soon rose to £12 12s. 6d. for foreign. When consumers' wants had been supplied values receded, and the month closed at £12 7s. 6d. to £12 8s. 9d.

February opened with buyers still holding aloof, and prices declined to £12 6s. 3d.; at this point things improved and more demand was noticeable, values rising to £12 8s. 9d. American sellers then raised their prices above the level of those ruling here, and in March when buyers were forced to cover, and it was found that United States producers had sold out, there was a very strong tone, and soft foreign was soon selling at £12 16s. 3d. The import duty passed in France had also a stimulating effect, but the closing quotations for foreign were £12 13s. 9d. to £12 15s.

The month of April saw the possibilities of a great curtailment in supplies owing to the threatened outbreak of hostilities between Spain and America, the two principal lead producing countries, and this caused a great deal of nervousness on the part of consumers, who rushed in and bought heavily, causing prices to go up by rapid strides, and the market—after sales were made as high as £14 15s.—closed with buyers at £14 7s. 6d., sellers asking £14 12s. 6d., and but very little offering at that.

May opened amidst renewed excitement at £14 12s. 6d., but when war was declared, and it became apparent that shipping would not be seriously interfered with, there was more caution displayed by buyers, and values suffered through neglect until the end of the month, when £13 10s. was the nearest price.

June opened with buyers still very reserved and only buying from hand to mouth. Trade at this time was not good, and new orders were slow in coming in,—the market for pigs consequently relapsed, and before the month was out sellers had accepted £13. This was about the price ruling at the commencement of July, but buyers then plucked up courage, and Continental users came in and made good purchases, £13 3s. 9d. being paid. Having covered their requirements for the time being, they again left the market alone, and caused values to again move downwards until £12 17s. 6d. was accepted; then another spurt took place to £13 2s. 6d., followed, however, by a further shrinkage to £12 13s. 9d. This latter price was ruling at the commencement of August, but it was soon evident that consumers stocks were seriously diminished, and when they came into the market to buy the price improved to £12 17s. 6d. There were at the time some good export orders, and this helped to keep things steady.

September opened with soft foreign ruling at £12 16s. 3d. to £12 17s. 6d., and in the absence of offers from America prices rallied to £13, but dropped again before the close of the month to £12 17s. 6d. Opening in October at this figure the market remained steady thereat until a little buying caused values to advance about 10 per cent., spot metal being very scarce and eagerly sought after.

Early in November this fact was again accentuated, and values improved to £13 11s. 3d., but on rather free offerings of arrival parcels receded to £13 8s. 9d., and after remaining steady at that price for a day or so prices began to slip back gradually, until at the opening of December, soft foreign was worth no more than £13 3s. 9d., and with the approach of the holiday season there was the usual slackness and the article was neglected; prices, however, kept fairly steady, final rates being £13 to £13 2s. 6d. for soft foreign, and £13 1s. 3d. to £13 3s. 9d. for English lead.

The Business in White Lead in 1898.

By L. A. Cole, President National Lead Company.

The business in white lead in the United States in 1898 was less in volume than in 1897; sales were less, and production was less. Three principal reasons may be assigned for this falling off: (1) The buyers had increased their stocks on the advancing market in pig lead during the second half of 1897, and at the end of the year the stocks of white lead in distributors' hands were large for the sesaon. (2) In the Spring of 1898, the time of the year when white lead is especially in demand, the trade was interrupted by the Spanish-American war. (3) White lead has probably suffered to some extent from the inroads of substitutes in the trade previously held. (4) By the time the Spanish-American war was over, or rather by the time the end of it was in sight, the Spring painting season was over.

The effect of the Spanish-American war was felt especially on the Atlantic Coast, within range of a 13-in. gun from deep water. It will be remembered clearly how difficult it was last April to secure tenants for a seaside cottage anywhere between Bar Harbor and Atlantic City, and not only on the immediate seashore, but also for several miles back very little house painting was done. Going inland, the falling off in business was less noticeable, and in the Mississippi Valley the trade was about the same as in 1897. Along the coast business picked up somewhat in the Autumn, but undoubtedly a good deal of painting that would have been done naturally in the Spring of 1898 was deferred until the Spring of 1899.

The production of zinc white and barytes, which are employed as substitutes for white lead, may have increased in 1898 for the reason that contracts for those products were made largely in the Winter months and while the prospect seemed bright.

The price of white lead in oil has remained nearly constant throughout the year, the total range of fluctuation not having exceeded 0.25c. per lb. At the end of the year it closes at 5½c. per lb. This shows an advance over 1897, made necessary by increased cost of raw material.

The year closes with bright prospects for the business in 1899. The year 1898 may be said to have been one of general prosperity. Probably there is no branch of industry in this country at the present time in which business legitimately conducted is not showing a profit. The previous year, 1897, was one of unexampled prosperity to the farmers,

and a largely increased amount of painting was done that year, when the demand for white lead was greater than ever before in the history of the business. The painting that was not done in 1897, and would naturally have been done in 1898 if it had not been for the war, will probably be done in 1899, and consequently an increased demand is looked for. Stocks of white lead in the hands of dealers are at present comparatively small.

Technically, the production of white lead in the United States continues the same as heretofore. Fully 90 per cent. of the total is made by the old Dutch process, and the entire output of the National Lead Company is produced in this manner. The experience of this company has been that white lead made by the old process possesses qualities of excellence which have not been found possible to obtain with the new quick processes. With respect to electrolytic processes, so far as I know none has yet passed beyond the domain of laboratory experiment. While there have been no improvements in the chemistry of the old Dutch process, the works employing it have made numerous mechanical improvements, all tending to reduce the cost of production and improve the quality of the product, which means to increase its durability as a pigment, as well as purity of color.

NICKEL IN 1898.

By Robert M. Thompson.

During 1898 the consumption of nickel has largely increased by the demand for nickel steel for use in armor plate and other parts of war vessels being built by several nations. It has now been fully demonstrated that nickel steel is a material as much superior to any of the ordinary steels as steel itself is superior to wrought iron. Wherever the question of cost is not a controlling factor nickel steel must and will be used. It is only a question of time also when nickel steel will enter largely into commercial uses. In the meantime much attention is being given to the production of the metal.

The metallurgy of nickel remains a difficult problem, on which many skilled metallurgists are working. So far America has held its own in the race, and the nickel from the Canadian deposits at Sudbury, refined by the Orford Copper Company, holds to-day fully one-half the market of the world. Certain parties in Canada have been agitating for an export duty on Canadian nickel, but as yet without success. Such a policy would of course be suicidal, and it would be an obstruction of the same nature as tearing up the railway tracks connecting the mines with the market, and going back to the old turnpike roads.

All sorts of solutions of the nickel problem are being presented. Ludwig Mond and his clever corps of chemists have worked out a most beautiful solution in what is known as the "Mond process," in which nickel is converted into a gas and redeposited as a metal exactly similar in appearance to the metal deposited by the electrolytic process. Francis J. Clergue is proposing to smelt nickel ores in an electrical furnace, the power being furnished by turbines driven by water power at the Sault Ste. Marie. The Canadian Copper Company is working on a very promising electrolytic process. The Societe Le Nickel continues to employ its well-proved and very successful process for treating the New Caledonia ores, and the Orford Copper Company continues its well-tried and well-established process.

The policy of the producers of nickel has been to make as little disturbance in the price of nickel as possible, and in the face of the very largely increased consumption prices have been but little advanced, and the large makers of steel are now satisfied that they can secure ample supplies at a reasonable and steady price. The danger in the situation is, as it is in all businesses, that competition may come into a market where supplies still far exceed the demand, and so bring on a scale of prices that will be wholly unremunerative. Still, the very large expenditure necessary for plant for any of the proposed processes, and the great skill required, make capital timid about entering into a field where the competition must be keen and the losses for all engaged in it great.

No new sources of nickel supply were developed during 1898, though several "discoveries" have been announced. In most cases these finds have turned out to be valueless; in fact, many of them have no trace of nickel at all. There seems to be a great lack of knowledge with regard to nickel ores among prospectors and miners. In fact, it seems often to be assumed by a prospector that any ore which he does not know is a nickel ore.

The Nickel Markets.—The market is comparatively so small and the number of producers so limited that the fluctuations have been very small. In fact, the prices have remained about on the same level throughout the year.

The closing quotations in New York are 33@36c. per lb. for ton lots, and 35½@38c. for smaller orders. The London price is 14@16d. per lb., according to size of order. This is about on a parity with the New York quotation, allowance being made for the duty on imports into the United States.

QUICKSILVER.

By Robert R. Bulmore, General Agent Quicksilver Mining Company.

The receipts of quicksilver from all mines in California from November 30th, 1897, to December 1st, 1898, amounted to 29,468 flasks; sales, 26,840. The average net price to the producer was $36.40 per flask. Compared with the previous year the receipts, or production, show an increase of 4,769 flasks and the sales a decrease of 1,127 flasks. The average price was $1.49 higher than in 1897. The falling off in sales in California was due to the lack of water in the mining districts, only about one-third of the usual amount of rain having fallen during the Winter of 1897-98. The future of the quicksilver industry is very doubtful, since there may be such changes in the internal affairs of Spain that the price and output may go up or down, and at the present time it is not worth while to hazard even a guess.

In Oregon the Black Butte Quicksilver Mining Company opened a mine in a spur of the Cascade Range, about 17 miles from Cottage Grove, in Lane County. A 40-ton reduction plant of modern design was erected. The quicksilver mines on Evans Creek, which were first opened 20 years ago, were sold to persons in Fort Townsend who propose to develop the property.

Lindheim & Co. have produced some quicksilver by crude methods at Agua Frias, Brewster County, Texas. These mines, which are situated about 90 miles from Rio, on the Southern Pacific Railway, are said to be promising, but at present they are in the hands of persons who have no money to develop them.

The receipts of quicksilver, in flasks, at London during the first eleven month of several successive years beginning with December 1st, have been as follows in flasks:

	1898.	1897.	1896.	1895.	1894.
Spain	46,126	46,199	40,827	40,167	41,800
	161	378	172	121	614
Italy	5,550	4,350	3,700	5,775	7,600
California	814	618	1,118	790	312
	52,721	51,545	45,817	46,853	50,326
Exports	25,907	25,158	29,803	36,168	36,518

The production of quicksilver in the United States in 1898 by mines, with the December output estimated, was as follows:

CALIFORNIA QUICKSILVER PRODUCTION, 1898.

Month.	New Almaden	Napa Con.	Mirabel.	Ætna.	Great West'n.	Great Eastern	New Idria.	Altoona.	Abbott.	Reddington.	Knox.	Small Mines.	Total.
	Flks	Flks	Flks	Flks	Flks	Flks	Flks	Flks	Flks	Flks	Flks	Flks	Flks.
January	330	600	40	300	70	181	500	306	21	90	15	.....	.....
February	336	600	68	300	30	135	500	352	20	78	.....	.....	.....
March	450	600	.....	200	86	120	400	264	18	70	42	.....	.....
April	544	600	.....	230	81	133	400	422	.....	135	.....	.....	.....
May	550	400	.....	310	100	170	400	391	24	95	58	.....	.....
June	600	395	.....	360	40	121	400	454	10	100	75	.....	.....
July	575	655	.....	300	202	148	400	404	43	50	52	.....	.....
August	450	600	.....	155	146	140	400	400	18	51	77	.....	.....
September	500	600	.....	250	110	110	400	322	11	.....	86	.....	.....
October	530	600	.....	325	83	140	400	247	24	25	20	.....	.....
November	550	600	.....	350	82	136	400	226	.....	52	35	.....	.....
December (a)	550	600	.....	350	80	130	400	250	.....	111	88	.....	.....
Total, 1898	5,965	6,850	108	3,430	1,110	1,664	5,000	4,038	189	857	548	600	30,359
Total, 1897	4,700	6,300	391	3,600	2,445	1,591	3,605	686	773	1,488	.....	600	26,079

(a) December estimated.

The highest prices during the year in San Francisco were $42.50 for home consumption and $38 for export; the lowest were $38 and $32.

In London the highest price of the year was £7 15s. a flask, and this rules at the close of the year. The lowest quotation was £7.

TIN IN 1898.

There was no production of tin in the United States during 1898. A little prospecting was done, but without result. The discovery of tin ores in Colorado has been reported, but in every case where the matter has been fully investigated it has been found that wolfram ore or the ore of some other rare metal has been mistaken for tin. There have been mysterious rumors of the purchase of tin properties in Colorado and New Mexico by Cleveland parties, but these are apparently entitled to little belief; certainly they will not be accepted until more specific statements are made.

The production of tin, as in former years, has come mainly from the Far East, with the exception of a small quantity from the mines in Cornwall, England, and some from Bolivia. According to the best authorities in London and Amsterdam, where the statistics of production are very carefully kept, the Malay Peninsula (reported under the general title of the Straits Settlements) furnishes more than two-thirds of the tin supply of the world. Including the year ending December 1st, 1898, the shipments from the Straits, which represent approximately the production, were 16,540 long tons to Great Britain, 12,720 tons to other European countries, 14,750 tons to the United States and 3,214 tons to China and India, making a total of 47,224 tons. This compares with 47,968 tons in 1897, showing only a very small change in production. It may be noted that a part of the tin shipped to London was in transit to the United States; but the direct shipments to this country have very largely increased, our consumers now buying and shipping directly from Singapore instead of going to London and Amsterdam, as in former years.

The production of tin in Australia for the year is estimated at 2,500 tons, of which 275 tons were shipped directly to the United States and the remainder to London. In the Dutch East Indies the periodical sale shows a production of 9,671 tons of Banka, 5,355 tons of Billiton, and 600 tons of Singkep, a total of 15,626 tons. This makes a total of 62,136 tons furnished by the mines of the Far East.

The other supplies reported outside of these are 5,400 tons from Bolivia, all of which went to London, and 4,452 tons from the mines of Cornwall, in England. The total production of tin in 1898 was therefore 71,988 long tons, against 69,412 tons in 1897, when the output was the lowest which had been reported for several years.

The Straits production has recovered somewhat from the depression of 1897, which, however, was due not to any falling off in possible resources, but rather to an attempt to regulate imports and improve prices. The Australian production does not increase, the Tasmanian mines, which furnished the larger part of it, having decreased their output with apparently little chance of bettering it. The Banka and Billiton production remains about stationary, though an increase is promised from the Singkep mines, which seem to be the most promising locations at present in the Dutch East Indies. The Bolivian production is always variable, but this year it has shown an increase

over 1897. The Cornwall output is steadily diminishing; it is now less than half what it was five or six years ago, and the probability is that the mines are rapidly becoming exhausted.

It is a singular fact that the tin production of the world is now very largely in the hands of Chinese miners and merchants, who are the first handlers of nearly four-fifths of the product.

The New York Tin Market in 1898.

The year 1898 will long be a memorable one in the history of the tin market. In this one single year the value of the article has recovered its loss of the previous five years. It is important to note that this movement was not the result of speculative operations, but was directly caused by the conditions of demand and supply. In our last year's review of the market we predicted that statistics would this year dominate the market, and such has been the case. At the close of the year the statistical position is such that with a continuance of consumption at the present rate values may still further advance.

AVERAGE MONTHLY PRICES OF TIN IN NEW YORK.

Year.	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
1893..	19.99	20.30	20.71	20.81	19.96	19.76	19.15	18.81	20.14	20.84	20.61	20.67	20.15
1894..	20.16	19.60	19.09	19.75	20.21	19.75	19.22	19.22	16.27	15.35	14.56	13.81	18.08
1895..	13.25	13.35	13.20	14.00	14.65	14.15	14.40	14.35	14.45	14.65	14.40	13.91	14.05
1896..	13.62	13.44	13.30	13.34	13.54	13.59	13.63	13.49	13.15	12.94	13.09	12.96	13.29
1897..	13.44	13.59	13.43	13.34	13.44	13.77	13.89	13.80	13.98	13.88	13.79	13.71	13.67
1898..	13.87	14.08	14.38	14.60	14.52	15.22	15.60	16.23	16.03	17.42	18.20	18.30	15.70

A review of prices during the past 20 years shows £55 to be the lowest, £170 the highest and about £90 the average price. The year, therefore, closed £31 above the lowest price, £84 below the highest, and £4 below the average price.

The statistics at the end of the year show a visible supply of 20,131 tons, against 29,855 tons at the beginning of the year, and show the London stocks to have dwindled to the unprecedentedly low figure of 9,687 tons, against 16,000 tons at the beginning of the year.

In America stocks have been depleted, and the estimates of American holdings are considered far too high. Consumption in this country has increased enormously, and is now estimated at almost 3,000 tons per month, or three-fourths the world's production.

In spite of the stimulus of the higher values, production has but slightly increased. This is due to the fact that the new tin-fields have not been sufficiently prolific or accessible. The decrease in the production through the giving out of the old mines was therefore not greatly exceeded by the addition from the new sources. Besides, coolie labor has been limited, and owing to the doubled price of rice the cost of labor has increased.

While the American market has, as before, been dependent upon the London and Eastern markets, prices here have not in every instance followed those of Europe, owing to the large stocks at times accumulated here. We refer to our separate report on the fluctuations of the London market.

The New York market opened at 13¾c., and during January fluctuated between this price and 14c. The following four months it advanced, with occasional reactions, to 15c., and during June and July to 16c. In August and September it went to 16¼c. During the last three months it has fluctuated considerably, but persistently recovered all reactions and moved upward, closing at 19c.

The London Tin Market in 1898.

By Our Special Correspondent.

The year 1898 opened with a large visible supply amounting roughly speaking to about 31,000 tons, and the English stock,—which is the principal medium of speculation—was practically in a few hands: shipments from the Straits continued to come forward in large quantities, and the position of the bull party did not seem at all an enviable one. The opening prices were £63 1s. 3d. for spot, £63 17s. 6d. three months, and throughout the month the fluctuations were confined to quite a narrow limit, the extremes being £62 12s. 6d. and £63 5s. cash; £63 6s. 3d. and £63 18s. 9d. three months, closing at £63 2s. 6d. and £63 15s. respectively. Consumption was on a good scale, and the Americans, whose stocks had become very bare, took considerable quantities direct from the Straits.

Statistics published at the commencement of February showed a further increase in European stocks of about 1,500 tons, and the market for Straits opened at £63 cash, £63 15s. three months, from which point they steadily rose to £64 5s. and £64 17s. 6d. A temporary reaction then took place, and values backed to £64 cash, at which figure the market remained almost stationary for a few days, and the public trading shrunk to a small area. Just towards the end of the month a better tone was manifested, and the closing figures were £64 12s. 6d. cash, £65 2s. 6d. three months. Consumption continued very good, but notably so in America, and deliveries were on a very large scale, causing a shrinkage in stocks of 1,718 tons, which was the first important reduction noticeable for a considerable time.

The month of March was fraught with trouble in the Far East, and the crisis between the United States and Spain was coming to a head. This kept speculation from developing to any great extent, and the tin market remained quiet in company with other articles. The opening values were £65 cash, £65 10s. three months; there was then a sharp decline to £64 8s. 9d. and £65 1s. 3d., but the recovery was almost as rapid, and prices rose to £65 7s. 6d. and £66; and, after considerable fluctuations closed with buyers at £65 5s. cash, £65 15s. three months.

Statistics compiled at the beginning of April made it quite evident that consumption was going ahead in a very healthy manner, and this attracted the attention of many outside operators; nevertheless, values only moved slowly and after a temporary dip to £64 12s. 6d. cash, and £65 7s. 6d. three months, closed at £65 13s. 9d. and £66 7s. 6d. The chief incident during this month was the large shipments of Straits tin from London to America, which was the natural sequel to the low level to which consumers in that country had allowed their stocks to run.

May opened with a reduction of 2,585 tons in European stocks, and the price of Straits was £65 13s. 9d. cash, £66 5s. three months, but after declining to £65 6s. 3d. and £66, took a decided turn for the better, and with almost daily improvement prices crept up to £67 15s. cash, £68 10s. three months, but closed at a decline of about 10s. from these figures.

Statistics published on the first of June revealed a further falling off in stocks of about 1,200 tons, but the prices under realizations took a downward turn to £67 5s. cash, £67 16s. 3d. three months. At this range there was considerable buying by speculative investors, who took up warrants rather freely, and as the demand from America continued good, and shipments from the East were meagre, prices soon recovered and advanced rapidly to £68 18s. 9d. cash, £69 7s. 6d. three months. Determined attacks were then made by prominent dealers who were against the rise, but these large sales only depressed values slightly, and they had the doubtful satisfaction of selling large quantities at prices which soon showed handsome profits to their rivals. The month closed strong with buyers over at £70 11s. 3d. spot, £70 10s. forward, which was a net gain of £2 16s. 3d. on the month.

July commenced with cash tin ruling at £71, three months at £71 2s. 6d., but the bulls were able to obtain large quantities at cheap rates owing to the somewhat doubtful tactics indulged in by their opponents, who threw large lines on the market with the idea of breaking the prices, but these parcels were readily absorbed by those engineering the rise. The statistics again showed a decrease of 1,169 tons; it was therefore evident that consumption was rapidly overtaking production. The market soon rallied to £72 1s. 3d. and £72 2s. 6d., only to be depressed again to £70 11s. 3d. cash, £70 17s. 6d. three months, but when the ostentatious selling ceased prices again went ahead, and the final rates were £71 8s. 9d. spot, £71 16s. 3d. three months.

European figures made up at the commencement of September showed a decrease of 678 tons, and the London stock was only about 10,500 tons. Prices pursued their upward course, and the opposition seemed quite powerless to stem the tide until £75 was reached for cash, at which height many speculative holders, and even some of the bull clique, sold large quantities, and so the market gave way to £73 7s. 6d. cash, and £73 11s. 3d. forward. The prices in the Straits however, were above the London parity, and a recovery was made before the end of the month to £73 17s. 6d. for all positions. The month of September opened at £73 12s. 6d. spot, £73 15s. forward, but as there was a decrease of only about 250 tons in the stocks, the public, whose appetite was thus somewhat checked, left the market for a time to the sport of the rival factions, who caused the fluctuations to be wild and varied; at times forward prompts were selling at a backwardation of 5s. per ton under the cash price; £72 3s. 9d. was the lowest price accepted for cash, and then a turn for the better came, and values rose with only moderate variation to £74 5s. cash, and £74 10s. three months; these were the closing figures for the month.

October opened with a good consumptive demand, but with European stocks only down some 200 tons. However, the month was destined to be a record breaker, and on a large trading prices went up by leaps and bounds. A rise of about £8 5s. per ton had been established, which showed an appreciation on the London stocks of close on £75,000, so that the bull operators certainly had every cause to be satisfied, and sold good lines, which sales in their turn caused a healthy decline from the highest point. One of the chief reasons for the sudden leap in price was the quantity of call options that had to be covered, and buyers had to dance to any tune the bulls played. The top price was reached on October 28th, when cash realized £82 10s. and three months prompts were worth £83. The greatest excitement occurred when values had reached about £80.

When the month of November dawned prices again advanced to £83 15s. cash, and £84 5s. three months, but on the political outlook becoming very uncertain a good deal of selling took place on the part of those who wisely wished to secure the handsome profits which had been thrust upon them, and this caused another reaction to £82 cash, £82 10s. three months, but at this point the bull party came to the rescue and stayed the fall. The month, however, was marked with violent fluctuations, and after improving to £84 2s. 6d. cash, and £84 10s. three months, some of those chiefly interested in the rise sold very heavily, and it looked as if the market was going to pieces entirely. The selling at times was quite forced, and savored somewhat of a ruse to catch unwary bears, but when 2,300 tons had been disposed of and the value of cash stood at only £80 5s., a stronger tendency was evident, and a smart recovery was made to £84 7s. 6d. cash, and £84 17s. 6d. three months; but before the month was out values had shed about 15s. per ton, and closed at £83 11s. 3d. spot, £83 18s. 9d. three months.

The statistics published at the beginning of December showed an increase in European stock of 132 tons, and the article was moved daily quite at the will of those controlling the stock; the fluctuations were frequent, and after opening at £83 10s. cash, £84 2s. 6d. three months, declined to £80 16s. 3d. and £81 7s. 6d., then recovered to £82 6s. 3d. and £82 18s. 9d., but eased off again to £81 and £81 13s. 9d. There was then a good deal of interest shown in this metal, and buyers having the market well in hand soon pushed prices again to £83 2s. 6d. for spot, and £83 17s. 6d. for three months, at the close.

ZINC AND ZINC OXIDE IN 1898.

By A. Heckscher.

The zinc industry during the year 1898 has been active and prosperous. More especially has it been so in this country, although the efforts made in 1897 to maintain prices on a remunerative basis, which failed at the time, were not renewed. Gradually it is becoming apparent that our matchless resources in the way of raw materials, our transporta-

tion facilities, and the enterprising spirit of our people must give us a commanding influence in the exploitation of many industries—and zinc is one of them. At present, not so much by reason of more economical processes in use here, but rather because of the price advance abroad, following upon the exhaustion of stocks and the scarcity of fresh supplies, we are in a position to export zinc ore and zinc oxide largely, and spelter at will.

The foreign works have always followed the practice of making ore contracts for years in advance on a sliding scale. Even this has not availed in the present contingency. The impetus given to our market by the advancing foreign price for spelter has been reinforced by large requirements here, and the exceptional expansion which has taken place in our production has been readily absorbed. Recent heavy offerings and abnormally high prices for ore have somewhat lessened demand and lowered price. Still, the market, statistically and intrinsically, remains in a perfectly healthy condition.

The Joplin ore-field has maintained its supremacy as the chief source of supply for our works. The tonnage has been much in excess of any previous year. It will foot up some 225,000 tons, representing over 100,000 tons of spelter, and it will thus be readily seen how great is the proportion of our output, which is dependent solely upon the production of one district. Ore prices have been high and out of reach at times. Had they not fluctuated so constantly, exports would have been larger.

Outside of Joplin, the only present great producer is located in Sussex County, N. J. Its zinc ore has been largely exported, being strictly high grade and not directly a competitor of the larger western mining district. In Wisconsin the sulphide ores are often pyritic; the tonnage mined is not large, and we have no present knowledge of any single great mine in that field; the carbonates are used for the manufacture of zinc oxide, and their tonnage, if not actually smaller than in the past, shows no signs of growth.

Good progress has been made in perfecting the ingenious devices invented by Mr. J. Price Wetherill for the electro-magnetic separation of ores and other substances heretofore deemed incapable of magnetic separation, because of their low degree of magnetic attractability. Generally speaking, the new process is best adapted for ores which gravity separation, either by reason of the minuteness of the component mineral particles or by reason of too slight differences in specific gravity, cannot be made to treat successfully. The Wetherill invention first made possible the separation of the zinc, iron and manganese minerals, constituting what is known as Franklinite ore, and added great value to the unique deposits of Sussex County, N. J. It is now found that spathic iron ore can be separated from blende and iron pyrites without any preliminary process other than crushing. The invention will ultimately open a wide field in the separation and utilization of ores heretofore deemed worthless. In Germany and Spain, mines abandoned years ago are being reopened. The present scarcity of good furnace material enforces the necessity of rendering available every source of ore supply.

Probably the most interesting feature to which the industry can point this year is the shifting of the center of manufacture from the older spelter works, scattered through Kansas, Missouri and Illinois, to the Iola gas-field, where several large plants are now partly in operation, partly in course of construction, gas being used exclusively as fuel. The new works are owned by the proprietors or the former proprietors of the older locations. Naturally enough, it must be an attractive proposition to be able to build furnaces of almost any size. The natural gas can be introduced at any point for the reduction of the ore by merely carrying a system of pipes under and along the front of the furnaces. Coal and ashes no longer cumber the ground. If the gas supply be continuous, the new furnaces will supplant the old; and they will have to introduce corresponding economies, or be the first to suspend when capacity is in excess of consumption. At present the gas is furnished to all comers free of charge; the supply appears to be ample. When it shall fail, the older locations, by reason of their proximity to the ore and coal fields, will again have the advantage. By that time, however, the plants themselves may be antiquated and useless.

The sheet zinc industry has been satisfactory in price and volume, while in 1897 it was slow and halting. The sales of high grade spelter have been quickened by ordnance requirements, not only in this country but abroad. The galvanizing industry, the chief consumer of ordinary metal, has been very active, and the many avenues through which zinc enters into consumption for electrical purposes, such as telegraph and storage batteries, have increased their calls, and are likely to so continue.

For oxide of zinc, while prices have remained stationary, the demand has been large. An exceptional business has developed for export by reason of the price advance abroad and the knowledge of the fact, now generally recognized, that the American product is uniformly purer than the foreign. The export business is new; at least, it has never before reached so large a volume. With the foreign price at 5½c. per pound in London, it is not to be wondered at that our product, which is offered much lower, should find a ready sale, and, by reason of its purity, lasting favor.

Here also sales of zinc oxide have been large. It is likely that sales of other pigments have increased. Nothing is so soon neglected when poverty pinches as are efforts to beautify and preserve the interior and exterior of buildings. It is for these purposes that paint is used, and its sale is as true a barometer for trade conditions as are the sales of iron and other metals.

To those who remember the conditions obtaining fifteen or twenty years ago, the present status must afford satisfaction. At that time we were largely dependent on foreign importations for zinc in blocks and sheets. All efforts to produce zinc oxide by the French process had failed. Exports of ore were not even attempted. To-day, as stated above, ores and metal are largely exported; more French process zinc white is produced and sold here than was ever imported, and, indeed, it may fairly be stated, as not the least satisfactory outcome of a sound trading situation, that foreign works for many years to come will derive greater profit from our exports of raw materials than they are likely to lose through the competition in finished products.

The Joplin Zinc and Lead District in 1898.

By Our Special Correspondent.

The year 1898 was the most prosperous in the history of the Joplin District, and has been a remarkable one in many respects. Zinc ore reached the highest price ever known in the history of mining operations in Southwest Missouri. Prospecting has been carried out on a larger scale than ever before attempted, and the increase in the output and valuation has been enormous. The substitution of natural gas as a fuel in place of coal by some of the big smelting companies has enabled them to pay better prices for ore, while still leaving them a good margin of profit, and has forced their competitors to meet the prices paid by them.

The saving in freight rates to the smelting works in the natural gas fields of Kansas on the ore hauled has also been an important factor in fixing the price, and there is no doubt that the competition of the smelters using natural gas for fuel has made serious inroads into the profits of those operating under old methods. This and other reasons have unsettled the smelting business to a great degree and led the Cherokee-Lanyon Smelter Company—locally known as the Combine—to turn back to the lessors early in July many of the furnaces leased and to shut down a number owned.

The dissolution of the Combine restored old conditions, and owing to the keen competition of individual buyers and the presence of a buyer for foreign smelting concerns, the market was unsettled and spasmodic for the last 6 months of the year, advancing steadily up to the week ending December 3d, when it reached $40.50 per ton for top grade zinc ore, and declining to $29.50 per ton for the week ending December 31st.

The high prices prevailing during the year greatly stimulated prospecting, and in addition to the new camps opened up, a large number of old mines which had proved unprofitable at lower prices were reopened and helped to swell the grand total. All the old camps have greatly increased their output over that of previous years, and Oronogo in particular has become the scene of renewed activity and is now one of the greatest producers in the district. Hell's Neck and Central City are two new camps which developed into great producers during the year, and operations have been renewed on a larger scale at Carthage and Spring City and at various other points in the district.

The transfers of mines and mineral lands to outside parties during the year have been very heavy, amounting to upward of $2,000,000. Among the sales were the McKinley Lease at Carterville, the June on the Rex Land at Joplin, the I Know Mine and plant, the Gregory Lease, the Circle Lease at Oronogo, the Ashcraft Lease at Webb City, the Dollie Land at Hell's Neck, and a large number of other valuable tracts and leases.

The opening up of new tracts and the renewal of operations on old leases has created a demand for machinery that has taxed the capacity of the foundries and machine shops to the utmost. Seventy-six new plants have been built this year, distributed as follows: Galena, 23; Joplin, 7; Oronogo, 7; Duenweg, 4; Webb City, 3; Carterville, 5; Carthage, 2; Hell's Neck, 2; Central City, 7; Spring City, 2; Belleville, 4; Aurora, 8; Cave Springs, 2. They cost from $3,500 to $10,000 each.

The prosperous condition of the zinc mining industry is further evidenced by the great increase in the sales, amounting to 114,190,940 lbs. over 1897; and while the lead ore sales were less than in 1897 by 7,295,020 lbs., the total value of the output of both ores for 1898 exceeded that of last year by $2,422,429.

The year opened with zinc ore selling at $23 per ton, at which figure it remained steady all through the month of January. It fluctuated during February, dropping to $22, but it commenced to rise during March and advanced steadily up to December, when it reached its highest point, $40.50 per ton. The average price for the first six months of the year was $24.92 per ton, and for the last 6 months $31.94, the average for the year being $28.44, A comparison of these figures with those of 1897 shows the great improvement in everything pertaining to the zinc industry.

Month.	Prices.	Month.	Prices.
January	$23.00	July	$28.00
February	22.50	August	28.37
March	23.00	September	31.00
April	24.62	October	33.70
May	26.50	November	36.25
June	28.50	December	37.00

Zinc opened the year in January, 1897, at $21.50, and closed at $24.50, the highest price being paid on December 4th and 11th, when it reached $24.50, and the average price for the year was $22.28, against $28.44, or $6.16 less than in the previous year.

The combined value of lead and zinc ore for 1898 was $7,148,731, against $4,726,302 for 1897. In spite of the enormous increase in the production, there is no surplus zinc ore on hand at the end of the year.

The cut of $11 per ton in the price of zinc ore inside of 4 weeks was regarded as arbitrary and uncalled for by the ore producers, and resulted, on December 21st, in the formation of the Missouri & Kansas Zinc Miners' Association, composed of the heaviest operators in the district. Every camp is represented and the association will thoroughly investigate the cost of manufacturing metal, the amount on hand at all times, the cost of transportation and every item charged against the business, as well as the condition of the foreign and domestic markets, with a view to establishing beyond a doubt the price that the metal manufacturer can afford to pay for ore on an assay basis.

The association will regulate the supply of ore by combining the concentrating plants of the entire district into groups of 20, shutting down a group at a time in alphabetical order when a surplus threatens the stability of the market. By these and other methods it hopes to control

the hitherto arbitrary methods of the buyers and establish a just and equitable basis for the sale of ore at all times.

During the early part of the year the wages of miners remained stationary at last year's figures, but as the price of ore advanced operators voluntarily raised wages throughout the entire district to $2 per day for ordinary labor and $2.50 to $3 per day for ground bosses and superintendents. The relations between operators and their employees are close and agreeable, and the district is noted for the entire absence of all labor disturbances. The miner of to-day may be the operator of to-morrow, and the system of sub-leasing which gives any man a chance to become a mine operator engenders a spirit of good fellowship peculiar to this district. Another reason for the absence of labor troubles is the fact that the miners are almost exclusively native born Americans, the foreign element being less than 2 per cent. of the population.

Lead.—Lead mining has not been prosecuted as vigorously this year as last on account of the activity in zinc mining and the high prices prevailing for zinc ore, and the sales fell below those of last year to the extent of 7,295,020 lbs., but the output has not fallen off to that extent, as there is a surplus of upward of 2,000,000 lbs. which is being held at various points in the district for higher prices. The market has been fairly steady throughout the year, opening in January at $22.50 and closing at $22 December 31st.

The highest price paid for lead was $24, which was paid one week in July and one week in August, and the lowest was $20.50, which was the ruling price the last two years in November and the first week in December. The average price for the year was $22.24½, agianst $21.32 for the year 1897. The average monthly prices were as follows:

Month.	per 1,000 lbs.	Month.	per 1,000 lbs.
January	$22.00	July	$23.60
February	22.12½	August	23.50
March	23.00	September	23.31½
April	21.50½	October	22.00
May	21.75	November	20.87½
June	22.87½	December	21.10

It was rumored a few weeks ago that the National Lead Company would enter actively into both lead and zinc mining operations in this section, and that they had a representative in the Joplin District looking up promising mineral lands with the view of purchasing large tracts, but if they have made any deals, big or little, they are not matters of record thus far.

The total output of the district of which Joplin is the center for the last two years was as follows, in pounds:

	1897.	1898.		Changes.
Zinc ores	355,951,060	470,142,000	Inc.	114,190,940
Lead ores	60,209,000	52,914,980	Dec.	7,295,020

The total selling price or market value of these ores in 1897 was $4,726,802. In 1898 it was $7,148,731, showing the enormous increase of $2,422,429 in the amount realized for the output of 1898.

The New York Spelter Market in 1898.

The course of the spelter market during 1898 has been exactly the reverse of that of 1897. Then the attempt made by a combination of some Western smelters to hold the market up by artificial means, such as the holding back of large quantities and the exporting of round lots at 10 to 12 per cent. below the domestic price, proved futile. This year the market has, notwithstanding an increase of fully 20 per cent. in the production, advanced beyond all previous limits. This has been due primarily to the tremendous consumption in this country. In all lines, the demand for the metal has been enormous. The wire industry absorbed more spelter than ever before, and the exports of galvanized wire have greatly increased. Galvanizers of iron sheets have also done a larger business, though the margins in this line have been unsatisfactory. Galvanized pipes have been in greater demand both here and abroad. The brass consumption has been enormous and that of sheet zinc as large as before.

Exports of spelter have been about the same as last year, but unlike last year, the sales of spelter for export were not made at a sacrifice, but placed at top prices. It was the European demand, that, at the end of the summer, when consumption here was very large, developed the strength of this market. In spite of the fact that spelter sold at unprecedentedly high figures during this year, complaints were heard that smelters were not able to secure a fair margin, owing to ore prices being driven up to unremunerative figures under strong competitive buying. Some of the older works in the coal belt were not operated. However, this was counterbalanced by the erection of new works in the gas fields of Kansas.

AVERAGE MONTHLY PRICES OF SPELTER IN NEW YORK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
1893..	4.39	4.39	4.28	4.38	4.41	4.27	4.13	3.89	3.69	3.68	3.65	3.80	4.08
1894..	3.56	3.85	3.89	3.62	3.47	3.40	3.43	3.38	3.44	3.45	3.36	3.43	3.52
1895..	3.28	3.20	3.23	3.30	3.50	3.65	3.75	4.15	4.30	4.10	3.55	3.49	3.63
1896..	3.75	4.03	4.20	4.09	3.98	4.10	3.97	3.76	3.60	3.72	3.99	4.14	3.94
1897..	3.91	4.02	4.12	4.13	4.21	4.21	4.32	4.26	4.18	4.17	4.03	3.89	4.12
1898..	3.96	4.04	4.25	4.26	4.27	4.77	4.66	4.58	4.67	4.98	5.29	5.10	4.57

In January the market ruled dull, and not until the end of February was there any perceptible increase in the demand. Then, however, and through March and the first part of April, the market steadily improved, reaching 4.10c. St. Louis, 4.30c. New York, and £18 12s. 6d. abroad.

The end of April and early in May, the demand fell off, buyers having covered their wants; and at the increased rate of production, stocks quickly accumulated and the market became weak. However, consumption continued to expand, stocks were soon depleted, and the demand at the end of May and in June was simply enormous. At this juncture the burning of one of the refining plants increased the already acute scarcity of spot and nearby metal, and prices advanced rapidly to 4¾@5c. St. Louis and 5⅛c. New York. The European market had meanwhile risen steadily and had reached £19 8s. 9d.

In July, buyers having bought more than their requirements, held off, and a reaction set in, the metal selling down to 4.35c. at St. Louis and 4.50c. at New York. In August some sales were made at 4.25c. and 4.40c. respectively, but again stocks in the hands of manufacturers had been used up and with liberal buying the market turned and continued to advance with few reactions until toward the end of the year. In Europe there was a great scarcity of metal, due to the decreased output in the large Silesian mines, and the market at the end of September was £22, while here it was 4.70c. St. Louis and 4.90c. at New York.

In October and November foreigners were forced to purchase round quantities in this country, both for prompt and future shipment, and with the increasing consumption on this side, the metal became exceedingly scarce. The miners were constantly advancing their prices for ore until $40 per ton—an unprecedentedly high price—was paid.

In November the advance culminated with New York selling at 5.40c., St. Louis at 5.22½c. and London at £24 15s.

During December the price of ore declined to $30 per ton and producers were anxious to make sales. Buyers had been apathetic, and, becoming frightened at the concessions offered, held off, in consequence of which prices suffered considerably, declining to 4.70 at St. Louis. Toward the end of the month, however, the demand improved somewhat and the market closed at 4.85c. St. Louis and 5c. New York, with London at £23 15s.

The London Spelter Market in 1898.

By Our Special Correspondent.

The Market opened quiet but firm in January last, with ordinaries quoted at £18 to £18 2s. 6d. and special brands at £18 2s. 6d. to £18 5s., but after consumers had bought freely at these figures, the tone became easier and prices declined about a half-crown or so. February opened quiet at £17 7s. 6d. to £18 for ordinaries, and the tendency was dull thereat. For the first two weeks of the month the Continental makers would not meet the market, and the Americans were decidedly higher in their views; buyers had consequently to meet the higher rates asked, and the price improved to £18 2s. 6d. and £18 5s.

When March came in it was found that the Continental producers had sold out for some months ahead, and in America there was such a good home demand that better prices could be obtained on their own side. Values in our market consequently stiffened, and buyers eagerly paid the advanced prices. The month closed with buyers of ordinaries at £18 8s. 9d. April commenced with the scarcity of sellers more pronounced, and most of the dealers were sold out. Values continued to advance almost daily, and as consumers did not believe in the reported scarcity, they only bought quite sparingly, nevertheless, before the month was out ordinaries were worth £19.

May saw a further advance on the Continent, and large lines were sold at good prices. Consumers on this side being temporarily covered, abstained from making fresh purchases, and the Market went dull. This state lasted only for a short period, and the price again rose to £19 5s., which was the figure ruling at the commencement of June. Towards the middle of the month large purchases were again made on the Continent, and that restricted the quantity for this Market. America was still practically out of the Market, and remained only a passive factor until well into the last quarter of the year. Prices in the United States at this time took a sudden jump, and shippers bought back parcels sold for shipment to this country. This was immediately reflected on the English market, and prices commenced to soar upwards, and ere the month was over there were eager buyers at £20 for ordinaries.

July opened with consumers showing considerable anxiety to cover themselves against sales of manufactured stuff, and they readily paid the advancing prices; £20 7s. 6d. was reached before any break occurred, but then some second hand holders showed rather an inclination to makes sales for forward delivery, and a retrograde movement was made to £20. August witnessed another steady rise, and it became apparent that it was no use expecting any help from America. Values, therefore, rose to £20 12s. 6d., with stocks on the Continent standing at a severely low level.

September found buyers very short of supplies for delivery over the remaining months of 1898, and they came in and bought with rather more pluck, and prices advanced quickly to £22. There was then a halt, but October was to be a month of surprises, and after a few holders of second-hand lots had sold at a sacrifice and weakened the market, the consumptive demand grew keener than ever, and prices rose at almost every sale until at the end of the month the nearest price was £24 for ordinaries, special brands fetching 5s. per ton more. Very little spelter was offered at the commencement of November, and the Continental makers had sold for a long time ahead. Spot stuff was very scarce, and there was good buying until £24 15s. was reached. At this point consumers had satisfied their immediate wants and left the market alone. There were then reports of American offers, and this frightened some London dealers, who sold down to £24. This level attracted buyers, and £24 10s. was again established, but when December came in, consumers were very reserved, and it was difficult to make sales. Buyers deeming it better to hold off until after Christmas, prices therefore dwindled gradually to £23 5s. to £23 10s. for ordinaries, £23 10s. to £23 15s. for specials.

ASBESTOS.

The production of asbestos in the United States in 1898 as in the previous year was derived chiefly from the Sall Mountain Mine, at Sauter, White County, Ga. The total production of the United States, including that which may have been mined elsewhere, may be put down safely as not exceeding 900 short tons. The production in 1897 was 770 short tons. The increase was due to the improved demand for the Sall Mountain asbestos, of which a good deal has been exported to Germany and England. The value of the product was from $16 to

$25 a ton at the mine, varying according to color, length and quality of the fiber. A new product called "asbestolith," a German invention, is now being made by the Sall Mountain Asbestos Company. It is used chiefly for the preparation of cement and tiling for floors, for which it is claimed to have many advantages, among them impermeability to water, and elasticity as high as that of wood, a hardness equal to that of cement, greater durability than asphalt, and lightness in weight, while it is, moreover, a non-conductor of sound. It is said that it will not crack, warp or bend, and shows greater resistance to abrasion than stone, brick or marble. Short fiber asbestos is worked up into this material, and since the mineral of Sall Mountain is chiefly of this character there will probably be a considerable future for the new branch of the business if the real merits of the product prove to be equal to the claims that are made for it.

ASPHALTUM.

There were no new sources of asphaltum or asphaltic rock in the United States in 1898. California continued to be the only producer of asphaltum proper (according to the ordinary classification). Bituminous sandstone was produced in California and Kentucky; asphaltic limestone in Utah and the Indian Territory. Grahamite, or gilsonite as it is more commonly (although improperly) known, was mined in Utah and Colorado, the latter State being a new source of supply, although the existence of deposits there was previously known. A new discovery of ozokerite was reported from Utah, but there was no production of this substance in the United States in 1898, and it does not seem likely that there will be so long as the Galician mineral can be laid down in New York so much more cheaply than that from Utah. As heretofore, the chief domestic supply of asphaltum for paving material was obtained from Trinidad. A considerable quantity of "manjak," a high-grade bitumen, was brought to New York from Barbados.

Complete statistics of the production of asphaltum proper, solid and liquid, in California in 1898, have not yet been compiled, but it is likely that the total will fall short of that for 1897 on account of the fact that there was less paving done in 1898 than in the previous year. The average price of pure asphalt at Ventura, Asphalto and other important points of production in California, was between $20 and $30 per ton. The Standard Asphalt Company moved its refinery to a more desirable location, within a few hundred feet of the mine workings at Asphalto. The plant has been entirely overhauled and is now one of the best designed in the State. The works are arranged so that the transmission of all material from the time it leaves the mine shaft until it is ready for shipment is done by gravity. The California Asphaltum Company, at Ventura, refined some asphaltum by the use of brimstone, developing hydrogen sulphide, which was burned to sulphurous anhydride and utilized for the fabrication of sulphuric acid.

California was the largest producer of bituminous sandstone, as in previous years. Outside of this State there was none mined in the United States except in Kentucky, where there was a falling off in production owing to the fierce fight which the Barber Company and other producers of asphaltic compounds forced on the local producers. It was the effort of the outside concerns to frame the specifications in all large cities so as to exclude rock asphalts, for which consequently there was very little business. The combination made its strongest fight at Louisville, knowing that if it could keep the Kentucky asphalt out of that market it would have a strong card to play in other cities, but so far this has been a losing game. There were two producers in Kentucky in 1898, the product being worth $1.80 to $5 f. o. b. cars, according to quality.

The asphaltum deposits of the Indian Territory, which promise to be important, begin at a point 3 miles from Dougherty and Davis, on the Santa Fe Railway, and extend over an area 15 miles in length and from 3 to 5 miles in width. The asphaltum occurs impregnating a blue limestone and also in admixture with sand. The deposits are very large. There are three plants already in operation for preparation of the refined product, which now turn out from 3 to 4 carloads per day, and are planning to manufacture asphalt blocks. Some asphaltic limestone was produced by the Assyrian Asphalt Company, at Pariette, Utah. The deposit near Thistle, in Utah County, was not worked. Some developments were made in other deposits of asphaltic limestone, but their output was unimportant. No bituminous sandstone was dug in Utah in 1898, although there are deposits of this rock. Grahamite, or gilsonite, was produced chiefly by the Gilson Asphaltum Company. A few carloads were shipped from an adjoining property by the Uintah Gilsonite Company, but it was enjoined from working by the Gilson Asphaltum Company, which claimed title to this property. The Castle Peak gilsonite mine, near the Uintah reservation, 75 miles north of Price, was sold to a Denver syndicate. Several carloads of grahamite were shipped from a new mine in Middle Park, Colo.

BARYTES.

The production of barytes in the United States in 1898 was derived chiefly, as in previous years, from three districts, the vicinities of Hot Springs, N. C., and Lynchburg, Va., and around Mineral Point, Potosi, and Cadet, in Washington County, Mo. The output of the last for the fiscal year ended June 30th, 1898, was reported by the State Mine Inspector as 8,360 short tons. The entire production of barytes in the United States in 1898 is estimated at 30,000 tons. The value of crude barytes at the mines in Washington County, Mo., was from $4.50 to $5 per ton. In Virginia and North Carolina pure lump ore was worth about $4 and washed ore (concentrates) $3.75.

Ground barytes was in steady demand throughout the year, with an upward tendency in price. At the beginning of the year No. 1 domestic sold in New York at $16, No. 2 at $14, and No. 3 at $11. At the end the prices were $18, $16 and $14 respectively. In St. Louis and Chicago prices averaged somewhat lower. The Western market is supplied to a considerable extent with floated, or water sorted, barytes, while none of the products which reach the Eastern market is prepared in this way. At the close of the year a schedule of $14.50 for No. 2 and $16 for floated was established in Chicago and St. Louis. In December it was reported that the barytes grinders of the United States had formed a pool with a view to the establishment of a uniform price list and division of the business.

Formerly there was a large importation of German barytes into New York, but now this business has practically ceased, the difference in quality between it and the best domestic product not being sufficent to outweigh the existing tariff of $5.25 per 2,000 lbs., notwithstanding the advantage in freight rates, which are only $1.50 per ton from Hamburg and Bremen to New York, while Virginia barytes has to pay $2.50 per ton.

Notwithstanding the exclusion of foreign ground barytes, there is still a large importation of "lithophone" in which barytes is an important constituent. "Lithophone" is prepared from a mixture of solutions of zinc sulphate and barium sulphide whereby a precipitate of zinc sulphide and barium sulphate is obtained. This contains about 30 per cent. of the former and 70 per cent. of the latter. According to a tariff decision of 1898, under a protest of Gabriel & Schall, this product is assessed for duty at the rate of 1 cent per lb. under classification as paint containing zinc, and not at 1.25 cent per lb. as white sulphide of zinc, as appraised by the New York Custom House.

BAUXITE.

The output of bauxite was about the same in 1898 as in 1897, all coming, as heretofore, from Georgia and Alabama. The production of Alabama was about 12,000 long tons, against 13,083 in 1897. The price remained at the same figure as in 1897, being $7 per ton delivered at the works of the consumer, which means $2 to $2.50 per ton to the producer. There were four producers, the American Bauxite Company being succeeded by the Dixie Bauxite Company.

BORAX.

The production of borax in the United States increased considerably in 1898, most of it coming, as in 1897, from the colemanite deposits of California, while a little was obtained from the marsh deposits of California and Nevada and a small amount from Oregon. Marsh deposits were worked at Candelaria, Nev., Humboldt, Nev., Amadee, Cal., Lovelocks, Nev., Independence, Nev., and at a point in Oregon about 120 miles northwest of Winnemucca, Nev., from which point shipments are made. All the producers, with two exceptions, sell their product to the Pacific Coast Borax Company, which continues to control this business in the United States.

There was also an increase in the production of boracic acid, which is now made in California by two companies, while a third plant is in course of construction and will be in operation during 1899. The California Borax Company was organized to erect works at Borax Lake, Cal., and to operate deposits in San Bernardino, Kern and Inyo Counties. The construction of a plant capable of turning out 100 tons of refined borax per month, located near the old Searles works, was begun, and it is expected that refined borax will be produced at this place early in the Spring of 1899.

The Pacific Coast Borax Company erected a new refinery at Bayonne, N. J., which was put in operation December 20th. The new works, which embody the latest improvements in borax refining apparatus, have a nominal capacity of 1,200 tons per month. They will be supplied chiefly with raw material from California, and will make boracic acid as well as borax. The old works at Alameda, Cal., which have a nominal capacity of 900 tons per month, will continue in operation, although probably on a smaller scale.

The Pacific Borax & Redwoods Chemical Works, Limited, which is the name of the combination of American and English refiners, reported for the year ended March 31st, 1898, a profit of £88,372, an increase of more than 50 per cent. over the previous year. The gain was attributed to the remarkable expansion in business, especially in America, together with a material reduction in the cost of production and a more profitable range of prices since the new American tariff went into effect, whereby the duty was raised from 2c. to 5c. per pound. Improved machinery and additional facilities are expected to lower the cost of production still further. Among other things, a branch line of railroad to the mines has recently been completed, while good results are expected from the new refinery at Bayonne.

During the last quarter of 1898 the American branch of the Pacific Coast Borax & Redwoods Chemical Works reported the largest volume of business in the history of the industry. On January 31st, 1898, the price of refined borax was raised to 7c. per pound, and that of refined lump in sacks to 6.75c., New York quotations. Later in the year an advance of 0.5c. per pound was put into effect, and this price was maintained throughout.

With respect to the future, the indications are for a continued increase in the demand for borax and boracic acid, and the number of industrial purposes to which these and their compounds are applicable. There has been considerable discussion lately in England as to the use of boracic acid as a preservative for food, but the preponderance of evidence seems to be in favor of its use in small quantities as an entirely harmless preservative. However, only a small part of the world's production of borax is consumed in this form, although the packing industries are using considerably larger quantities than heretofore.

BROMINE.

The total production of bromine in the United States in 1898 was 491,681 lbs., of which 361,481 was in the form of liquid and the remainder in bromide of potassium. In 1897 the production of liquid bromine was 356,949 lbs., and the total bromine production was 487,149 lbs. The bromine business in the United States was without special feature during the year. The world's production of this substance continues in the hands of the Associated American Producers and the Leopoldshall-

Stassfurt Convention of Germany, which divide the world's trade between them. Their agreement, which expired in the Autumn of 1897, was renewed at that time for a further period of five years. At the same time a combination was effected among the European manufacturers of bromides, who immediately afterward raised the price of their products and since then have held it firmly at an advanced figure.

CARBORUNDUM.

By E. G. Acheson.

The manufacture of carborundum in the United States during 1898 remained as heretofore in the hands of the Carborundum Company, of Niagara Falls, N. Y. The output for the year amounted to 795 tons, against 621 tons the preceding year. This increase was due entirely to more careful compounding of the crude materials and increased efficiency in the operation of the furnaces.

During the year a still farther reduction was made in the price of the grain product, the latest quotations being 10 to 12c.; the price on powders remained at 8c., as during 1897. About three-fourths of the production was in grains, the remainder in powders.

During the year the use of carborundum in grains and powders as a substitute for emery and corundum made decided advances. It has made a successful showing in all lines of work, with the single exception of belts, where the practice has been to mount emery with glue. The difficulty encountered in using carborundum in this field is the extreme sharpness and hardness of the particles, which causes them to be torn from the glue or cement mounting, as the result of the deep cuts they make in the metal being ground. Early in the year it was introduced into the granite mills at Aberdeen, Scotland. The polishers quickly appreciated its value as a substitute for emery, and at the close of the year they were ordering at the rate of about 2½ tons per month.

The sales of vitrified wheels during the year were over 50 per cent. greater than during 1897. Early in the year a very valuable improvement was made in the method of binding wheels and other forms of goods. Prior to January, 1898, the wheels had not proven a success when used for grinding tools, saws, and steel work generally, but the changes that were then made in the binder worked such a decided improvement that those now made for these particular purposes are, perhaps, the most successful of any produced. The change consisted in materially reducing the amount of bond (porcelain) and introducing iron, which at the temperature of vitrification fuses and combines with the porcelain, and at the same time chemically attacks the surface of the carborundum particles, causing a distinct and firm union of the mass, with the smallest amount of binder, thus producing a wheel of great strength and splendid cutting qualities.

An effort was made by the Carborundum Company to have the sandpaper and emery cloth manufacturers take up the manufacture of carborundum paper and cloth, and, while some of them were disposed to handle the product to a limited extent, the negotiations were not successful, and as a result a very extensive and complete factory for the spreading of carborundum on paper and cloth was added to the plant of the Carborundum Company. This department was put into operation about October 1st, and the company is extremely well satisfied with the venture. Thus far the work has been principally directed toward the introduction of the paper into the shoe trade as a substitute for garnet and ruby paper. At the close of the year many prominent shoe factories had adopted the paper, to the exclusion of the garnet, their results showing it accomplished about 2½ times the amount of work they could get out of the garnet paper, while the price was only about 60 per cent higher. A few experiments made with the paper in the wood-working trade have encouraged the company to believe that in the near future they will be able to secure a large portion of the trade in that line.

The use of carborundum in steel making was a subject of investigation by a number of steel manufacturers, and several of the leading steel casting companies have adopted it as a substitute for the ferrosilicon formerly used. There was sold for this purpose 110 tons during the year.

Experiments on the use of a non-crystalline variety of carborundum—known as amorphous carborundum—as a refractory lining for furnaces, and for the manufacture of refractory bricks, crucibles, etc., were very successful, and indicate that carborundum may prove a very valuable material for the uses of the furnaceman and metallurgist. This amorphous material is produced in the carborundum furnace simultaneously with the crystalline, but in those portions more remote from the zone of high temperature. It is the first step in the conversion of the crude material into crystalline carborundum, and when sufficiently heated changes into the latter form. Unlike the crystalline, it is not soluble in or chemically acted upon by molten iron, and, having been formed at an extremely high temperature (probably more than 4,000° Fahr.), is admirably suited for the purposes in view.

During the year a small factory was built in Niagara Falls, Ont., in which 200 electrical H. P. is used in the manufacture of carborundum, the current being supplied by the Canadian Electric Power Company. The plant was built by the Carborundum Company, of the United States, owning the carborundum patents in Canada. The company proposes to limit the work to the production of the crude carborundum and the crushing and sizing into the various grains, as required by the trade. The manufacture of wheels and other forms required by the trade has been arranged for with the Hart Emery Wheel Company, of Hamilton, Ontario.

CEMENT: PORTLAND, SLAG AND NATURAL ROCK.

The greatly increased demand for Portland cement in the United States in 1898 led to a depletion of stocks and taxed the domestic productive capacity to its utmost. At present the actual production is less than the current consumption and stocks are very small. The increase in consumption is attributable partly to the extraordinary requirements of the Government and partly to the extensive construction of buildings, dams, bridges and other large works. It is noteworthy that cement is taking the place of lime and mortar in a good deal of construction work. Notwithstanding the large increase in the domestic demand the importation of foreign Portland cement fell off from 2,787,760 bbls. in 1897, to about 1,700,000 bbls. in 1898, which shows the extent to which American producers now control the Portland cement business of this country. Of course, the existing conditions led to an increase in prices and American Portland cement ranged between $1.90 and $2.25 per bbl. in New York during the year. Imported cement sold at $2.10@2.25, against $1.90@2.10 in 1897.

The increase in the consumptive demand was a great stimulus to the industry and several new concerns were induced to engage in the business, while many of the older manufacturers made prepartions to increase their output largely. The Lawrence Cement Company began in October the erection of a large new plant at Siegfried, Pa.; the Coplay Cement Company commenced the erection of an additional plant, with a nominal capacity of 1,500 bbls. per day; while the Atlas Cement Company, at Northampton, Pa., made preparations to double its capacity and turn out 2,000,000 bbls. in 1899, adding 32 new kilns to its plant.

In the Middle West the Michigan Portland Cement Company is building plants at Coldwater and Quincy, Mich., and when these are completed it will have a nominal capacity of 3,000 bbls. per day. A new plant is contemplated by the Portland Cement Company of Utah, near Bedford, Ind., where cement will be made out of the Bedford limestone and the shale occurring near by; plans for this plant have not yet been fully matured, however. The Michigan Alkali Company, at Wyandotte, Mich., is erecting a plant of 450 bbls. per day nominal capacity to make cement out of the precipitated calcium carbonate which is obtained as a by-product from its causticizing tanks. The company has a supply of good clay on its own land. It has gone into the cement business chiefly with the view of getting rid cheaply of a troublesome by-product. The establishment of a cement factory at Athens, Mich., is contemplated and plans are said to be under consideration for one near Columbus, O. An important discovery of marl was made in and about Lake Maxinkuchee, in Marshall County, Ind., and it is said that a cement factory will soon be erected to utilize this. The works of the Peerless Portland Cement Company at Union City, Mich., were destroyed by fire in October. It is reported that the Dickinson Cement Company, of Chicago, Ill., will build works at Deer Park, near La Salle, Ill. The plant of the Chicago Portland Cement Company, at Hawthorne, Ill., which had just been reconstructed and enlarged, was destroyed by fire February 13th. New works have been built by this company at Oglesby, which were expected to be in operation January 1st, and have a nominal capacity or 600 bbls. per day.

West of the Mississippi River there are not many producers of Portland cement. There are works in South Dakota, at Yankton; in Texas at San Antonio and Austin; one at Los Angeles in California, and one in Utah. The last, belonging to the Portland Cement Company of Utah, was destroyed by fire May 31st, but the erection of a new plant was immediately undertaken and it was put in operation October 1st, 1898. The White Cliffs Portland Cement & Chalk Company's works at White Cliffs, Ark., have not yet been completed.

In British Columbia the Canadian Pacific Railway Company's works at Vancouver are to be increased to a nominal capacity of 1,000,000 bbls. per year. These works have an abundant supply of raw material, and although operated heretofore on only a small scale, have turned out a good quality of cement. With the great increase in output which is contemplated they will probably be a competitor for business all along the Pacific Coast.

Manufacturers of the best grades of American Portland cement claim that their product is now so high in quality that it is superior to any imported, and probably this claim is no idle boast. It is now recognized that chemical tests alone are not sufficient to grade a cement, but that mechanical tests of the finished product should be the criterion, though difficulties arise herein since experts differ in their methods. To obviate these one of the leading engineering societies is now formulating a uniform test.

Although 1898 was a prosperous year, 1899 is expected to be still better, notwithstanding the indications of a reduction in price, chiefly through the competition of the new producers. There is no danger to be feared from the competition of slag cement, although the manufacture of this product is increasing.

With respect to slag cement the Illinois Steel Company and the Pennsylvania Steel Company (Sparrow's Point works), were producers; while the Brier Hill Iron & Coal Company, of Youngstown, O., and the Clinton Iron & Steel Company, of Pittsburg, Pa., began the erection of works. All told, there were five producers of slag cement in the United States in 1898. One company in New York produces "silica cement," which is indeed nothing but Portland cement diluted with sand.

The natural rock cement business in the Rosendale District in New York did not increase in volume during the year, notwithstanding lower prices, which averaged about 65c. per bbl., New York delivery. At one time this product sold as low as 45c. at Rosendale, and 55c. in New York. In 1897 the average at Rosendale was 61c. per bbl. The motto of the Rosendale operators, "sell cement at a profit if you can, but anyway, sell cement," has proved quite demoralizing to the business. The production of the Rosendale District is estimated to have been 3,500,000 bbls., or about the same as in 1897. The competition of the Rosendale producers among themselves, together with the competition of Portland cement, the superiority of which does not outweigh the higher price, do not augur favorably for the future of the Rosendale District.

Natural rock cement business in the Illinois-Kentucky District was also demoralized in 1898. Early in the year the Western Cement Association, embracing 13 mills, which are allowed a quota of production, made a cut of 5c. per bbl. in order to crush the independent producers who had previously been disposing of their product through concessions in price. The business remained upset throughout the year, the price dropping to about 15c. per bbl., against an average of 40c. per bbl. in 1897. The low price stimulated production to the extent of about 200,000 bbls., and the total for the year is estimated at 1,700,000 bbls.

A large deposit of natural cement rock was discovered near Zaca Lake, in Santa Barbara County, Cal., and preparations were made to exploit it. Production from this source may be expected in 1899. A natural hydraulic cement of white color, which was formerly employed by the Spaniards, is now being dug at River Junction, Fla., by the Florida Cement Company, which has erected a plant at that point. The cement makes a useful wall plaster and also a good hydraulic brick. Tests of its tensile strength showed 240 lbs. per sq. in., after 30 days' heat, and 412 lbs. for 2 parts sand and 1 part cement, in 12 months. Exploitation was not begun until Autumn, so the production from this source was not important.

COAL IN 1898.

The total production of coal of all descriptions in the United States in 1898 reached the great figure of 208,952,502 short tons of 2,000 lbs., or 189,560,458 metric tons, valued at $210,396,253, or $1.11 per metric ton, being an increase of 8,692,878 short tons, or 4.3 per cent. over 1897, which had shown up to that date the highest production on record. The growth was general in almost all parts of the country. The Eastern anthracite production, it is true, remained nearly stationery, the figures for 1898 being almost the same as those for 1897, but the growth of the great bituminous industry was steady, if not so strongly marked as in some previous years. The trade was free from any extensive strikes or labor movements, and there was no such interruption as was enforced by the great Western strike of 1897, which lasted from early June until the middle of September. On the other hand, it was free from the rush of production which followed the close of the strike in 1897, and the output was much more uniformly distributed throughout the year. Unfortunately, disputes were not by any means absent. There were a number of small strikes, but no general stoppage of production, the disturbances being usually confined each to a limited district. The most important of these, or at least, that which attracted most attention, was at the mines in the neighborhood of Pana and Virden, in Illinois, where a disagreement over the mining rate caused the closing of the mines of several large companies. These operators finally decided to reopen their mines with labor imported from the South, and the result being an outbreak of violence, culminating in several deaths, some destruction of property, and the patrolling of the district by the State militia. Owing to the extraordinary and illegal course of the Governor of the State, a settlement has been prevented, and the whole affair still remains a source of irritation and trouble which may possibly extend through the State.

The values given in our table are in all probability somewhat too high. They are based as a rule on the reports of the mine inspectors, and these have always a tendency to give higher prices than were actually obtained, owing, of course, to the statements made them by operators—in which the universal human tendency to exaggerate profits. The actual price obtained for coal at mines, averaging the entire country, probably did not exceed $1.05 per metric ton.

The important Pittsburg District, in Western Pennsylvania, was the scene of a good many quarrels of a minor nature between the operators and the miners, but most of these were settled without a resort to strikes or lockouts. Other local disturbances occurred, but none of very great importance. Most of these troubles were the result of differences as to the interpretation of the Chicago agreement, which closed the great strike of 1897, and generally had reference to the differentials which that agreement allowed to different districts. There has been so much uncertainty in this respect that a convention has been called to formulate a new agreement and the delegates to this body will meet in Pittsburg during the present month. It is not easy to foresee the result, since there is a general disposition among the miners to ask for an increase in the mining rate, while the operators claim that they are not in a position to make any such allowance under the present conditions of trade.

Perhaps the real trouble is that the trade has grown too fast, the result being an excessive competition, which not only keeps the price down, but compels frequent stoppages and irregular working of the mines. In most cases the nominal mining rate is sufficient to pay the miner fair wages if his work is steady, but statistics show that in some important districts, such as Western Pennsylvania, Ohio, Indiana and Illinois, the miner is not sure of more than half time, and occasionally less, the consequence being that his yearly income is reduced to a point entirely insufficient for his proper support. The real remedy for this, of course, is a reduction in the number of laborers engaged in the industry, but just how to bring this about is an exceedingly difficult question.

The anthracite production as already noted shows hardly any change from 1897, notwithstanding the fact that sales of this description of coal in the Western cities were larger than for two or three years past. As in previous years the main market for this coal is in the cities along the seaboard and in the Eastern States, and principally for domestic use. As a steam coal the gradual process of displacement by the cheaper bituminous fuel continued during 1898. The conditions of the anthracite trade are fully treated below, as are those of the seaboard and Eastern bituminous coal trade.

The accompanying table gives the production by States in comparison with that of 1897. The month of December is necessarily estimated in most cases. In compiling these statistics we have used as a rule the figures furnished us by the coal carrying railroads, as it has been found by experience that these are not only the most accessible, but are also after all the truest measure of the production. In some cases the figures have been furnished us by the mine inspectors or other State authorities, but the railroad shipments have been the chief guide.

If we refer to the table we find that Pennsylvania still remains by far the largest producer of bituminous coal, and that it also shows the highest percentage of increase, the gain over 1897 having been about 15 per cent., while the production of bituminous coal was nearly two-fifths of that of the entire United States. This pre-eminence will be still further emphasized if we add the output of anthracite, as we then find the Pennsylvania furnished more than half of all the coal mined in the United States. The large increase in bituminous coal was due to the prosperity of the iron industry and the heavy demand for coal and coke which followed.

TOTAL PRODUCTION OF COAL IN THE UNITED STATES.
(In tons of 2,000 lb. Figures subject to revision.)

States.	1897. Tons.	1897. Value. Totals.	1897. Value. Per Ton.	1898. Tons.	1898. Value. Totals.	1898. Value. Per Ton.
Bituminous:						
Alabama	5,868,271	$5,164,078	$0.88	6,266,957	$5,326,913	$0.85
Arkansas	826,243	900,605	1.09	1,270,152	1,346,361	1.06
California	87,449	196,252	2.24	136,454	305,803	2.24
Colorado	3,501,543	4,690,068	1.34	4,174,037	5,426,248	1.30
Georgia	196,268	147,479	0.75	209,000	156,750	0.75
Illinois (a)	20,072,758	14,472,529	0.72	18,599,299	14,567,598	0.78
Indiana	4,228,085	3,382,468	0.80	5,404,266	4,700,111	0.87
Indian Territory (a)	1,334,795	1,801,973	1.35	1,458,098	1,895,527	1.30
Iowa	4,560,000	5,107,200	1.12	4,803,820	5,380,278	1.12
Kansas	3,672,195	3,931,707	1.07	3,500,000	3,850,000	1.10
Kentucky	3,283,702	2,429,993	0.74	3,189,779	2,328,539	0.73
Maryland	4,411,932	3,353,068	0.76	4,516,649	2,619,656	0.58
Michigan	152,850	215,518	1.41	175,000	245,000	1.40
Missouri (a)	2,429,388	2,684,757	1.10	3,178,730	3,148,862	0.99
Montana (a)	1,603,237	2,870,481	1.79	2,500,000	3,923,037	1.57
Nebraska	500	1,750	3.50	1,000	3,500	3.50
New Mexico	733,539	1,195,915	1.63	858,583	1,408,680	1.64
North Carolina	20,611	28,855	1.40	2,000	2,800	1.40
North Dakota	120,000	120,000	1.00	125,000	125,000	1.00
Ohio	12,465,533	9,847,771	0.77	13,721,000	10,029,075	0.75
Oregon	110,929	258,464	2.33	120,000	270,000	2.25
Pennsylvania	54,454,655	36,484,619	0.67	62,068,280	37,240,968	0.60
Tennessee	2,902,341	2,263,826	0.78	2,649,688	1,854,782	0.70
Texas	598,987	964,369	1.61	700,000	1,050,000	1.50
Utah	506,455	607,746	1.20	690,000	782,000	1.20
Virginia	1,418,746	879,622	0.62	1,555,000	1,010,795	0.65
Washington	1,489,815	3,322,287	2.23	2,028,139	3,500,000	1.72
West Virginia	13,762,133	9,751,392	0.65	15,085,000	9,051,000	0.60
Wyoming	2,744,969	3,431,201	1.25	3,050,000	3,812,500	1.25
Total bituminous { Sh. tons.	147,557,980	$120,505,982	$0.81	158,955,931	$125,311,783	$0.82
Total bituminous { Met. tons	133,864,599	.....	0.89	144,203,875	.....	0.90
Cannel:						
Kentucky { Sh. tons.	56,511	153,145	2.71	49,000	132,300	2.70
Kentucky { Met. tons	51,267	.....	2.98	44,444	.....	2.98
Anthracite:						
Colorado	64,097	150,628	2.35	64,000	150,000	2.34
Pennsylvania	52,581,036	85,707,089	1.63	49,883,571	84,802,170	1.70
Total anthracite { Sh. tons.	52,645,133	$85,857,717	$1.63	49,947,571	$84,952,170	1.70
Total anthracite { Met. tons	47,759,665	.....	1.79	45,312,139	.....	1.87
Grand total coal { Sh. tons.	200,259,624	$206,516,844	$1.03	208,952,502	$210,396,253	$1.07
Grand total coal { Met. tons	181,675,531	.....	1.13	189,560,458	.....	1.11

(a) Fiscal year.

Illinois continued the second producer in rank, although it was one of the few coal mining States which showed an actual decrease in 1898 as compared with the previous year. This decrease was partly due to labor troubles and partly to the increased use of Ohio and West Virginia coal in Chicago and other manufacturing centers. Some of it was also due to the increase in Missouri production and the larger shipments of Missouri coal to the city of St. Louis, which formerly drew almost its entire supply from Southern Illinois.

West Virginia was the third producer, furnishing about 10 per cent. of the entire bituminous output, and showing a rate of increase greater than that of any other State than Pennsylvania. The West Virginia production moreover has had a degree of importance in the Western bituminous trade which is even greater than its proportionate production. We have frequently called attention to the natural advantages which are possessed by the West Virginia operators and which, combined with the excellent quality of their coal, have enabled them to undersell any other Western producers. The West Virginia operator pays a lower mining rate than his competitors in any other State, but the miners generally have steadier work and are thus enabled to make better wages. The mines of the State continued at work as a rule all through the great strikes of 1897, and were thus enabled to secure a large amount of trade which had previously gone to Pennsylvania, Ohio and Indiana. Thus in 1897 and 1898 West Virginia coal became an important factor in the Lake coal trade and furnished a considerable amount of the coal which is shipped from Lake Erie ports to Michigan and Minnesota. The mines of the State were also enabled to secure a good deal of trade in Chicago and other Northwestern cities in competition with mines much nearer the point of consumption. Efforts have been made by agitators from other States to organize West Virginia miners, but usually without success.

The production of the Ohio mines shows an increase of about 9 per cent., notwithstanding the fact that some of the larger operators of the Hocking Valley District were compelled to shut down for several months, owing chiefly to the competition of West Virgina. This stoppage was compensated for by a period of great activity in the closing months of the year.

Of the other States east of the Mississippi, nearly all show a satisfactory gain, which was due in most cases to the increased demand for coal for manufacturing purposes, which was especially marked in the second half the year. West of the Mississippi the same conditions prevailed, and the mines of Missouri, Kansas and Iowa show a very fair production, though less change from 1897 than some of their Eastern competitors. On the Pacific Coast Washington showed a notable increase, but the output of Oregon and California remains small, no important new sources of production having been opened or discovered.

As in previous years, the exports and imports of coal were insignificant in comparison with the total production. For the ten months end-

ing with October, 1898, the exports were 1,134,279 tons of anthracite, and 2,648,392 tons of bituminous; a total of 3,782,671 tons, which is an increase of 761,505 tons over 1897. Nearly all the anthracite and a large part of the bituminous coal exported goes to Canada, a large trade existing between our mines and the towns and cities of Ontario and Quebec. The greatest part of the increase in exports, however, was due to the shipment of considerable quantities of Pocahontas and New River coal to South American cities, where an opportunity for the opening of this trade was given by the strike of the Welsh miners in England and the consequent scarcity of Welsh coal for export. The chance thus given for the introduction of our coal has been improved and will very probably result in increased exports hereafter, as its excellence, especially for steamship use, becomes fully appreciated.

The total imports of coal were only 1,076,888 tons for the ten months, showing an increase of 25,157 tons. Nearly all of these imports were on the Pacific Coast, most of them being British Columbia and Australian coal, delivered at San Francisco. A small quantity of Nova Scotia coal was brought to Boston, but not enough to make any difference in the trade.

The production of coke in Pennsylvania, West Virginia and Alabama was large in consequence of the activity of the iron trade in those and other States. A development in the coke trade, which is referred to elsewhere, is in the increasing number of by-product coke ovens, and in the tendency which is beginning to be apparent for iron-making plants to erect ovens of this class and make their own coke. We have referred elsewhere to the plants of this description recently erected at Ensley in Alabama and Benwood, in West Virginia, while a very large plant of the same district will be erected at the Lorain works of the Federal Steel Company, to supply fuel for the new blast furnaces there. An important movement of this description is also found in the very extensive works which the New England Gas & Coke Company is putting up at Revere, near Boston, which are intended to supply gas for heating and power purposes, as well as for illuminating to Boston and other New England cities. These works—which, by the way, will use Nova Scotia coal from the mines of the Dominion Coal Company in Cape Breton—will be closely watched and will very probably be only the first of a number of the same description should they prove financially successful.

The foreign coal trade will not show any very important changes in 1898, although in nearly all European countries the coal mines have been active. In Great Britain, notwithstanding the long strike of the Welsh miners, it is probable that 1898 will show a production of over 200,000,000 tons. Until the exact figures of production are obtainable it will be a little uncertain whether our own or the British production for 1898 has been the greater. In Germany, France, Belgium and Australia coal production in the first half of the year shows considerable increases, which have doubtless continued through the remainder of the year. There is no doubt that the world's production of mineral fuel in 1898 was the greatest ever known.

The Anthracite Coal Trade in 1898.

The product of the anthracite coal mines of Pennsylvania is shipped to New England, New York, New Jersey and seaboard cities south, and also to a belt of country running west from New York, along the Great Lakes as far as the Mississippi River. In New York, New Jersey and New England points, however, anthracite is largely a necessity for domestic use, but in the Western field it is more or less of a luxury, and consequently its consumption in that territory may fluctuate more than in Eastern.

The general course of the trade during 1898 resembled that of 1896 and 1897. The great railroad and mining companies that control the output of the anthracite region started the new year with better resolutions and stronger promises than in years before. They seemed to have a keen realization of the folly of mining more coal than the market can take at ruling quotations, and of going in for a high tonnage record, to make an impressive show of business, even though profits amount to nothing. Prices had been badly demoralized by such overproduction in the fall of 1897; the Reading, Lehigh Valley and Delaware & Lackawanna Companies being each given the doubtful honor of having knocked the bottom out of the market. The f. o. b. quotations at New York Harbor ports at the beginning of 1898 were: Broken, $3.40 to $3.50 per ton, egg $3.75 to $4, stove $3.85 to $4, chestnut $3.60 to $3.80. An advance of 15c. per ton was talked of at this time, but mild weather kept down buying and stopped the talk. The production for the month was 3,073,500 tons, though the companies at the beginning of the month had agreed among themselves that 2,500,000 was about all the market would take, and were to limit their output to that amount. The weather remained mild, but a cold wave in February stimulated buying a little. The companies then got together and made out a list of prices, at which they were to sell coal f. o. b. New York Harbor, net, as follows: Broken $3.50, egg, $3.75, stove $4, nut $3.75. The companies kept faith pretty well in restricting production, so that stocks by the end of the month were shorter than at the same time in 1897, and the month's output was but 2,762,000 tons, against the 2,500,000 estimated. March proved to be an unusually bad month, very mild weather keeping down demand, and rumors of cuts were heard. The companies decided not to get out a new list price, but kept the old circular throughout the year. The small sizes used for steam production, as had been the case in previous years, were higher during the winter, and in March pea was selling at $2.60 f. o. b. New York, and buckwheat at $2.25. The March output was 2,700,300 tons, as against the estimate of 2,500,000, making a total output for the first quarter of the year of 8,535,800 tons, as compared with the total estimated output by the companies of 7,500,000 tons.

April opened poorly, and the companies estimated that the market would not call for more than 2,000,000 tons. A cold wave in the middle of the month stimulated buying, and it was reported that circular figures were generally realized. The outbreak of hostilities with Spain and uneasiness over a possible interruption of navigation along the seaboard, that became almost a panic by the 25th, led to heavy buying in advance of the usual time for spring trade. The total output was 2,228,750 tons.

May opened with heavy shipments to seaboard points, contracted for during the war scare, while freight rates declined after the news from Manila. The companies' estimated output for the month was 2,000,000 tons, but owing to the heavy movement to the seaboard, the actual production was 2,399,900 tons. June trade was dull East, as the demand from seaboard points had been satisfied. Movements up the Lakes were heavy, as lake freights were low, a rate of 20c. a ton being named from Buffalo to Duluth, a distance of over 900 miles. Buying West was limited, however, by large stocks left on hand in Chicago territory by the mild winter. The total production for the month was 3,026,970 tons, against an estimated output of 3,000,000. Late in the month rumors of cutting among the companies were heard, and it was evident that only good management could keep the market up. The total production for the first half year was 16,191,420 tons, against an estimated production of 15,500,000, and the average net price f. o. b. at which the different sizes sold at New York is reported as follows: Broken $3.36, egg $3.64, stove $3.87, chestnut $3.60, pea $2.21, buckwheat $1.81, rice $1.55.

July saw demoralization begin. One or two companies which had large stocks at Western points, brought over from 1897, sold this rusty coal at very low figures, cutting the circular price at Chicago by $1. Other companies not only sold old coal at these figures, but made contracts to supply freshly mined at the same price. This action became general and prices fell down hard, to show no improvement for months, though representatives of the various companies met late in July and put prices nominally back by getting out a new list, with quotations at Chicago $1 higher. The July output was 3,768,400 tons, whereas the estimated quantity was 3,500,000. August and September showed larger sales, though the warm weather kept down buying in the East. In the West buying was active, but generally at the low figures made in July, the companies finding it easier to sell coal West than to restrict production at the mines. The August output was 3,783,300 tons and September 4,260,710; the estimated quantities being 3,500,000 and 4,000,000, respectively. By this time consumers at Eastern points realized that the year was to be a repetition of 1897, and that if they only waited, the companies which were removing restrictions on production would soon be offering coal at almost any figure, so buying at seaboard points remained light, while prices came down. The first cut was one of 25c., announced at New York by the Central Railroad of New Jersey; this was denied, but the report weakened the market. In October the cutting became general; it started openly at Boston. It had been going on for some time previously in New York, though not reported. As a result, prices fell rapidly, and by November 12th the top price for stove coal f. o. b. New York Harbor was $3.60, while much was selling for below $3.50. The other large sizes were correspondingly low, particularly broken, the market for which has been very much reduced during recent years by the competition of bituminous coal. The October output was 4,765,170 tons, as compared with the estimated quantity of 4,750,000. The total output for the nine months of the year was 28,003,830 tons, compared with the estimated output of 26,500,000 tons.

By the middle of November the companies had abandoned all thought of restriction on output and of maintaining prices, and coal was mined as fast as it could be shipped. A peculiarity of the fall trade was an unexpected scarcity of chestnut. This started in Chicago territory, where base-burning stoves are largely used in households, and where the low prices made in July, coupled with two good seasons for farm products, enabled many families to lay in supplies of anthracite as a luxury. In the East the market was saved from utter demoralization by cold weather setting in late in the month and at a much earlier date than in 1897. The total output for the month was 4,854,520 tons. December was an old-fashioned winter month and the consumption of anthracite was unusually large, so that in spite of the heavy movement from the mines, stocks at tidewater kept lower than at corresponding dates last year. Prices, however, were down, and early in the month were at the lowest of the year. The blizzard of November 28th, which destroyed so many coastwise vessels, interfered with shipments East, and as many dealers there had not laid in very heavy stocks, prices began to appreciate, and toward the end of the month an advance of 25c. in prices was announced at Boston. In the West the closing of Lake navigation and the continued good demand made prophecies of a short supply before spring, and prices also advanced. The improvement elsewhere and the continued cold weather finally affected New York, and at the end of the year an advance of 15c. or 25c. in circular prices was under consideration by the companies, with some prospect of going into force. The total output for December was estimated at 4,000,000 tons, and for the last half year 25,432,100 tons; making for the whole year 41,623,520 tons.

The average f. o. b. selling price at New York is reported as follows during the last six months of the year: Broken $3.20, egg $3.42, stove $3.64, chestnut $3.43, pea $2.10, buckwheat $1.77, rice $1.51; and for the last quarter: Broken $3.12, egg $3.29, stove $3.52, and chestnut $3.36.

It will be seen from this review that the trade was kept within satisfactory limits only by the unexpectedly heavy demand in the West, which absorbed so much coal during August, September and October, and by the coming of winter weather much earlier than usual. The big producing companies have again shown, in spite of all professions, that they are not yet prepared to stand together through a whole year and must still rely on causes beyond their control, such as the weather or a period of good times, to enable them to do business at a profit.

The year was free from labor troubles and interruptions of work at the collieries from dry weather. The only thing that kept down production during the first half year was the united action of the large companies. In June and July many collieries did not make over 5 days a month. With restrictions abandoned the companies generally made full time, and the mines during November and December were more busy than for several years.

The restrictions on production during the first half of the year and the consequent depressed state of business in the anthracite mining towns led to a movement among the Chambers of Commerce of several towns in the region to "do something" for anthracite. The movement

resulted in the formation of the Anthracite Association. This body, formed largely of men not coal producers, proposed to get lower freight rates for anthracite to New York and Philadelphia, to do away with alleged discriminations in freight rates shown by the railroad companies, and by thus cheapening transportation charges, lower the selling price and so increase consumption. The association has accomplished little, and when the collieries began to run full time its influence practically ceased. A number of the so-called independent operators of Scranton and Wilkesbarre, however, dissatisfied with present freight rates, have had surveyors in the field during the summer ostensibly surveying a line for a new road from Scranton to New York, to be called the New York, Wyoming and Western, and, it is stated, have taken an optional contract for some steel rails. Just what arrangements will be made about terminal facilities is unknown, and the whole project is still in a somewhat nebulous state.

Some changes are to be noted among the coal companies during the year. The reorganization of the Philadelphia & Reading was finally completed and the whole property passed under the control of the new Reading Company. The controlling interest in the New York, Susquehanna & Western Company passed into the hands of the Erie Railroad Company, largely increasing the latter company's interest in the anthracite trade. In December it was reported that Mr. Samuel Sloane had decided to retire from the presidency of the Delaware, Lackawanna & Western Company. This report has been confirmed, but it is not yet announced who will succeed to the position. In view of the large interest in that company now held by the Vanderbilts, it is not unlikely that a new man may be put into the position, and in that case we may hope for a very much needed reform in the management and methods of this company.

An event announced late in the year called attention to the changes in transportation methods that the anthracite trade has experienced. The Delaware & Hudson Company finally decided to abandon shipments by its canal from Honesdale to Rondout, built nearly 70 years ago. The company had been cutting down its canal shipments for several years owing to the loss made in breaking bulk twice, and the necessity of stocking coal and then hurrying it forward through the few months of canal navigation, so that this final action was not unexpected. With the closing of the canal came the announcement of a closer contract with the Erie for its Northern trade.

There have been the usual number of rumors during the year that the anthracite trade was to pass under the control of a single interest. It is true that the house of J. P. Morgan & Co., through its control of the Reading organization, its advances to the Lehigh Valley Company in time of necessity, and the addition to the anthracite interests of the Erie, now represents a very strong interest in the anthracite trade, but it is not yet a controlling one and is not likely to become so at any early date.

The Atlantic Seaboard Bituminous Trade.

The seaboard bituminous trade includes the coal shipped from mines in Central Pennsylvania, the Cumberland region of Maryland and West Virginia, the Pocahontas and part of the Kanawha District in the last named State. This coal supplies the territory tributary to New York Harbor shipping ports, Philadelphia and the shipping ports of Chesapeake Bay, including New England.

The main lines—that is, the roads hauling coal from the mines to the seaboard shipping points, advanced rates 15c. a ton early in the year, but this nominal advance was not maintained, secret rebates being given by roads which had offended in similar ways before. Trade during the first three months of the year was very quiet, and, in fact, dull. A slight improvement set in with the opening of spring, and the usual fall of vessel rates, the freight from Philadelphia, Providence, New Bedford and Sound points being down 65c. to 70c., and to Boston, Salem and Portland, 75c. to 80c. by April 1st. The contracts for the shipping season of 1898 were taken unusually early, most of them being out of the way by March. They were at prices about 5c. under those prevailing in 1897.

The declaration of war with Spain in April and the scare over the possible depredations of a Spanish fleet completely demoralized captains and vessel owners, and by the end of the month freights from Philadelphia to Providence and Long Island Sound ports were $1.10 @ $1.15, and to Boston, Salem and Portland $1.25 @ $1.35. The natural reaction set in after the news from Manila, and the demand for coal, which had been greatly stimulated by a fear of interrupted shipments, fell off. Freights gradually declined and business became limited to shipments on season contracts. The curtailment of manufacturing in the East also lessened the demand, with the result that by the middle of June trade was very dull, with freight rates from Philadelphia of 55c. to Sound points and 65c. to Boston, Salem and Portland, and 5c. higher from Chesapeake Bay ports. This dullness lasted throughout the Summer.

In October trade began to improve and vessel freights to climb up. It was announced at this time that the Atlantic Transportation Company had contracted to increase its fleet to 50 vessels, and in addition to its 3-year agreement with the New River Coal Company it would take business from other companies. Export business, which got a start as a result of the strike among the Welsh coal miners, jumped up as soon as all dangers from Spanish fleets were set at rest at Santiago on July 3d. A considerable number of vessels that had been in coastwise business took this South and Central American trade in preference, and export business remained good till into November. Coastwise freights rose slightly with the approach of winter. On November 28th came the great blizzard, which wrecked and disabled the coal-carrying fleet, over 40,000 tons of coal going to the bottom in Massachusetts Bay alone. Freight rates climbed up, especially to points in the Far East, and by December 10th $1 to $1.10 was paid from Philadelphia to Sound points and $1.25 to Boston and Portland, while the demand for coal remained heavy, particularly from Sound ports. The storm also bore heavily on miners, who had agreed to ship at certain figures throughout the year, and particularly on vessel owners that had very low all-the-year contracts.

Late in November the presidents of the soft coal roads got together and tried to arrange some agreement as to freights from mines to tide for 1899. The Baltimore & Ohio, which had long been an offender, under its new control promised to do better things, and the opposition to a satisfactory arrangement came from the Chesapeake & Ohio and the Norfolk & Western. The year ended, however, without any agreement settled.

The price of soft coal declined most of the year. In early summer quotations were: George's Creek at Baltimore, $1.75; New River at Newport News, $1.75; Pocahontas at Norfolk, $1.75; Clearfield at Philadelphia, $1.20 to $1.75; poor grades at New York, $1.50; best grades, $2.25. The prices declined slowly until by November coal was openly quoted 10c. less than these figures, and when late in the month the soft coal road presidents tried to patch up an agreement on freights for next year it was openly charged that one road which had insisted that its prices were not cut had made contracts extending over the next year at $1.47 at a Chesapeake Bay port. The subsequent interruption of navigation advanced prices for spot coal, and the year closed with prices about where they were at the beginning.

Generally speaking, the year was a good one. Soft coal continued to supplant anthracite, aided by the great difference in price. There was considerable complaint from some companies at the way in which freight rates from mines to tide were cut by secret rebates to favored parties, but this is an old grievance. The low price did not leave a large margin of profit to miners, but then it helped increase the consumption. The year was free from labor troubles.

The Alabama Coal Trade in 1898.

By Our Special Correspondent.

The coal mines and coke ovens in Alabama have been busy during 1898. The output at the many mines will be 300,000 or 400,000 tons larger than in 1897, and more mines have been opened. The war between the United States and Spain did not interfere with work at the mines, except in Walker County. The various furnaces remaining in blast kept up the demand for fuel, while the railroads increased their demand for coal, and at the last of the year it was impossible for the mining companies to even attempt filling orders as quickly as tendered.

The output for 1897 at the various mines in the State, as reported by the State Mine Inspector, amounted to 5,893,771 tons. It was estimated during the first of the year that the output this year would be about 6,000,000 tons. The average up to September 1st has been 513,543 tons per month. Taking this average as a fair one, the output for the year should be 6,162,516 tons, showing an increase for this year, as compared to the output of last, of 268,745 tons. In Walker County, the second largest producing county in the State, there was a decided falling off in production during May, June and July, when the mines only worked on about three-fourths time. The trade which has been worked up on the Mississippi River, between Greenville, Miss., and New Orleans, La., became very slack during those months. In Jefferson, Bibb and Tuskaloosa counties the mines kept at work, and since October 1st the mines in Jefferson County have been totally unable to supply the demand. New mines have been opened in several parts of the State. In Marion County the Aldrich Company, of Birmingham, is opening a large mine for the Illinois Central Railroad. The railroad is building a branch from a small station on the Kansas City, Memphis & Birmingham road to its mines. New mines are being opened in Jefferson County at Stockton, Cardiff, North Birmingham and other places, while an abandoned mine at Pratt City is again worked, a long haulage system having been put in..

The demand for coal has been great and it has brought a fair price. Unfortunately the railroads failed to stock coal ahead, and in the last few weeks have had considerable trouble in getting their needs supplied. Smaller customers in the last month or so have been refused fuel, and other districts have been sought by Alabama operators in order to hold good customers.

The coke ovens ran pretty steadily during the year. There was but little done, comparatively speaking, at the large battery of ovens at Ensley City, which were turned into a by-product saving plant. Consequently the amount of coke made this year will amount to about 1,246,524 tons, showing a loss of over 100,000 tons as compared to the output for last year.

THE CHICAGO COAL MARKET IN 1898.

By Our Special Correspondent.

Anthracite Coal.—Never before has Chicago experienced a worse year in the anthracite coal trade than the year 1898. It has been a year full of discouragements to the dealers in hard coal, trade having been slack and prices so low that profit was very small. The year opened with a limited business and prices rather poor. As the winter progressed a cold spell now and then would create an enlarged demand, but when the temperature got up, buying would slacken. The Summer months brought no improvement worthy of mention and it was not until Winter set in again that the market began to enlarge. In November buying was quite brisk for a time, but it was a forced dealing, due entirely to the fact that November weather was rather colder than usual. The market was fairly good during the brief remainder of the year, dealers having been forced to increase their lines through larger demand and the low price asked for hard coal. The months of November and December were characterized by a shortage of chestnut coal, which, toward the end of the year almost resulted in a famine in that size of coal. The receipts of anthracite coal by lake and rail were somewhat larger than 1897.

Prices on anthracite coal the entire year were very low. January opened with circular at $5.35@5.60. Gradually throughout the year declines took place until the low level of $4@4.25 was reached along in October, and until the close of the year there was but small advance, except on chestnut coal, which stiffened 25c. per ton because of shortage

of supply. Freight rates on hard coal by lake were never lower, but they were nearly even throughout the season, only increasing toward closing of navigation.

Bituminous Coal.—The market was rather inactive during the first six months of the year, but the remaining six months made up, bringing the year's total sales up to a very fair aggregate. The demand for soft coal used for domestic purposes has grown steadily, the year 1898 having surpassed all other years by far in the sales of the better grades of bituminous coal. The immensely increased business among the railroads, iron and other industries made itself manifest to the soft coal trade during the closing months of the year, an enormous tonnage of soft coal having been placed; so much so that for a time there were doubts as to the supply holding out. Scarcity of cars for carrying coal, the decreased hours of the miners for working, and again the fact that shippers were wholly unprepared for the tremendous business that poured in on them were the reasons why Chicago got so low in its soft coal supply in November and December. Prices on spot coal for the larger part of the year were low, but later on stiffened, and the months of October, November and December brought with them prices that permitted of fair profit. Freight rates from the bituminous coal fields did not vary much during the year, the railroads having maintained prices extremely well, though they are carrying soft coal cheaper to-day than ever before. The year 1899 will open up with excellent prospects for the bituminous coal trade. Not in years have conditions been so favorable, and it is to be hoped that, after years of very poor trade, we are to witness once again a market with good business and good prices.

The Pittsburg Coal Trade in 1898.

The River coal trade of Pittsburg was not very active during 1898. The disputes over the adoption of the Chicago scale for mining, interfered with production, while shipments were restricted by low water. There were no shipments made during June, July and September, and November shipments were very small. In all the River Districts, trade has been injuriously affected not only by these causes but by the continued active competition of the Kanawha Region in West Virginia, for the coal business of the cities on the lower Ohio and Mississippi rivers. This continued exceedingly active, and within the past year the competing elements have been increased by the shipments of Alabama coal from Greenville, Miss., to New Orleans.

In one respect, Pittsburg has had an advantage this year owing to the purchase by the Government of the Monongahela improvements. The slack-water navigation is now free from Pittsburg to the head waters of the river. This has not only been a benefit directly to coal shippers, but a large trade in both freight and passengers has sprung up on the river since the tolls have been removed. New lines of steamers have been established, and a large tonnage of supplies and general

SHIPMENTS OF COAL FROM PITTSBURG BY THE OHIO RIVER.

Year.	Cincinnati.	Louisville.	Total.	Year.	Cincinnati.	Louisville.	Total.
	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.
1883.....	1,261,320	2,258,480	3,519,800	1891.....	1,125,000	1,931,600	3,056,600
1884.....	985,240	1,232,040	2,217,280	1892.....	973,560	1,519,960	2,493,520
1885.....	1,303,600	1,693,360	2,996,960	1893.....	879,950	1,617,840	2,497,790
1886.....	1,329,160	1,537,406	2,866,566	1894.....	1,139,920	1,383,280	2,523,200
1887.....	830,800	1,438,920	2,269,720	1895.....	984,400	1,384,080	2,368,480
1888.....	2,053,560	2,340,520	4,394,080	1896.....	2,029,760	2,578,120	4,607,880
1889.....	1,214,400	1,515,800	2,730,200	1897.....	1,144,568	922,800	2,067,368
1890.....	1,304,640	2,042,160	3,346,800	1898.....	1,236,800	1,319,120	2,555,920

freight has been carried. The Government officers now in charge of the improvement have made improvements in the management of the locks, and other improvements are contemplated. The great point is that the mines in the pool along the Monongahela are now placed on equal terms with the West Virginia and Kentucky producers, so far as freights are concerned.

The accompanying table shows the shipment of coal by river from Pittsburg for 16 years; during that period the largest shipments were in 1896, and the next largest in 1888, while the lightest were in 1897 when there was a low stage of water almost all the year, and coal loaded in Pittsburg waited for months before a coal boat rise in the river came.

In the Railroad District, a fair business was done through the year, notwithstanding the great competition which had to be met from the West Virginia and Ohio mines. The lake shipments of coal, this year, were the largest on record, and Pittsburg secured a better share of them than was expected at the beginning of the year. It is evident, however, that a re-adjustment of the mining rate will be absolutely necessary to enable the Ohio and Pennsylvania miners to withstand West Virginia competition. Whether any settlement can be reached at the convention which is to be held early in January remains to be seen.

Already many Pennsylvania operators are preparing for the inevitable, and are securing tracts of coal land in West Virginia for future use.

The Lake Coal Trade at Cleveland in 1898.

By Our Special Correspondent.

The Lake coal trade was much heavier during 1898 than during the preceding year for several reasons. In the first place the operators were able to secure the coal needed, there being no labor disturbances at any of the mines supplying the trade. Occasionally during the season, however, there was a car famine, which inconvenienced the agents. The revised figures showing the total traffic for the district in which Cleveland is located will not be announced until early in 1899 by the collector of customs. The figures at hand on December 16th, however, when the season practically closed, indicated that the increase in the volume of business over the trade of 1897 was about 15 per cent. It is estimated that the gross tonnage of the cargoes shipped from ports in this district during the year was as follows: Cleveland, 252,740 tons, against 219,250 in 1897; Lorain, 215,000 against 195,000 in 1897; Fairport, 205,000 against 185,318 in 1897; Ashtabula, 875,000 against 751,289 in 1897. The prices fixed by the operators at the commencement of the season were rigidly adhered to and the operators are well pleased with the business transacted during the year. The strike of the summer of 1897 had interfered greatly with the coal supply, but the agreement entered into last spring by the miners and operators assured a stability to the business which was most gratifying. The prices of soft coal for the season, f. o. b. vessel at Cleveland, were: West Virginia, $1.25@1.30; Ohio, $1.35@$1.40; Pittsburg, $1.50@$1.60.

The coal freight rates were somewhat lower during 1898. The average daily rates for the season were: Ohio ports to Milwaukee or Chicago, 28c. per net ton; Ohio ports to Escanaba, 26½c.; Ohio ports to Duluth, 23c.; Ohio ports to Green Bay, 28½c.; Ohio ports to Manitowoc, 28½c. In 1897 the Escanaba, Duluth and Manitowoc rates were 3c. higher.

The average daily coal rates during the past ten years follow: Ohio ports to Milwaukee and Chicago, 48c.; to Escanaba, 39c.; to Duluth, 38c.; Green Bay, 42c., and Manitowoc, 40c. The averages for Green Bay and Manitowoc cover a period of only seven years.

LITHOGRAPHIC LIMESTONE.

There was a production of 112 tons of lithographic limestone in Utah in 1898. Some of this stone was sent to Chicago in the summer as an experiment, and later orders were received for regular shipments. It is believed that there is a future for this new industry. A deposit of lithographic stone which is believed to be extensive was opened near Brandenburg, Ky. At this place there are three strata; one 34 in. thick and the others 12 in. thick each. The quality of the stone is said to be good. Arrangements were made for opening a quarry, and some production is expected from this source in 1899. So far as we know there was no production in 1898 from the deposits of lithographic stone that have been opened in South Dakota and Arizona.

PETROLEUM.

Early in 1898 exports began to increase so rapidly that stocks in the hands of pipe lines had to be drawn upon, deliveries being in excess of runs. Speculators in former years were able to bull the price of oil under less favorable circumstances, and with this in view purchased heavily. Yet in 1898 the price failed to move upward, and in fact at one time in March petroleum sold in the West at 10c. per barrel more than in the East. By August stocks had been depleted 3,000,000 bbls., but notwithstanding this situation the price actually fell 3c. per gallon on exaggerated reports as to production in Russia. In the West prices had a steady upward tendency, with little fluctuation.

American petroleum has had a larger export demand than previously, and realized prices about 10 per cent. higher than any other in competitive markets, owing to its higher suitability for some purposes, especially as an illuminant, while the crude oil furnishes a larger proportion of refined oil per barrel and less asphaltic residuum. Less than one-third of the world's production of kerosene comes from Russia, while fully as much crude oil is used to produce it as to produce the make of American. Russian, Peruvian and Sumatran oils are of higher specific gravity than American, and consequently they do not so readily rise in the wick, nor are they burned so thoroughly. This is fully appreciated abroad, and is no doubt instrumental in holding back the legislation hostile to American oil which has been discussed. A combination formed by the Peruvian petroleum companies (English, German and Italian) to displace American oil in Chile proved abortive and disastrous to the combination, its oil being inferior in quality.

The conditions unfavorable to exploration and development of new oil territory in the United States at the beginning of 1898, especially in the Appalachian field, were weather, low prices, the absence of good wild-cat wells, and a certain conservatism which prevailed. The older fields were pretty thoroughly exploited, but extensions produced only low grade wells, with an unusual number of dusters, and where formerly an occasional good well in a new locality would renew actively such indications did not seem sufficient where much capital was involved, except in strictly new localities, such as at Scio, Ohio, in the Berea formation, where a new pool might reasonably be expected. In the last instance there was the usual rush and excitement. Oil was also found at Toledo and Athens, Ohio. The Sistersville field of West Virginia was extended across the river into Ohio, developing a number of good wells, mostly in the Big Injun and Keener sands. The lines of exploration have been extended in West Virginia, Northwest Ohio and Indiana. The Cudahy Brothers' pipe line, from Chicago to the Indiana field, was completed, and extensions into Ohio are now contemplated.

Toward the latter half of the year the prospects for increased output were more favorable in the Appalachian field, a large number of low grade wells coming in as producers and a considerable increase in the number of new holes and rigs being discernible throughout the field. Still the number of barrels per well was less than at the commencement of the year. In certain localities in the old fields the casing was removed from wells which had ceased to flow, and gave indications of oil in upper sands, but not sufficient at the time the wells were drilled to be deemed important. The returns from such wells have proved satisfactory, and in some instances at least their overhauling will prove a new source of supply in the worked out territory.

The only technical improvement in the Appalachian field in 1898 is the electrical apparatus patented by Mr. Flanigan, his object being to increase the flow of oil without recourse to nitro-glycerine. The apparatus is constructed on the theory that paraffin forms in the crevices of the oil rock, preventing the free flow of oil after a time, and to over-

come this the electric current is to be employed. There are not yet sufficient data at hand to state whether his aparatus meets all requirements.

Outside of the United States Appalachian field there has been a good deal of prospecting for petroleum in 1898.

Alaska is reported as having a promising prespect, oil having been discovered at Chilkat Lake and near Yakutat Bay. Information is meagre and to the effect that English experts are now examining the fields.

California has widened her oil limits, even into the ocean, at Summerland, where wells are driven 200 ft. from the shore. The California product is well adapted for fuel and lubricating purposes, yet it appears to be so abundant as not to find a ready market, a large surplus having accumulated in the past year. The output from all sources in California will not fall short of 2,750,000 bbls. for 1898.

Colorado's oil field, at Florence, seems to be at a standstill, and probably produced about 650,000 bbls., the same as last year.

Kentucky and Tennessee are both producing oil in a small way, the former at Otto Creek, near Somerset, and the latter in Fentress County. Pipe lines and refineries are contemplated under the management of the Interstate Petroleum Company. The wells are small producers, but promise to prove remunerative if the crude oil is refined near by.

Texas has at Corsicana an oil territory which is attracting considerable attention. Corsicana began the year with 50 wells, which, although not gushers, have held up remarkably well. By August the number had increased to 200, and by December more than 300, with a total production of 3,000 barrels daily were reported. Toward the close of the year the Mirus well, several miles distant from Corsicana, came in and flowed 20 barrels per day. The small number of dusters returned, and the wide extent of territory being explored makes the Texas field one of importance. Stocks are rapidly accumulating, local consumption being inadequate to meet with the supply. One of the particular features of this field is the absence of rock covering until the oil is reached, a matter which allows fast well drilling by the rotary system. Two wells are stated to have been put down 1,000 ft. in 32 and 30 hours, respectively Oil has been discovered near Dallas, Tex. The 25 old wells at Nacogdoches are being overhauled, although they flow less than 1 bbl. each per day. Sour Lake, Tex., is steadily being developed, and so far each well driven has tapped oil.

With respect to new developments in the petroleum industry abroad it is worthy of note that the resources of Mexico are now to be exploited. Mr. De La Bara, of the firm of Cheeswright, De La Bara & Fuber, has recently obtained a concession to develop the fields near Vera Cruz. Mexican and New England capitalists are interested in developing oil fields in Southern Mexico.

Pittsburg parties have found oil on Maintoulin Island, Ontario. As the island is an Indian reservation, arrangements were made, through the Canadian Government, to exploit the land, paying the Indians a royalty of 2½c. per gallon on all oil produced.

A matter of interest to the oil trade of Europe was the building of a large petroleum dock for handling Russian oil at Dantzic by the German-Russian Naptha Company. Statistics show that only a small percentage of American oil is used in Germany, 74 per cent. being Russian, while a large portion of the remainder is Austrian and Russian oil. Several large joint stock companies were contemplated in London, with the avowed purpose of controlling the Russian oil field, but none of these matured.

THE PHOSPHATE INDUSTRY IN 1898.

The operations during 1898 have been widely scattered, owing to the opening up of new deposits. In Florida, South Carolina and Tennessee miners have increased their shipments, and are exporting considerable rock, notwithstanding the competition of the Algerian and other foreign phosphates. An encouraging feature during the past year has been the better prices both here and abroad, and it is believed that 1899 will see a still further advance in this direction. On the other hand, the working of phosphate deposits is being prosecuted more economically, and the facilities of transportation are becoming more and more favorable to the producer.

Much the larger part of our exports is made up of high-grade Florida rock, but there is also a good demand for Tennessee and South Carolina. Our largest consumers abroad are found in Europe, especially in Germany. We have also shipped a considerable amount of phosphates to Holland, and some has gone as far east as Japan and Australia. In the case of Florida rock the exports from January 1st to November 30th, 1898, amounted to 334,708 tons, against 329,325 tons in 1897, and 291,540 tons in 1896. These exports were distributed as follows: To Continental ports, 196,585 tons, against 176,372 tons in 1897, and 148,022 tons in 1896; Baltic ports, 98,186 tons, against 95,646 tons in 1897, and 82,358 tons in 1896; United Kingdom ports, 27,959 tons in 1898, against 27,385 tons in the previous year, and 20,693 tons in 1896; Mediterranean ports, 11,978 tons, against 29,922 tons in 1897, and 39,467 tons in 1896. Prices for high grade rock have risen from about $5 to $9 per long ton, f. o. b. Fernandina, and land pebble is quoted at $5.50@$6, delivered in New York.

Concerning the South Carolina industry our special correspondent advises us that the entire year's business of crude rock and manufactured fertilizers has been a most unusual one for Charleston; the production of land phosphate rock has been very good indeed and has reached 249,000 long tons, and the consumption amounted to 185,000 long tons, 90 to 95 per cent. of which is high grade land rock. The consumption at Beaufort for several years past has been 10,000 to 15,000 long tons, and from this year's business it is estimated at 12,000 tons, doubtless all river rock. The shipments of South Carolina phosphate rock during 1898 amounted to 199,187 long tons. The exports were made largely through Beaufort, and were made principally to the United Kingdom, while some found their way to the continent of Europe and to Japan. The miners have been and are still very stiff on their asking prices of $3 to $3.25 for high grade kiln dried land rock, 60 per cent. bone phosphate of lime, guaranteed, although it runs about 62 per cent. A decline is in no way probable, but miners will hardly attempt to advance prices to any extent, as it would only invite competition from the higher grades of Florida and Tennessee rock. No quotations can be given on ground rock, as there has been no business done in it since the failure of the Wappoo Mills last spring. River phosphate rock, 55 per cent., guaranteed, but running 57 to 58 per cent., is offered at $2.80 to $2.90 alongside vessel at Beaufort. Local manufacturers have been pretty well supplied with phosphate rock at about the usual prices existing for some time past, $3.15 to $3.25 for high grade kiln dried land rock, delivered at their works, and two of our large manufacturers have made some satisfactory contracts for several years ahead. The large buyers of local plants have one contract for 200,000 tons delivered within the next five years at about $2.75 for one of South Carolina's best land rocks, and have also bought a large and good deposit of high grade rock and will soon start mining it themselves. They have also secured lease of another tract of a little lower grade, which is now being mined. And there are also pretty strong rumors of a very large deal with the owners of South Carolina's largest land rock deposit. The most unusual part of 1898's business was the large shipments of acid phosphate to the following ports by sail: Baltimore, 15,158 tons; Alexandria, 1,694 tons; Philadelphia, 460 tons; Norfolk, Va., 3,273 tons; Georgetown, D. C., 675 tons; Richmond, Va., 4,213 tons; total, 25,423 long tons, which reduced to short tons is 28,530, the heaviest ever known in the trade. Acid phosphate has been quoted at $5.75 to $6 cash for bulk, f. o. b. cars or vessels, at factory of sellers, for 13½ to 14 per cent., available phosphoric acid, and bagged and tagged for 13 per cent. goods, $7 to $7.25, f. o. b. cars or vessels as above, and ammoniated goods, 2½ per cent. ammonia and 2 per cent. potash, bagged and tagged as above, at $14.50 to $15. Very little, however, has been done in ammoniated goods and that sold up to date is due more especially on account of the increased planting of wheat in Tennessee, North Carolina and South Carolina in 1898, and Charleston has gotten its full portion of it.

In the Tennessee field there have been many changes in concerns as well as in operations, and promising new beds of phosphate have been uncovered during the year. Railroad facilities have been improved, and there has grown up quite an export demand for this article. The two producing centers in this State are Mount Pleasant, in Maury County, and Polita, in Hickman County. At the latter place the largest shipments were made by the Duck River Phosphate Company, and at Mt. Pleasant there are not only several large producers, but also many small miners. The chief shipping ports are at Centerville, Twomey's Switch and Aetna. The increasing demand has induced the miners to raise prices, from $1.45 per ton early in the year to $2.20 and $2.30 in December, f. o. b. Mt. Pleasant, according to quality.

In referring to the export business some mention should be made of the freight market, which is a very essential feature, and upon it in part depends the increased consumption of our rock abroad.

Freight rates for the latter part of the year were, from Tampa to Ghent, 20s., and to Yokohama, Japan, 50s.; Coosaw to Dublin, 19s., and to London, 18s. 6d.; Fernandina to Rotterdam, 18s. 3d.@19s. 6d. per ton.

Much the larger number of vessels chartered during the year were British, and were ordered abroad.

The investment of new capital in developing our phosphate industry has encouraged increased exploitation of new deposits, and as the year closes the situation is very encouraging and 1899 promises many good things.

Phosphate Rock in Tennessee in 1898.

By Lucius P. Brown.

In phosphates the year 1898 has been emphatically a favorable one. At the beginning of the year prices were little if at all improved over those which had prevailed for some time, and miners worked until about the beginning of the Spanish war on the same low margin of profit as for several years past. But the war, while interfering for a few weeks with coastwise and foreign shipments, seems to have posted buyers on the depleted stocks held by miners and the exhaustion of several mines in Florida which had been good producers. Almost from that time prices took an upward tendency and have been steadily improving since that time. The causes for this have been suggested above, but may be summarized as an increased demand for fertilizers due to the improvement in agricultural conditions abroad and at home and to the final exhaustion of stocks accumulated in Florida and Carolina during the period of depression. The reports from all three of the American fields at the end of the year are favorable. Carolina seems to be enjoying a demand which it has not experienced since the opening of the Tennessee fields, and there are complaints from Florida of some inability to fill orders. In Tennessee the miners have been very active, and the production of the Mount Pleasant District may be characterized as phenomenal. A considerable proportion of the production from this field is now being sent abroad. The most notable incident in the industry in this State is the appearance of Perry County as a shipper, although only a few hundred tons went out from there, and the development of the field is really still to come. This rock is of high grade, and if the extent of the field is proved considerable it will become a considerable factor in the market.

The outlook for 1899, both for phosphates and for fertilizers, seems very good. A great number of mines are sold ahead for the entire year, and those manufacturers who have made such contracts have reason to felicitate themselves upon their astuteness, for it seems that present prices will be maintained. While the low price of cotton may cut to some extent the consumption of fertilizers for that crop, it is possible that even in the South this will be more than made up by an increase in wheat acreage. In the Northwest, which is apparently that section of the United States in which the consumption of fertilizers is showing the most rapid growth, no diminution in the rate of increase of consumption is to be noted.

PYRITES.

By W. H. Adams.

The most important developments during 1898 were in the South. On the Virginia mineral belt the year was an unusually active one. The Sulphur Mines Company and the Arminius Chemical Company exceeded all records heretofore made for shipment of pyrites, and a new mine was added to the list of producers, which property lies between the lands of the two companies mentioned. The shipments made by these three mines during the year 1898 were fully 130,000 tons, and from present indications this should be exceeded for the coming year by at least 40,000 tons.

There are no new developments on the mineral belt, although there are rumors that several properties will be prospected early in the coming year, and many options have been taken of late on lands to the northeast of this section.

A notable change from the established methods of mining pyrites in this district will shortly be inaugurated at the Arminius mines, where a cableway nearly 500 ft. in length is just about completed and ready for the excavation and removal of over 1,000,000 tons of overburden, iron ore and pyrites from the main deposit of the company. The hoisting and removal of this enormous tonnage is to be done by electrically driven motors of new design, the successful installation of which promises to revolutionize the handling of heavy materials of this character under the peculiar existing conditions.

There is every evidence that combinations of capital and the centering of many outlying factories for the manufacture of sulphuric acid and fertilizers in strong hands (which has been noticed for the past twelve months) will result in a largely increased business during 1899, and thus establish the well earned position of these American mines of sulphur ores. There seems to be every prospect that within the coming year new sources of supplies in Newfoundland, Canada and the United States will enable producers to hold the markets they have already gained, as against Spanish pyrites, and to accept all new trade as offered.

On the present sale basis per unit of sulphur, American pyrites are sold at an average of about 7½c. per unit at the mines, and the freight rates to points of consumption average 3½ to 4c. per unit. At these prices foreign ores, which are sold on the Atlantic Coast at from 11 to 13c. per unit of sulphur, cannot expect to materially increase their consumption. With increased demand, there is every probability of stable prices, as quoted above, with some prospects of an increase in prices at inland points. Summing up the trade situation, 1898 has been a very satisfactory year, while 1899 promises to be the best one ever known since this industry was established.

The addition to the increasing consumption of sulphur in the manufacture of fertilizers, the refining of oil and our general chemical trade, the manufacture of sulphide pulp is coming forward so rapidly with so large a consumption of sulphur as to be considered an important factor in all future calculations. Besides this new demand for sulphur, the dynamite interests are very active at present, calling for a very large amount of strong acid.

SALT.

The domestic production of salt is obtained chiefly from New York, the Ohio Valley, Michigan, Kansas, Louisiana, Utah and California. Comparatively small amounts are obtained from Illinois, Nevada, Virginia, Massachusetts and some other States. In Massachusetts and California some salt is produced by evaporation of sea-water in lagoons. Rock salt is mined in Louisiana, Kansas and Utah, but by far the greater part of the American production is produced by solution in water, pumping from wells and evaporation by artificial heat.

California.—About 50,000 tons of salt were sold in California in 1898. This was produced chiefly around the bay of San Francisco. Prices declined from 12 to 30 per cent., and the trade is reported as never before in such a deplorable position. The reason for this situation is attributed to the change in the conditions under which the industry is conducted. Formerly the entire production was made by manufacturers under leases and contracts with the owners of the properties. These leases and contracts having expired, everybody who owns salt has gone into the business, and consequently the entire market has been demoralized. The salt making season in California begins about January 1st, earlier or later, according to climatic conditions, and lasts until November 1st. Refined salt (dairy and table) sold in 1898 at $4.25 per ton at the works. Coarse salt, or crude, as it comes from the evaporation ponds, was worth $1.25 to $1.85.

Illinois.—The production of this State was about the same in 1898 as in 1897. Prices were 10 to 12 per cent. lower. There were no new producers.

Kansas.—Reports from the largest producers indicate an increase of about 10 per cent. in the production of salt in the Hutchinson District in 1898 as compared with 1897. Prices ranged between 47c. and 60c. per barrel, including cooperage, which amounts to 25c.

Louisiana.—The Iberia Mines were operated in 1898 on about the same scale as previously. Plans are being made for a new mining plant with double the capacity of the present one. The entire product of these mines is rock salt.

Massachusetts.—The production was small, work being interrupted by rain, fog and mosquitoes. The product sold at wholesale at 28c. per bushel.

Michigan.—There was no material change in the salt business in Michigan from 1897 to 1898. If anything, it would be said that the product of 1898 moved a little more slowly than that of 1897. Some manufacturers reported a falling off in business owing to increased competition and lower prices. The net price of salt at Saginaw from January 1st to April 1st was 52c. per barrel. In May it fell to 47c., and in June to 42c.; in July it rose to 43c. These prices include cooperage, which amounts to 15c. There was an increased production of salt by the alkali manufacturers, corresponding to the increase in the production of soda products.

New York.—Indications are that the production of salt in the Warsaw District was less in 1898 than in 1897. In the Onondaga District, apart from the wells of the Solvay Company, whose product is used for the manufacture of soda ash, the production is no longer of any consequence in the trade. In the Warsaw District agricultural salt sold at $1.50 per 2,000 lbs.; common, fine, and coarse at $2.30; dairy and table salt at $2.90. These prices are about 50c. per ton better than in 1897. Elsewhere in Western New York common fine salt sold at 55c. per barrel on January 1st, advanced to 60c. in February, and later to 70c., which remained the current price throughout the rest of the year. These prices include the cost of cooperage, which varies from 20c. to 25c. per barrel.

Ohio Valley.—There was little change in the salt business in this district in 1898, except an advance in prices, owing to a better demand. Prices, which in 1897 ranged from 50c. to 65c. in 1898 settled at 65c. a barrel.

THE SLATE INDUSTRY IN 1898.

General Business Conditions.—The demand for roofing slate for home consumption during the year 1898 was somewhat more than for 1897, and the export trade has been very gratifying to quarrymen. The uncertainty preceding the war with Spain was responsible to some degree for retrenchment in building operations, which lessened the call for structural slate. Following the depression in business, stocks of roofing slate began to accumulate, resulting in shading of prices and keener competition among quarrymen for what business was offered. As the year advanced prices became more demoralized, and in August the Vermont Slate Company, better known as the "Sea-green Trust" in

THE LIST PRICES PER SQUARE FOR NO. 1 ROOFING SLATE OF STANDARD BRANDS.

F. O. B. quarries. For exporters' use we have added the number of squares and weight per mille.

Size in Inches.	No. Pieces in Square with 3-inch Lap.	No. Squares per Mille. 1,260 Pieces.	Estimated Weight per M. 1,260 Pieces.	Monson or Brownville.	Bangor.		Bangor Ribbon.		Albion or Jackson—Bangor.		Lehigh.	Peach Bottom.	Sea Green.		Unfading Green.		Red.	
		Sqs., Ft.	Cwt.	1898.	1898.	1897.	1898.	1897.	1898.	1897.	1898.	1898.	1898.	1897.	1898.	1897	1898.	1897.
24x14.....	98	12.86	74	$6.10	$3.50	$3.50@$3.85	$3.00	.....	$3.25	$3.40	$3.50	$4.85	$2.50@$2.90	$3.25	$4.50	$3.50	.....	.....
24x12.....	115	11.03	63	6.60	3.50	3.50@ 3.85	3.00	$3.00@$3.25	3.25	3.40	3.50	5.00	2.60@ 2.90	3.35	4.50	3.50	.....	.....
22x12.....	126	9.97	57	6.60	3.60	3.60@ 4.10	3.00	3.00@ 3.50	3.25	3.70	3.50	5.00	2.60@ 2.95	3.35	4.50	3.50	.....	.....
22x11.....	157	9.15	52	6.50	3.60	3.60@ 4.10	3.10	3.00@ 3.50	3.25	3.70	3.75	5.00	2.75@ 2.95	3.45	4.50	3.75	.....	.....
20x12.....	141	8.92	51	6.90	3.60	3.60@ 4.10	3.10	3.00@ 3.50	3.25	3.70	3.75	5.00	2.60@ 2.95	3.35	.....	3.75	.....	.....
20x10.....	170	7.43	43	6.80	4.25	4.25@ 4.60	3.35	3.25@ 3.50	3.50	4.00	3.80	5.10	2.75@ 2.05	3.45	4.80	4.00	$10.50	$11.00
18x12.....	160	7.88	45	6.80	3.60	3.60@ 4.15	.....	.....	3.25	3.70	.....	5.00	2.60@ 2.95	3.35	.....	3.50	.....	.....
18x10.....	192	6.56	38	7.20	4.25	4.25@ 4.60	3.35	3.25@ 3.60	3.50	4.00	3.80	5.10	2.60@ 2.95	3.45	4.80	4.00	10.50	11.00
18x9.....	213	5.91	34	7.10	4.40	4.40@ 4.90	3.35	3.25@ 3.75	3.50	4.00	3.80	5.10	2.60@ 2.95	3.35	5.00	4.00	10.50	11.00
16x12.....	185	6.83	39	6.80	3.60	3.60@ 4.15	.....	.....	3.25	3.70	.....	.....	2.50@ 2.90	3.15	.....	3.50	.....	.....
16x10.....	222	5.69	33	7.10	4.00	4.00@ 4.50	3.25	3.25@ 3.75	3.50	4.00	3.80	5.00	2.50@ 2.90	3.15	.....	4.00	10.50	11.00
16x9.....	246	5.12	29	7.00	4.25	4.25@ 4.75	.....	.....	3.50	4.00	3.80	5.10	2.25@ 2.85	3.00	5.00	4.00	10.50	11.00
16x8.....	276	4.55	26	7.20	4.25	4.25@ 4.75	3.25	3.25@ 3.75	3.50	4.00	3.80	5.10	2.25@ 2.85	3.00	5.00	4.00	10.50	12.00
14x10.....	262	4.81	28	6.60	3.60	3.60@ 4.15	3.25	3.25@ 3.60	3.25	3.70	3.75	.....	2.25@ 2.85	3.00	4.80	3.75	10.50	11.00
14x8.....	327	3.86	22	6.50	3.75	3.75@ 4.25	3.25	3.25@ 3.60	3.25	3.85	3.40	4.85	2.20@ 2.45	.....	5.00	4.00	10.50	11.00
14x7.....	374	3.37	19	6.40	3.90	3.90@ 4.25	3.25	3.25@ 3.60	3.25	3.85	3.40	4.85	2.15@ 2.20	.....	5.00	4.00	10.50	11.00
12x8.....	400	3.15	18	5.50	3.25	3.25@ 4.00	.....	.....	3.25	3.40	3.25	4.60	2.15	.....	4.00	3.25	9.00	9.75
12x7.....	457	2.76	16	5.00	3.25	3.25@ 3.75	.....	.....	3.25	3.40	3.25	4.60	.....	.....	4.00	3.25	9.00	9.75
12x6.....	533	2.37	14	4.80	3.25	3.25@ 3.75	.....	.....	3.25	3.40	3.25	4.60	1.95	.....	4.00	3.25	8.50	9.75
Av. price..	.....	.....	.....	6.50	3.76	4.00	3.19	3.24	3.33	3.73	3.42	4.93	2.34	3.26	4.63	3.71	10.08	10.77

In Brownville and Monson delivery quotations can be had somewhat lower than above, which is also true of other brands. No. 1 Bangor are 50c. extra when full $\frac{3}{16}$ in. thick. Purple sizes run 24x16 to 10x9 in., and vary from $3.75 to $4.00 per square, against $3.25 to $4.50 last year. Variegated and mottled are the cheapest roofing slates at $1.75 to $2.90 per square, according to size. Intermediate sea green, sizes 24x14 to 18x10 in., $2.25; 16x12 to 16x10 in., $2.10; 16x9 to 14x8 in., $2.00 per square.

In the table above where 1897 prices have been omitted it means that they varied little from 1898. The good export demand for unfading green roofing slate has raised prices in 898. Within the past twenty years prices have diminished greatly, and sales in 1898 have been made at considerably less than the list prices.

Vermont, had to go out of business, owing to dissension among its members. Fully one-third of the slate held by the trust was owned by Norton Brothers. When a disagreement arose between the members prices became unsettled, and cuts of 60c. and over were made on sea green and intermediate green slate. Efforts were made to start a new association among the smaller quarries, without success; instead, operators reduced wages, and some closed down altogether. Such a break in prices caused the Pennsylvania quarrymen to follow suit, some closing their quarries, and in the last quarter of the year dealers in the East were able to purchase quantities of various sizes and kinds of roofing slate at very low prices; so much so, that we are unable to give the

actual selling quotations. We give below what are known as list prices. Probably the only slates that held any way firm in price are "Red" and "Unfading Green," but these are modified by discounts of all kinds. For the former a fairly good demand existed all through the year. The stock of unfading green slate now on hand is considered quite large, though the export market is taking much of it.

The Bangor Roofing Slate Manufacturers' Association, which was formed about four years ago, has a membership of 12 of the leading producers of roofing slate in the Bangor region. It is not a pool, nor does it endeavor to control the business of its members; it only guarantees the genuine Bangor roofing slates, and on each lot sold the members append its certificate. The business of the association within the past four years is best shown by the following number of squares of roofing slate which it marketed: Domestic, 150,000 squares, against 139,600 squares in 1897, 136,700 squares in 1896, and 102,700 squares in 1895. Exports, 75,000 squares in 1898, 50,820 squares in 1897, 8,330 squaress in 1896, and 2,870 squares in 1895. The totals were 225,000 squares in 1898, 190,420 squares in 1897, 145,030 squares in 1896, and 105,570 squares in 1895.

As the year closes a revival in building operations and a good export demand exists, and prospects for the quarrymen are encouraging.

Mill stock with few exceptions ruled quiet throughout 1898, and prices were not very satisfactory. In slate for electrical purposes the demand has improved, owing to its excellent non-conducting qualities, and some good sized orders have been booked. Blackboards yielded a comparatively small profit to the manufacturer. Early in the year blackboards were quoted at 10c. per square foot for 3 ft. wide, 11c. for 3½ ft. wide, and 12c. for 4 ft. wide, while in September they were 1c. higher for all sizes. School slates were in demand for export, while at home a curtailment in sales was manifest. Marbleized slate has rather gone out of fashion, but an increased export trade has been done during the year. It is difficult to quote on mill stock, as much of it is sold according to specification. For plain work, such as 12-in. tile and treads made from red slate, makers quote for 1 in. stock 40c. per square foot, and for 1½ in. stock, 60c. Manufactures of any other colored slate are quoted comparatively cheaper. Marbleized slate valuations depend upon workmanship, size and shape.

Ground slate is used in making up certain roofing paints, as a backing for oil cloth, as a filler or first coat in some outside painting, and to a small extent for the same purpose in coach painting. This article comes in five colors, green, red, olive, slate and dark brown or drab. The ground pigment is mixed in oil by the buyer. It is said that this makes a durable paint, but it consumes much oil in grinding. For the red and olive ground flour $7.50 per ton is asked in carload lots.

It is suggested that waste and broken slate could be utilized by grinding and making into bricks. A mill for making bricks of this character was in successful operation some years ago at Phillipsburg, N. J., and readily disposed of its entire product, but it was burned down, and for some reason has never been rebuilt.

The manufacture of slate pencils has been neglected in this country, owing to the low cost of the German soapstone pencils. Some years ago a slate pencil factory existed in Vermont, and there were a few quarries in Pennsylvania that produced a suitable slate for this purpose, but the venture has been found unprofitable.

Export Trade.—This branch of the American slate industry has made excellent progress within the last few years, and so rapidly has it grown that our exports in 1898 show a very large increase over any twelve-months' on record. It is estimated that fully 290,000 squares of roofing slate were exported in 1898. At first 90 per cent. of the slate exported went from New York, but now shipments are made also from Philadelphia, Baltimore, Newport News and Boston. New York, however, still sends forward nearly 70 per cent. of the slate exported.

This export business had its opportunity in the labor troubles in Wales. Although the Welsh quarries have resumed operations, and are making strong efforts to shut out foreign slates, American exporters are pushing their trade, even establishing a stock yard in London where their slates may be displayed. They are also selling on the Continent and in the East, and only a short time ago a New York merchant went to South Africa to build up a market for roofing slate there.

UNITED STATES SLATE EXPORTS.

Month.	New York.		Other Ports.		Total U. S.	
	1897.	1898.	1897.	1898.	1897.	1898.
January	$39,366	$86,480	$10,344	$20,358	$49,710	$106,838
February	36,316	50,482	29,824	30,394	66,140	80,876
March	37,622	91,885	16,174	31,666	53,796	123,555
April	58,125	73,698	33,861	24,165	91,986	97,863
May	87,821	112,285	36,628	24,910	124,449	137,195
June	56,340	97,050	22,139	34,956	78,479	132,006
July	72,075	93,533	39,098	30,599	111,173	124,132
August	103,698	80,305	24,119	45,743	133,817	126,048
September	93,059	93,751	49,417	32,931	139,476	126,682
October	71,354	79,928	46,873	26,415	118,227	106,343
November	55,230	75,220	24,488	20,000	79,727	95,220
December	76,329	62,302	22,353	30,000	98,682	92,302
Totals	$790,344	$996,923	$355,318	$352,237	$1,145,662	$1,349,160

The exports from the United States in 1896 amounted to $515,058, and in 1895 to $84,599.

Our exports consist mainly of the larger sizes of roofing slate, and in many cases of the heaviest. We also sent abroad much rubbish slate which is used for building foundations and wall partitions, acting as a damper. Mill stock has also been shipped, but manufacturers are reticent about their foreign orders. School slates find a small market in the East.

Of late methods of transporting slate have been improved, and more care is exercised in handling it, resulting in a smaller percentage of breakage, and a material saving to the exporter. The leading shippers have their own stevedores at the port of shipment, who superintend the loading of the slate on the vessel.

Prices on export slate have been somewhat less during 1898 than in 1897, owing to the competition among quarrymen. Efforts have been made to remedy this situation by forming an association of the exporters but nothing has yet come of the matter.

The largest exports were made to the United Kingdom, where increased building operations demand a supply of slate. London received most of our roofing slate. There have also been several shipments of mill stock to Great Britain in the form of slabs, but the larger part of the exports were in roofing slate.

Australasia is the second largest consumer of American slates, and of the five Colonies to which we have sent roofing slate Western Australia stands foremost. The next in importance is New South Wales, wherein Sydney imported all the slate.

In Germany the demand is principally for small sized slate, and the largest quantity is imported by the city of Hamburg, with Bremen second, and Stettin third. In Denmark they desire large slates, and so far we are shipping to only one port there—Copenhagen—which is buying a fair amount of roofing slate and some mill stock. In Norway the city of Christiania received some slate from the United States, and in Sweden, Gothenburg. In Holland, Amsterdam received a few lots of roofing slate. Antwerp, in Belgium, is a fair market for our slates, and some slabs have gone there.

South Africa is a buyer of school slates, and occasionally a small lot of roofing slate is sent to Natal or Cape Town. Efforts are being made to introduce roofing slate there. India for several years has been receiving some school slates. China has been a purchaser within the past year, the city of Hong Kong taking a lot of school slates.

South America, though it has taken slate only in small quantities, but a market for our product can be cultivated there. Central America and the West Indies have shown some demand, the principal importer being Kingston, in Jamaica.

Canadian territory has not been worked as actively as might be expected, but slate manufacturers have sent their goods to St. John's, in Newfoundland, and to Halifax, in Nova Scotia.

The exports of roofing and manufactured slate from New York during 1898 were the largest on record, amounting to fully $200,000 more than in 1877, when they were $714,709. During the past twenty-two years this trade has shown many changes, dropping to $94,737 in the year ending December 31st, 1883, and to $19,684 in the fiscal year ending June 30th, 1894. In the calendar year 1897, however, these exports reached the large sum of $790,344, and in the present year they amount to considerably more. The majority of the slate sent abroad since 1876 was for roofing purposes, although mill stock played a part also in our export trade. This mill stock consisted largely of slabs, although there were fair sized lots of mantles and similar manufactures. Among the first American quarrymen to form connections abroad was the firm of John Galt & Son, and to-day there are many others who are exporting large quantities of slate. Mr. Charles A. Morrison within recent years is representing a German export house, besides having connections with Englishmen who have become interested in the American slate industry.

Competition among exporters of roofing slate particularly has become very keen. The average price of the quality of roofing slate exported is about $2.50 per square at quarry in Pennsylvania, and allowing 12s. 6d. for ocean freight, the cost in London has been as follows, allowing 3½ squares to the long ton:

	U. S.	Sterling
Slate at quarry, per long ton (2,240 lbs.)	$8.75	36s. 6d.
Freight to New York	2 75	11s 5d.
Ocean freight	3.00	12s. 6d.
Unloading, storing, etc	1.44	6s. 0d.
Total	$15.94	66s. 5d

The present price of Penrhyn second quality, 20 by 10 in., roofing slate at the shipping point in Wales is 142s. a thousand (about seven squares of American slate). This would make the cost of Welsh at the quarry 9s. more per thousand than an equivalent quantity of American in London. Nothing has been said of the freight on the English railroads for the Welsh slate, as to all points except in a small district the rates from London would be nearly the same as from the quarry. Our export business, therefore, depends greatly upon the ocean freights, which are variable and may cancel the present advantage at any time, or may increase it.

Freight Market.—It is the custom of exporters of slate to make contracts with transportation companies direct or through freight brokers for vessel room for periods of six or twelve months ahead at a stipulated figure and for a certain amount of space each month. For many years steamship companies would not permit exporters to ship roofing slate in bulk, requiring it to be put in crates, an extra expense to the shipper. Only after long discussion would the steamship companies allow roofing slate to be sent forward in bulk. To-day a large proportion of the slate exported is used as ballast in cotton vessels and others carrying light freight. Freight rates at the opening of the year were rather strong. Contracts were made in the first quarter of the present year to London at 12s. 6d. At the opening of the second quarter the movement of slate began to increase, and in June steamship companies were asking 15s. 6d. freight to London on spot business. There was some difficulty from the war for the Atlantic Transport Company, which handles much of the slate shipped abroad, sold seven of its vessels to the Government. Early in July a freight rate to London on contract could have been secured at 10s. 6d., and at 12s. 6d. to Newcastle and Manchester. In August trade at New York fell off somewhat, gaining at other ports, while spot Newcastle freight was given at 17s. 6d., and 15s. to London. For Stettin, Germany, the freight rate was 17s. 6d. from New York. September opened with a little better feeling in shipping circles, but freight rates were about the same, only that a shipment from New York to Cork, Ireland, was made at 18s. The shipments from New York in October were being curtailed owing to the increasing movement of merchandise and the rising ocean freight rates. Steamship companies were firm in asking 15s. for prompt shipments to London, although a few contracts were bid on at 12s. 6d. to 13s. 9d.,

the latter figure being beyond the expectations of the exporters. Newcastle spot business ranged from 15s. to 20s., according to the time of shipment and amount of space available on the outgoing steamer. A few orders were booked for Newcastle for six months' time at something less than quoted above. Liverpool room was offered in October at 17s. 6d., and the same rate was asked to Bremen, Germany; while to Copenhagen, Denmark, 20s. ruled. Competition between the steamship and sailing vessel concerns was instrumental in reducing the freight rate to Melbourne and Sydney to 10s., which is much less than has been asked to London, notwithstanding the greater distance. From this 10s. freight a 10 per cent. rebate is allowed, while to the United Kingdom and Europe the rebate is only 5 per cent. November is always an irregular month for shippers, and usually considerably less is done in exports. During that month nearly all the freight room was taken by grain, cotton and similar merchandise. Spot business to London was quoted from 15s. up to 20s., and contracts were offered at 13s. 9d., while exporters were reluctant to accept. Newcastle freight ranged from 16s. up, and to Liverpool 15s. was asked for prompt shipment. South African business was quoted at 22s. 6d. to 23s. to Natal and Cape Town, principally. As the month closed there was an easier feeling in freights, and suitable room is obtainable to many of the foreign ports.

ELECTRICITY IN MINING IN 1898.

The extent to which the use of electricity as a motive power in the factory, shop, mill and mine, as well as in the transmission of power over long distance, has been put is hardly realized by those not directly brought into contact with the manufacturing side of the electrical industry.

It is hardly more than seven years ago that special departments were tentatively established by electrical manufacturing companies for the purpose of essaying a new field—that of the application of electricity as a motive power in other directions than in that of the street railway. Misgivings were many as to the success likely to accrue from the efforts, but the widening use of the trolley and the electric light was pointed to by the believers in the necessity of electric power in the manufacturing and mining industries, and predictions of ultimate success outweighed the incredulity of the less hopeful.

With direct current systems only to fall back upon, the propaganda did not meet with the encouragement expected. The limitation of distance in the possible transmission confined the use of the direct current within restricted bounds, and while the direct current motor was almost as perfect a machine as could be manufactured, it had certain shortcomings, which in cases rendered it unsuitable. The alternating current, while it facilitated transmission, was weak in its motor side, and thus one system gave excellent generation and utilization, but poor transmission, while the other gave excellent generation and transmission, but poor utilization. With the introduction of the multiphase system and the induction motor many of the major difficulties disappeared, and for the first time was given to the world an ideal system of electrical generation, transmission and utilization. The field of electrical employ was immediately widened, while missionary work among miners, manufacturers and others was shorn of many of the difficulties it had before encountered.

Early in 1893 the first important multiphase transmission plant was installed and operated. Since that date multiphase installations have been made with constantly increasing rapidity, while the use of the direct current or combination of both direct and multiphase systems have also shown a gratifying growth. Starting with comparatively low voltages in generation and transmission, and short distances, both pressure and distances have been increased, until to-day even electricians most skilled in the art hesitate to set limits to the use of any voltage, however high, or transmission over any distance, however great. As electrical pressures are increased, so is the strength of the insulation to withstand them and the apparatus to transform, convert and utilize them. As the apparatus is perfected and the factor of safety is increased, the popularity of electricity as a motive power becomes wider and wider, and while the rational being refrains from sanguine prophecy, the prediction of electricity as the universal motive power seems warranted if based on figures attainable.

The progress of electrical work in mining operations during 1898 was marked, and new plants of this description were constructed and put in operation in many mines, both in the East and in the West. These included coal cutting plants of all descriptions, haulage plants, hoisting and pumping, and in fact power of every description.

Perhaps the most important extension of electrical work has been for the production of bituminous coal, and in this class of mines the principal types in use have been undercutting, shearing and long wall machines. In the majority of our bituminous coal mines the methods of work are best adapted to the use of the undercutting machines, the method of mining usual with this machine being by room and pillar. Shearing and longwall machines are comparatively new types and are so far in use to a somewhat limited extent, although the shearing machine is finding an extended place. The longwall machine is at present in use in only a few localities, as this method is not by any means in so general a use in our bituminous coal mines as others, and moreover it requires a carefully arranged system of wiring for the transmission of power to the separate motors.

In the metal mines of our Western States the use of electric power has also made rapid advances. The ease with which power can be transmitted within certain limits has led to the utilization of many water powers for the operation of dynamos, from which the current can be transmitted to the mills where it is needed. In the West electric power is used for the operation of every kind of machinery, pumps, hoists, stamp mills, concentrators, and in fact machinery of all kinds. The peculiar advantages of a central power station in a district where there are many small mines have been realized in one or two instances, the central plant selling power to its customers at a lower rate than they can furnish it for themselves, and saving them also a considerable investment of capital and reducing their cost for labor.

An important development during the year has been the use of electric power for haulage in coal and other mines, which has increased at a rapid rate. Some new types of electric locomotives have been introduced which have found much acceptance.

No new developments in practical work have been made in the use of electricity in drilling. The defects which are apparently inherent in all the forms of the electric drill so far brought forward have not yet been fully overcome, and in this branch of mining work compressed air has fully maintained its superiority. Toward the close of the year, however, the Siemens-Halske Company, of Chicago, made arrangements to introduce some of its Meissner electric drills at the Silver Lake Mine in Colorado. Much is expected of this drill and its operations will be watched with a great deal of interest.

One of the best types of central station plants installed during 1898 was that of the Colorado Electric Power Company, which furnishes power to the Cripple Creek mines. A large central station here operated by steam supplies the power, and it has been thus far very successful. The number of electric hoists and pumps introduced at the mines in the district is also large and is rapidly increasing, and apparently it will not be long before the great majority of the mines take their power from this station. A fully illustrated description of this plant was given in the "Engineering and Mining Journal" for December 10th last.

THE MINING STOCK EXCHANGES IN 1898.

Records of the exchanges do not adequately show the real amount of capital that is going into mining. There are a great many mines, well known to our readers as heavy producers and very profitable to their owners, which have never been listed. When such properties are capitalized and floated on the London, San Francisco, New York or Boston exchanges, there is the natural suspicion that the ore bodies are giving out, and that shares are being sold on a record. But during the past year the insatiable search for good mining properties, and especially gold mines, has brought to light a number of investments which are well thought of by capitalists. Those who have money to invest and are not satisfied with the 3 or 4 per cent. of real estate mortgages, whether their reserve capital is small or large, have been looking for something more profitable. Naturally, mining is the most attractive form of investment. That the selection of particular securities is judicious is questionable; but on the whole the mining industry is the gainer by this present surplus of unoccupied capital. There never was a time when a really meritorious proposition could so easily secure working capital as now. The only danger is that the opportunity will be misused by promoters and middlemen.

Of all the Western mining exchanges Salt Lake has shown the greatest activity during the year. In San Francisco, which has mainly depended upon the Comstock shares, everything has been quiet. In Denver, where the transactions have been nominally large in the number of shares handled, but small in market value, there has been little of interest to record. At Salt Lake, however, the developments in the Mercur District and some of the Tintic mines have created something of a sensation.

In Boston copper stocks have been very active, as noted below. The small transactions in the New York Stock Exchange and in the Consolidated Exchange are not important. In the former exchange are listed a few securities of well-known and reliable companies, which are dealt in only at intervals, and then for investment and retirement; in the Consolidated Exchange there are a miscellaneous lot, and the transactions are light.

The activity in the shares of coal and iron mining companies is significant. The large number of shares transferred in the Philadelphia and New York exchanges shows that, apart from speculation, which usually does not use this class of securities as a medium, there is a serious tendency toward permanent investment. In the ordinary fluctuations of the market these shares usually follow the course of the railroad stocks; but latterly they have manifested an individuality which shows that investors are considering them as a legitimate investment, to be held for dividends.

The New York Mining Stock Market.

Interest has flagged almost entirely in the local share market, notwithstanding the repeated efforts of brokers. After a year's career the Mining Exchange has looked for support in the industrial and miscellaneous stock market, and accordingly its name has been changed to the Industrial Exchange. Much the larger part of the transactions during the year were in ridiculously cheap Colorado stocks, based on mere prospects. Naturally legitimate investors refused to buy. The result was obvious, and with the opening of a new year new plans have been devised, and it is thought a better class of mining shares will be called in the future, in addition to other stocks.

The shares dealt in on the other exchanges in this city are largely governed by the quotations on the San Francisco and Colorado mining stock exchanges. The business done on the Consolidated Stock and Petroleum Exchange during the year amounted to 924,520 shares, as against 997,080 shares in 1897. The best month in 1898 was March, when 104,910 shares changed hands; the next best was December, when 93,280 shares were dealt in. The smallest amount of business was done in July, when only 38,200 shares were traded in. Much the larger part of this year's transactions were made in the Comstock shares. On the New York Stock Exchange dealings have been principally in the higher priced mining shares, and of these there were sales of 1,513 shares of Homestake, of South Dakota; 6,158 shares of Quicksilver, preferred, of California; 3,050 shares of Quicksilver common, and 1,224 shares of Ontario, of Utah. There were also large sales of Horn Silver, of Utah, and Standard Consolidated, of California. The Stock Exchange has done something in the Comstocks, but most of the dealings in these shares have taken place on the Consolidated Exchange.

It is noteworthy that much money has been made in selling mining shares outside of the exchanges. Though large transactions have taken place early in the year in the Klondike "freezers," holders of these shares are anxiously asking the return of the money they have invested. With the agitation of copper stocks in Boston many of the new

companies reaped quite a harvest, and in New York several are known to have disposed of considerable stock.

The Boston Mining Stock Market in 1898.

By Our Special Correspondent.

The Boston mining stock market opened the year in comparative quiet, although the gradual advance in demand and prices had given a firmer tone to the copper stocks, which furnish the bulk of the dealings, than had been the case for some time past. The regular investment stocks which are regarded as steady dividend payers, were at a higher level than most of them had shown since 1892, but the purely speculative stocks generally commanded very moderate prices. No one anticipated the expansion which was destined to come before the close of the year, although a few shrewd promoters were doubtless making

FLUCTUATIONS IN THE PRICES OF STOCKS AT NEW YORK DURING 1898.

Name and Location of Company.	Par Value.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Con., Colo.	$10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.05	.....	.05	.....	.08	.05	.10	.05	$8,800
Alamo (g.), Colo.	1	.04	.03	.04	.02	.03	.02	.03	.02	.02	.....	.03	.02	.....	.....	.04	.03	.06	.03	.05	.03	.06	.04	.06	.05	1,350,600
Alice (g.), Mont.	25	.....	.....	1.10	.....	.85	....	1.05	.50	.90	.....	.80	.....	.....	.....	.77	.65	.85	.70	.90	.75	1.20	.85	.90	.75	9,700
American Flag, Colo.	1	.....	.....	.22	.15	.20	.15	.08	.06	.10	.04	.10	.04	.....	.....	.06	.....	.10	.05	.10	.04	.08	.03	.....	.....	118,350
Anaconda (g.), Colo.	5	.42	.39	.48	.35	.41	.26	.38	.20	.53	.33	.54	.40	.43	.38	.41	.32	.80	.40	.68	.45	.65	.48	.64	.50	183,000
Anchoria Led. (g.), Colo.	1	.....	.....	.96	.88	.94	.68	.80	.62	.77	.61	.75	.71	.80	.70	.87	.68	.87	.73	.76	.70	.75	.72	.....	.....	85,000
Arg.-Juniata (g. s.l.), Nev.	2	.22	.18	.21	.19	.22	.16	.....	.....	.23	.22	.29	.....	.....	.....	.19	.18	.23	.....	.20	.....	.32	.20	.33	.15	3,950
Belcher (s. g.), Nev.	3	.63	.47	.40	.....	.48	.25	.30	.13	.23	.15	.....	.....	.....	.....	.15	.08	.18	.10	.20	.03	.20	.08	.24	.14	2,900
Best & Belcher (g.s.), Nev	3	1.15	.....	.35	.....	.42	.28	.37	.25	.34	.31	.25	.18	.15	.....	.19	.10	.31	.15	.31	.10	.....	.....	.40	.30	12,100
Boston & Montana, Mont.	25	.....	.....	.....	.....	.....	.....	177.00	173.00	198.00	182.00	203.00	196.00	209.00	203.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65
Breece (s. i.), Colo.	25	.30	.....	.32	.....	.48	.34	.47	.35	.....	.....	.....	.....	.....	.....	.90	.55	1.26	.70	1.10	.80	1.00	.85	.90	.80	4,775
Brunswick Cons. (g.), Cal.	1	.14	.12	.10	.....	.15	.10	.15	.11	.22	.13	.16	.12	.12	.10	.12	.08	.11	.08	.15	.08	.15	.10	.15	.10	24,500
Bul.-B'k & Ch. (g.s.l.e),Ut	10	.15	.10	.12	.....	.....	.....	.....	.....	.20	.08	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.60	.50	2,500
Caledonia, S. Dak.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.50	.....	.60	.50	.50	.....	.....	.....	.....
Calumet & Hecla(c.),Mich	25	.....	.....	.....	.....	.....	.....	517.00	.....	555.00	525.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	630
Catalpa (s. l.), Colo.	10	.09	.....	.10	.....	.07	.....	.07	.....	.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,110
Chollar (s. g.), Nev.	3	.30	.23	.....	.....	.....	.....	.34	.30	.15	.....	.07	.....	.20	.15	.30	.10	.20	.10	.17	.02	.38	.08	.24	.12	4,600
Chrysolite (s. l.), Colo.	50	.....	.....	.....	.....	.....	.....	.....	.....	.13	.11	.....	.....	.....	.....	.....	.....	.16	.10	.15	.10	.14	.09	.15	.12	2,100
Comst'k Tun. (s. g.), Nev.	100	.04	.03	.04	.....	.04	.02	.04	.02	.03	.....	.....	.....	.....	.....	.02	.....	.....	.....	.04	.03	.04	.03	.04	.....	22,400
Comstock Tunnel Bonds	100	.....	.....	.04	.....	.03	.....	.04	.03	.04	.....	.03	.....	.....	.....	.02	.....	.04	.02	.04	.03	.04	.03	.04	.03	8,150
Comstock Tunnel Scrip.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.05	.03	.05	.03	.04	.....	.....
Con. Cal. &Va. (s.g.), Nev	2½	1.45	1.05	1.50	.88	.91	.70	1.05	.64	.73	.49	.55	.30	.42	.25	.44	.28	.92	.32	.83	.60	1.50	.92	1.50	1.00	15,835
Con. Imperial (g.s.), Nev.	1	.02	.....	.03	.01	.02	....	.02	.....	.02	.....	.02	.....	.....	.....	.....	.....	.02	.....	.02	.....	.03	.02	.03	.....	35,100
Cr'de & Crip. C'k (g.) Colo	1	.04	.02	.04	.03	.04	.03	.09	.03	.08	.03	.11	.04	.04	.03	.04	.02	.08	.04	.09	.08	.08	.04	.06	.04	54,600
Crescent, Colo.	10	.....	.....	.05	.....	.....	.....	.04	.....	.06	.....	.05	.....	.....	.....	.10	.....	.03	.....	.....	.....	.05	.....	.10	.05	4,900
Crip. C'k Cons. (g.), Colo.	1	.11	.09	.12	.10	.11	.08	.10	.07	.10	.08	.10	.09	.10	.....	.10	.07	.12	.06	.09	.06	.10	.04	.10	.04	126,300
Crown Point (g. s.), Nev.	3	.32	.25	.....	.....	.25	.10	.24	.10	.....	.....	.08	.04	.04	.....	.15	.05	.18	.10	.15	.08	.20	.05	.17	.12	5,400
D'd'w'd-Terra (g.), S. Dak	25	1.25	1.00	1.00	.90	1.10	.70	1.10	.65	.....	.....	.....	.....	.....	.....	.35	.25	.40	.25	.45	.29	.45	.35	.50	.38	6,050
Elkton Cons., Colo.	1	.89	.83	.89	.75	.84	.70	.71	.53	.96	.69	.95	.90	.....	.....	1.20	.97	1.26	1.15	1.21	1.00	1.06	.92	1.00	.72	70,400
Enterprise, Colo.	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.35	.....	.....	.....	.....	.....	.38	.35	.40	.25	.38	.35	900
Fanny Rawlings, Colo.	1	.06	.05	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,800
Father de Smet (g.), Dak.	100	.20	.....	.....	.....	.23	.16	.23	.14	.....	.....	.....	.....	.....	.....	.....	.....	.17	.15	.17	.10	.16	.10	.18	.10	650
Garfield Con., Colo.	1	.08	.06	.08	.06	.07	.05	.06	.05	.15	.14	.16	.13	.....	.....	.15	.11	.13	.12	.13	.11	.15	.12	.17	.12	761,700
Golden Fleece (g.s.), Colo	1	.59	.48	.54	.43	.47	.35	.41	.21	.40	.20	.35	.22	.26	.17	.....	.....	.40	.25	.....	.....	.35	.24	.27	.22	145,200
Gould & Curry (g.s.), Nev.	3	.30	.....	.....	.....	.25	.15	.....	.....	.30	.20	.16	.07	.....	.....	.17	.07	.30	.10	.20	.10	.25	.07	.25	.15	20,100
Hale & Norcr'ss (s.g.) Nev	3	1.50	1.25	.....	.....	1.30	1.10	1.10	.55	1.00	.90	.75	.70	.45	.....	.80	.55	.90	.45	1.10	.65	1.20	.75	1.75	.90	4,600
Havana.	.....	.....	.....	.....	.....	.76	.75	.76	.75	.76	.75	.76	.75	.76	.75	.80	.75	.76	.75	.76	.75	.76	.75	.....	.....	.....
Homestake(g.), S. Dak	100	46.50	40.00	46.00	41.75	50.	42.	48.00	42.00	50.00	40.00	50.00	47.00	53.50	50.00	52.00	45.00	57.00	45.00	60.00	45.00	61.00	60.00	50.00	.....	1,345
Horn Silver (s. l.), Utah.	25	1.20	1.10	1.35	.....	2.50	1.30	1.50	1.20	1.40	1.30	1.50	.55	1.35	1.30	1.50	1.15	1.40	1.20	1.20	1.10	1.20	1.10	1.30	1.10	3,975
Iron Silver (s. i.), Colo.	20	.42	.25	.50	.43	.50	.35	.50	.45	.60	.43	.70	.60	.80	.45	.78	.60	.70	.55	.70	.55	.75	.40	.81	.70	23,775
Isabella (g.), Colo.	1	.35	.30	.32	.21	.28	.20	.22	.17	.24	.21	.28	.23	.....	.....	.28	.21	.28	.20	.28	.21	.30	.23	.36	.20	149,400
Japan (g.), Colo.	10	.....	.....	.....	.....	.....	.....	.....	.....	4.25	.....	5.00	2.50	5.00	2.50	5.00	2.50	5.00	2.50	5.00	2.50	5.00	2.50	5.00	2.50	.....
Jefferson (g.), Colo	1	.06	.03	.05	.04	.06	.04	.06	.02	.05	.03	.06	.04	.....	.....	.11	.07	.09	.07	.09	.05	.09	.05	.10	.05	1,045,700
Justine (g.), Colo.	1	.02	.....	.03	.01	.07	.01	.05	.01	.05	.03	.04	.02	.03	.02	.04	.01	.05	.02	.04	.02	.09	.02	.04	.02	2,808,600
K'gst'n & Pemb'ke(i.)Ont	10	.22	.21	.21	.20	.22	.15	.22	.10	.22	.20	.29	.22	.20	.16	.17	.14	.16	.14	.15	.10	.16	.10	.18	.12	5,500
Lacrosse (g.), Colo.	10	.17	.16	.16	.....	.16	.12	.17	.10	.....	.....	.....	.....	.....	.....	.....	.....	.15	.08	.15	.08	.14	.07	.14	.07	15,400
Lagonda, Colo.	1	.....	.....	.....	.....	.....	.....	.....	.....	.18	.10	.24	.17	.25	.20	.45	.20	.35	.32	.50	.30	.....	.....	.40	.36	56,400
Leadville Cons. (g.), Colo.	10	.....	.....	.....	.....	.09	.08	.13	.07	.12	.09	.12	.10	.11	.10	.10	.03	.08	.07	.08	.07	.09	.07	.11	.07	21,800
Lillie, Colo.	5	.79	.65	.76	.69	.81	.76	.85	.75	1.00	.81	1.02	.89	.90	.....	1.10	.95	1.25	1.06	1.20	1.06	1.25	1.10	.....	.....	111,700
Little Chief (s. l.), Colo.	50	.....	.....	.18	.16	.18	.12	.15	.11	.25	.15	.25	.....	.....	.....	.26	.18	.24	.18	.21	.16	.20	.17	.21	.12	15,634
Mexican (g.s.), Nev.	3	.25	.20	.45	.20	.40	.25	.50	.15	.20	.12	.20	.10	.13	.10	.22	.07	.30	.10	.23	.07	.30	.15	.40	.17	19,300
Miami, Colo.	1	.40	.30	.39	.38	.40	.39	.40	.39	.50	.30	.65	.45	.....	.....	.54	.40	.54	.40	.41	.35	.....	.....	.....	.....	182,700
Mollie Gibson (s.), Colo.	5	.26	.13	.23	.12	.24	.19	.22	.20	.28	.20	.33	.21	.25	.18	.24	.14	.24	.19	.25	.19	.24	.18	.30	.20	29,300
Mt. Rose (g.), Colo.	1	.17	.12	.16	.13	.14	.10	.12	.09	.14	.11	.14	.11	.13	.10	.27	.10	.21	.13	.21	.16	.20	.16	.25	.17	454,500
Occiden'l Cons.(g.s.), Nev	3	1.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.70	.....	.....	.....	.45	.40	.80	.45	.80	.20	.60	.38	1.00	.50	1,000
Ontario (s. l.), Utah.	100	4.50	2.50	6.00	3.50	5.00	3.50	5.80	3.00	6.00	2.50	6.00	3.00	5.00	3.00	4.00	2.50	4.00	3.50	4.25	3.50	5.00	3.50	6.25	5.00	1,189
Ophir (g. s.), Nev.	3	.75	.55	.56	.....	.70	.40	.75	.40	.45	.35	.25	.....	.20	.15	.30	.12	.55	.13	.55	.37	.83	.50	.70	.40	12,750
Osceola, Mich.	25	.....	.....	.....	.....	.....	.....	40.00	38.50	47.00	41.00	52.00	46.50	48.00	46.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	120
Pharmacist (g.), Colo.	1	.09	.06	.08	.07	.10	.06	.07	.06	.07	.05	.07	.06	.09	.05	.05	.03	.10	.07	.07	.03	.20	.03	.08	.03	122,400
Phœnix Cons. (g.), Ariz.	1	.10	.09	.09	.....	.09	.05	.09	.05	.....	.....	.25	.10	.14	.10	.20	.13	.18	.11	.19	.08	.17	.11	.....	.....	119,320
Plymouth (g.), Cal.	10	.12	.....	.....	.....	.14	.07	.09	.06	.....	.....	.....	.....	.....	.....	.12	.08	.14	.07	.13	.07	.12	.07	.12	.07	9,000
Portland (g.), Colo.	1	.82	.75	.81	.73	.81	.74	.85	.75	1.05	.85	1.20	.95	1.18	.....	1.42	1.10	1.50	1.40	1.45	1.35	1.50	1.25	1.50	1.35	146,200
Potosé (g. s.), Nev.	3	.46	.32	.30	.25	.50	.35	.45	.26	.61	.22	.22	.07	.15	.06	.22	.10	.25	.05	.20	.05	.26	.10	.21	.07	22,600
Quicksilver, Cal., com.	100	3.50	1.00	3.00	1.25	2.00	1.00	3.50	1.25	3.50	1.00	2.50	1.25	2.00	1.50	2.00	1.25	2.13	1.25	1.75	1.25	2.60	1.25	3.00	1.25	1,910
Quicksilver, Cal., pref.	100	8.00	3.00	8.00	3.00	7.00	3.00	7.00	2.25	11.00	2.25	8.00	5.00	8.00	5.00	7.00	3.00	6.00	3.50	6.00	3.00	6.50	3.50	11.50	5.00	3,858
Quincy (c.), Mich.	25	.....	.....	.....	.....	.....	.....	107.00	.....	115.00	108.00	115.00	113.00	118.00	114.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90
Rocky Mount. (g.), Colo.	1	.17	.14	.17	.08	.15	.10	.09	.08	.17	.05	.14	.05	.14	.06	.16	.10	.20	.12	.18	.03	.11	.02	.05	.01	940,000
Savage (g. s.), Nev.	24	.40	.20	.....	.....	.25	.21	.30	.10	.16	.10	.....	.....	.....	.....	.12	.05	.17	.08	.14	.03	.23	.08	.20	.01	3,500
Sierra Nev. (g. s.), Nev.	3	.90	.50	1.10	.74	2.00	.85	2.25	.69	.65	.35	.70	.43	.52	.02	.60	.45	.96	.55	.77	.55	1.25	.60	1.20	.60	42,500
Small Hopes (s. l.), Colo.	20	.....	.....	.75	.....	.90	.....	1.05	.75	1.05	.80	1.10	.....	1.15	1.05	1.00	.90	1.10	1.00	1.30	1.00	1.30	1.00	1.30	1.00	9,100
Stand'd Cons. (g.s.), Cal.	100	1.60	.....	1.75	1.60	1.85	1.65	1.80	1.60	1.65	1.55	1.70	1.55	1.60	1.40	1.55	1.40	1.75	1.50	1.85	1.60	1.90	1.75	1.20	2.75	10,958
St. Fran's Carib.(g.), B.C.	5	.....	.....	2.75	2.63	2.75	2.63	2.75	2.25	2.75	2.25	3.00	2.50	3.00	2.50	3.00	2.50	2.75	2.50	3.00	2.50	3.00	2.00	.....	.....	23,970
Syndicate (g.), Cal.	100	.05	.....	.....	.....	.05	.04	.05	.04	.05	.....	.....	.....	.....	.....	.05	.04	.05	.....	.....	.....	.....	.....	.....	.....	66,800
Tamarack (c.), Mich.	25	.....	.....	.....	.....	.....	.....	150.00	145.00	160.00	149.00	160.10	157.00	158.00	155.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Union (g.), Colo.	1	.15	.11	.14	.13	.14	.09	.15	.09	.14	.10	.12	.11	.18	.15	.17	.11	.26	.14	.24	.16	.23	.17	.18	.12	990,200
Union Cons. (g. s.), Nev.	24	.46	.25	.40	.....	.40	.25	.45	.30	.....	.....	.15	.10	.....	.....	.24	.12	.....	.....	.20	.10	.30	.15	.23	.14	15,800
Utah Cons. (s.), Nev.	3	.10	.....	.15	.11	.15	.10	.13	.05	.10	.07	.07	.04	.08	.04	.09	.05	.15	.05	.08	.05	.17	.05	.20	.04	47,800
Waldorf (g.), Colo.	1	.13	.10	.15	.05	.10	.08	.10	.03	.05	.02	.11	.02	.08	.05	.07	.05	.07	.03	.04	.02	.04	.02	.01	.....	509,100
Work (g.), Colo.	1	.05	.04	.05	.03	.04	.02	.03	.02	.04	.02	.04	.02	.14	.08	.12	.14	.13	.07	.10	.06	.15	.07	.15	.09	536,400
Yellow Jacket (g. s.), Nev.	3	.37	.....	.37	.25	.33	.24	.30	.10	.27	.20	.26	.17	.10	.....	.30	.10	.28	.10	.24	.10	.25	.15	.33	.15	120 100
Yukon, Can.	1	.14	.10	.12	.....	.14	.10	.18	.10	.14	.11	.14	.10	.14	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	88,300
Total sales.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,902,859

ready for a boom, while they could not anticipate its exact date. The same condition of affairs continued through nearly all the first half of the year; and is best illustrated by the prices of some of the leading stocks. Thus Calumet & Hecla, which sold as low as $489 in January, crept up gradually to a maximum of $575 in June, having never fallen below $500 in the intermediate time. Tamarack, which sold at $131 in January, brought $167 in June, which was the highest point touched so far in the year. Quincy remained about the same level, the lowest point being $105 in January—which was again touched in March—and the highest $118 in June. Osceola, which sold as low as $39 in January and $35 in March, had by the middle of the year taken a decided upward turn, and in June brought $55. Atlantic had maintained very nearly a level, ranging between $24 in March and $32 in June. Boston & Montana, which opened at $149, reached $192 in March, receded to $167 in April, but by June had crossed the $200 line and sold as high as $210.

At the same time the speculative stocks in the first half of the year showed only a moderate degree of activity and not much improvement in prices. Butte & Boston, which had recovered somewhat from the extremely low point to which it fell in 1897, opened at about $23, and in June sold at $26, having reached its maximum with a single sale at $27. Centennial, which began at $8, climbed to $17, but with numerous reactions by the way. Franklin, which has fallen into the list of the speculatives, from $17 went down nearly to $10, but recovered a little to $15, which was still lower than its opening price. Old Dominion showed fluctuations within comparatively narrow limits, but ended the half year about where it began at $25.

Among the minor stocks—including a number of such old companies as Allouez, Arnold, Humboldt and others—there was but little dealing.

and most of the new stocks which were destined to cut quite a figure later had not yet fairly made their appearance.

July and August, which are very apt to be dull months in the stock market, rather repeated the experience of the first half of the year, although to the keen observer there were some symptoms of a coming rise. The price of copper and the demand for the metal continued very favorable. As it became apparent that the war—which after all had had comparatively little effect after its first outbreak—was practically at an end, and that its effect upon business had not been marked to anything like the degree which was anticipated, the speculative feeling gradually increased. The effect of two successive large crops and enormous exports; of the general prosperity of the farmers and their consequent heavy purchases of manufactured goods, began to be apparent in the prosperity of most classes of manufacturers and in the abundance

of money in the Eastern centers, to which Boston was no exception. The great drawback was the unfavorable condition of the textile trade, which is a great factor in New England business, but the state of the cotton goods trade improved gradually, and that of the woolen interest no longer operated as a drawback upon the general improvement of business. The speculative feeling, which had been dormant or held in check since 1893, or even before that, since the Baring panic of 1891, was beginning to reassert itself. Under all these conditions a rise was inevitable and it took very little to start it.

In September the upward movement began, slowly at first, but acquiring increased momentum as time went on. It was most apparent at first in the dividend paying stocks, but these having reached a high level paused there and made way for the speculative shares and the wild cats. The controversy between the Boston & Montana and the Butte & Boston interests and the predictions of the irrepressible Thomas W. Lawson, who for the time being represented Butte stock, must be fresh in the memory of readers. To one who has only a general interest in watching the market they were valuable chiefly as showing the point where investment buying stopped and manipulation began. Interested parties were very quick to recognize this, and the promoters and others who had been organizing new companies brought them out upon favorable terms and soon found them selling at prices far beyond their wildest expectations.

To take up again the steadier investment stocks where we left them in June, we find that Calumet & Hecla climbed steadily and gradually to the highest point in its history, selling at $600 in September, reaching $650 in November, and closing the year a little lower, at $640.

The greatest gain and the highest prices probably, in proportion to real values, are shown by the new stocks which have been brought out. Some of these will doubtless in due time prove themselves to be mines. Others are uncertain, while others again are simply prospect holes incorporated with a view to selling the stock. Prices, however, seem to have little reference to the real foundation of the company, and in most cases seem actually to be higher for those which are entirely uncertain. Thus we find Arcadian, which finds its value in promises altogether, selling as high as $73. This is the most notable example of its class. Adventure, another new prospect, sells only at $10. Allouez, which has revived after a long dormant period, is quoted at $7. Baltic, which commands confidence because brought out under the Stanton management, has sold at $32, but with very much less excitement and demand than is shown by other stocks which have not the same guarantee of honest and capable control. Winona, under the same management, sells at $15. The early months of 1899 will see a large crop of new companies on the market, many of which are now ready to make their appearance.

The copper stocks have been the star performers of the year, and even in the later boom months other shares have had comparatively little prominence. The quicksilver stocks, which are owned in Boston, have been generally quiet and have shown few dealings and few changes in price. Most of these are now on a steady dividend-paying basis and are held largely for investments.

The gold mining stocks have presented nothing particularly sensational in their course during the year and, indeed, have not attracted a great deal of attention. Merced, which opened at $5.75, went as low

PRICES OF INDUSTRIAL AND COAL STOCKS AT NEW YORK AND PHILADELPHIA DURING 1898.

Name of Company.	Par Value.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal...	$25	140.00	120.00	140.00	120.00	140.00	100.00	140.00	100.00	140.00	100.00	140.00	100.00	140.00	120.00	140.00	110.00	130.00	110.00	125.00	110.00	140.00	120.00	150.00	120.00	.....
Bethlehem Iron..	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70.00	69.00	113
Cambria Iron....	50	40.75	38.50	38.50	37.00	39.50	35.75	38.00	36.00	43.88	37.38	45.50	43.00	43.50	41.25	59.00	41.00	48.00	52.25	56.25	51.50	57.00	39.13	42.88	42.00	113,932
Cambria Scrip...	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	85.00	84.00	20,650
Cambria Steel...	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.00	10.88	82,302
Central of N. J...	100	.....	.....	97.50	89.00	95.00	86.50	94.00	88.00	96.00	93.00	96.00	94.00	94.50	87.00	96.00	89.75	93.50	90.00	91.75	85.25	95.00	85.00	98.50	92.00	257,816
Choc. & Gif. Ctfs.	50	32.00	28.50	33.00	28.00	31.00	28.50	31.88	29.50	38.50	30.38	39.00	34.13	39.25	38.00	42.50	38.75	42.00	39.75	41.50	39.75	42.00	39.50	43.75	40.63	160,441
Choc. Tr. Ctfs....	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29.00	27.75	6,731
Col. C. & I. Dev..	100	1.25	1.00	1.00	.25	1.00	.25	1.00	.13	1.00	.13	1.00	.38	.50	.13	.63	.25	.75	.25	.75	.25	1.75	.38	1.25	.50	4,700
Col. Fuel & Iron.	100	26.63	23.00	25.00	20.13	21.00	17.00	19.75	15.00	23.00	20.00	23.75	21.00	23.00	20.00	26.63	19.50	23.50	20.00	23.00	20.00	28.00	22.00	32.88	22.50	48,456
Col. H. C. & Iron	100	7.50	6.00	7.25	5.00	6.50	5.00	6.00	5.00	6.50	5.00	7.00	6.00	5.25	4.00	6.88	4.00	6.50	4.00	5.50	4.00	5 50	4.00	9.75	4.50	21,202
Con. Coal.....	100	41.00	38.00	40.00	39.00	41.00	40.00	45.00	36.00	45.00	38.00	46.00	40.00	45.00	40.00	41.00	40.00	46.00	.....	50.00	46.00	50.00	47.00	50.00	47.00	175
Del. & Hud.....	100	154.00	110.75	114.50	108.75	110.50	106.00	108.50	104.00	111.88	108.00	112.00	108.00	108.50	103.00	110.00	106.75	108.75	105.75	109.50	.....	101.00	93.00	108.00	99.50	147,441
Federal Steel....	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33.00	30.00	52.00	31.00	188,838
Federal Steel, pf.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	82.75	71.50	94.00	76.00	764,534
General Electric.	100	41.00	31.00	39.75	30.50	34.25	29.25	33.25	23.00	37.38	32.25	39.38	36.25	40.00	38.63	42.25	39.63	50.13	42.25	48.00	47.00	.....	.....	.....	.....	563,989
H. & Br. Top....	50	17.00	.....	15.00	.....	15.00	.....	.....	.....	10.00	.....	15.00	13.00	13.00	.....	10.00	.....	10.00	.....	.....	.....	10.13	.....	13.00	11.00	845
H. & Br. Top. pf.	50	43.00	40.50	45.00	42.00	42.75	41.50	41.50	40.50	41.00	23.00	40.50	40.25	40.25	.....	39.00	38.50	39.00	37.00	38.00	37.50	41.00	.....	43.00	41.00	1,411
Illinois Steel....	100	55.75	46.00	55.00	40.00	50.00	44.00	45.50	44.50	59.88	49.75	60.00	54.88	60.00	39.75	73.63	57.50	75.25	64.50	90.75	67.00	78.75	76.25	.....	.....	131,553
Lehigh Nav.....	50	.....	.....	49.00	24.50	40.38	39.50	40.00	39.00	39.50	38.25	40.00	37.50	38.00	37.00	38.00	37.00	39.00	37.50	85.50	37.50	37.50	35.00	38.25	37.00	7,988
Lehigh Val. R.R.	50	.....	.....	25.00	21.00	23.00	20.50	22.75	20.25	24.00	21.63	23.88	21.00	21.75	20.00	21.88	20.00	21.63	20.50	20.75	19.25	20.00	17.50	22.88	20.00	91,985
Md. Coal, pref...	100	58.00	43.00	55.00	40.00	55.00	44.00	55.00	40.00	55.00	40.00	54.50	47.00	53.00	45.00	53.00	42.00	53.00	45.00	52.00	45.00	52.00	45.00	56.00	47.00	492
Minnesota Iron..	100	60.00	55.00	65.00	59.50	64.00	60.00	63.50	59.00	73.50	63.50	76.50	72.25	74.50	70.75	99.75	72.63	99.75	88.50	137.00	90.00	142.50	135.00	.....	.....	213,089
National Lead...	100	37.75	34.00	38.38	30.00	33.25	26.50	31.00	27.50	33.75	30.00	36.00	33.50	36.00	33.50	39.63	36.50	37.63	33.50	34.25	31.63	36.00	32.00	39.38	35.25	331,664
New Centr'l Coal	100	8.13	6.88	8.50	7.00	8.00	6.00	8.00	6.00	8.00	6.25	9.00	7.00	.....	.....	46.00	35.00	45.00	35.00	44.00	32.00	45.00	35.00	42.00	38.00	4,270
Pa. Coal	100	370.00	330.00	370.00	300.00	340.00	325 00	325.00	300.00	330.00	300.00	340.00	310.00	340.00	320.00	356.00	325.00	355.00	325.00	340.00	325.00	340.00	320.00	350.00	320.00	24
Pa. R. R	50	58.50	50.75	60.13	50.13	58.63	55.50	57.50	55.50	58.75	56.00	58.75	57.25	58.88	57.63	60.00	58.63	59.75	58.13	59.00	53.25	59.75	57.25	61.25	59.38	159,599
Pa. Salt.....	50	103.00	.....	107.00	105.00	106.50	101.00	101.50	101.00	103.00	101.50	103.00	.....	104.25	103.00	104.00	.....	104.00	102.00	104.25	102.25	112.00	104.00	.....	.....	81
Pa. Steel.....	50	15.75	12.00	14.00	11.00	10.00	9.00	10.00	9.00	16.25	12.50	18.50	14.50	18.50	15.00	20.00	17.00	20.25	18.00	18.00	10.00	21.75	16.00	22.00	18.50	32,515
Pa. Steel, pref....	50	24.50	21.00	23.00	20.00	22.00	18.50	.....	.....	27.00	20.00	29.00	26.00	29.00	15.00	41.00	30.25	41.00	38.00	.....	.....	41.50	40.00	42.00	38.00	2,734
Phila. & Reading	100	23.00	21.25	23.25	18.00	19.50	15.75	17.00	15.38	19.25	17.00	20.63	18.88	19.25	16.00	20.00	17.50	19.13	17.50	18.13	10.13	19.13	15.50	23.13	18.25	379,448
Phila. & R. 1st, pf	100	52.63	48.88	54.13	41.25	46.00	20.50	46.50	37.00	46.00	40.13	49.00	45.13	47.00	38.25	46.00	41.63	46.63	42.00	43.50	38.13	46.13	37.50	51.00	45.00	795,342
Standard Oil.....	100	394.00	294.00	433.00	361.00	388.00	348.00	376.00	346.00	440.00	374.00	443.00	436.00	442.00	354.00	426.00	405.00	416.00	403.50	422.00	414.00	422.00	410.00	432.00	413.50	.....
Tenn., C. & I.....	100	28.38	23.63	25.88	19.00	22.00	17.00	21.50	18 38	26.50	20.50	26.50	23.00	26.13	24.50	34.50	25 13	32.00	27.00	29.50	26.25	32.00	27.88	38.75	29.75	792,435
United Gas Imp..	50	106.00	97.75	114.25	104.00	116.25	98.50	106.88	102.50	114.75	99.38	110.88	103.25	11 1.50	107.50	123.00	116.25	125.00	119.50	122.00	120.00	123.00	119.00	128.00	123.00	464,086
Welsbach, Can...	5	1.50	1.13	1.50	1.00	1.50	1.25	1.25	.....	1.38	1.25	2.50	1.25	2.25	2.00	2.25	2.00	2.38	2.00	2.00	1.88	1.88	1.50	2.00	1.50	46,529
Welsbach Com...	100	15.00	14.00	10.50	.....	15.50	10.00	15.50	14.00	16.00	12.00	28.50	12.00	26.00	20.00	20.00	.....	18.00	.....	16.00	15.00	17.00	10.00	10.00	.....	59,394
Welsbach, pref..	100	64.13	41.00	55.00	53.00	58.00	50.00	65.00	57.00	65.00	61.00	83.88	60.00	83.00	75.00	76.00	70.00	71.00	.....	70.00	64.00	66.00	30.00	62.00	55.25	11,252
Welsbach Light..	100	42.00	38 50	41.13	44.00	44.75	37.50	44.50	40.25	45.13	41.25	68.75	42.25	62.75	53.25	58.75	49.50	55.00	50.13	50.00	41.00	46.00	32.50	41.25	32.75	81,378
W'tmorel'd Coal.	50	50.00	49.50	50.25	50.00	50.50	48.00	50.50	48.00	50.00	49.50	50.00	49.50	50.13	.....	50.00	.....	50.00	.....	49.00	48.00	50.00	48.00	50.00	49.00	500
Total Sales...	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,989,634

Tamarack, from $167 reached $199 in November, but then reacted slightly, closing at $190. Quincy reached its highest at $144 in November, but dropped off to $140 in the last week of the year. Osceola made a fair advance, from $55 to $77, closing at $87. Atlantic held its ground well, selling at $35 in November and closing at $31.50. Wolverine, which has established its standing as a dividend payer, reached $28.50 in October, but did not attain its maximum until the close, when it sold between $34.50 and $35.50.

Boston & Montana, which is a dividend payer, but which is more of a speculative stock than any of the others, climbed from $200 to $243 in November, and at the close is still higher at $277.

The leader in the great boom was Butte & Boston. Its rise started with the report that the stock had been purchased largely by members of the party known in New York and Boston alike as the Standard Oil crowd. It was further rumored that a sale or consolidation of the company had been arranged with the Boston & Montana and very possibly with the Montana Ore Purchasing Company also, and that for that purpose the Boston & Montana stock had been transferred to New York in considerable blocks. As time went by these rumors were not substantiated by any action, but their effect continued. Moreover, Butte & Boston for the time being was a mystery, and the Boston speculator dearly loves a mystery about which he can argue and reason, report and lie to his heart's content. Under these combined influences and the able manipulation of Mr. Lawson the stock which in September sold at $21.50, and in October had reached a point apparently far above its true value at $41.50, touched $60 in November, $80 in the early weeks of December, and closed at $94, with the promise that January will see it selling for $100. The other speculative stocks also made strong advances without the special stimulus which Butte & Boston received. Franklin went up from $11.50 to $21; Old Dominion climbed from $22 to $40, and others—as shown in our table—in proportion. A number of the older stocks, which have been neglected for a long time, also claimed some share in the advance, and such companies as Arnold, Ashbed, Humboldt, Tecumseh and Washington were dealt in at respectable prices.

as $4, but recovered toward the close to $7.50. The company continues to promise returns, but apparently is very slow in making them. Pioneer shows a greater falling off declining from $7 to $5.50. Santa Ysabel ends the year about where it began at $6.50, although it touched $4.50 in the meantime. The only stock of this class which shows a considerable decline is Victor, which fluctuated earlier in the year between $6.50 and $8, but in December dropped to $3 under the influence of unfavorable rumors of its condition.

Dominion Coal stocks have been gradually gaining strength as favorable reports continue to come from the mine and as the great works which the New England Gas and Coke Company is building at Revere to utilize Dominion coal gradually take shape and approach completion. The publication in the "Engineering and Mining Journal" of Prof. Hofman's experiments with this coal at the Halifax works, showing the successful results which could be obtained with it in the by-product oven, attracted a good deal of attention among those who look at stocks as an investment and not as merely gambling counters. A number who had heretofore regarded the intentions of the gas company as a little visionary begun to take an interest in them and to realize their extent and importance. New England Gas and Coke Company securities are not yet on the market and may not be for some months to come, but Dominion coal as a feeder of the big company has been regarded with favor. The common stock, which has been regarded as of very little value, is now selling at $35 and there is every prospect that it will go higher.

Very little is to be said, especially about the industrials which Boston regards with favor, their course being simply a reflection of the general market. The only one in which any marked change can be noted is Illinois Steel, which has now disappeared, being merged in the new Federal Steel Company. This stock has met with more favor possibly than it deserves. The preferred stock now sells up to about $84, while the common stock, which is the speculative part of the issues of the new company, has varied somewhat in prices but closes at about $49, a substantial advance since it was first introduced on the market.

Upon the whole the Boston Mining Stock Exchange has had an active

and a prosperous year. The dealing in mining stocks has greatly broadened and is on a larger scale than ever before. The boom is for some reasons to be regretted, since it has undoubtedly carried values to an unwarranted height in many cases. The question now is when with the reaction come and will it come gradually or with a crash? At present no one can answer, but the more prudent are inclined to get out of the market before it goes much higher.

FLUCTUATIONS OF MINING STOCKS AT BOSTON DURING 1898.

Name of Company.	Par Value.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Copper:																										
Adventure Con. *b*	$25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.00	9.63	5,950
Allouez *b*	25	1.00	.50	3.00	1.13	2.75	1.38	2.00	1.75	3.50	1.88	5.75	3.00	5.00	3.25	4.75	4.00	4.25	3.00	5.88	3.25	6.00	4.75	7.00	4.93	143,834
Arcadian	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24.00	20.00	23.25	20.00	24.00	21.50	29.00	23.25	40.00	29.00	73.00	36.50	148,211
Arnold *b*	25	9.00	2.00	10.00	7.50	12.00	8.38	12.00	10.00	16.50	11.50	17.00	13.88	20.25	14.25	19.00	16.00	17.13	15.50	18.50	16.00	18.50	13.75	15.00	8.00	204,352
Ash Bed *b*	25	.....	.....	3.88	2.25	3.00	2.13	2.75	2.25	3.38	2.63	4.25	3.00	3.75	2.88	3.25	2.75	2.75	2.00	3.00	2.00	3.00	2.00	2.25	1.50	55,776
Atlantic *b*	25	28.75	23.38	32.00	28.50	34.00	23.25	28.50	24.00	27.50	25.00	32.00	27.00	36.00	26.50	29.13	26.00	27.00	25.00	29.00	25.00	35.50	28.75	32.50	30.00	45,648
Baltic *b*	25	.....	.....	.....	.....	.....	.....	13.00	11.50	.....	.....	24.25	16.75	20.00	17.75	20.00	17.50	18.00	15.00	19.25	16.00	27.88	18.00	32.25	25.00	165,654
Bost. & Mont. *a*	25	160.00	149.00	190.00	163.75	191.75	158.00	177.75	167.00	202.00	178.50	211.50	195.25	210.00	203.00	231.00	206.00	228.00	219.75	247.50	224.50	243.00	226.50	288.00	228.00	422,446
Butte & Boston *a*	25	26.63	23.25	28.50	22.75	27.00	18.50	25.38	22.88	26.50	23.75	26.00	20.50	25.88	23.50	26.50	24.25	24.63	21.50	41.50	23.00	59.25	48.00	94.25	57.25	875,779
Cal. & Hecla *b*	25	500.00	489.00	530.00	507.00	535.00	510.00	520.00	515.00	555.00	520.00	575.00	550.00	575.00	560.00	600.00	575.00	590.00	575.00	590.00	580.00	650.00	595.00	649.00	605.00	5,202
Centennial *b*	25	11.75	8.00	12.50	9.00	14.75	10.50	13.50	11.00	15.88	12.00	17.00	13.75	15.50	13.75	21.00	14.50	19.50	16.88	20.00	17.00	27.50	20.75	40.00	24.50	473,148
Franklin *b*	25	17.00	10.38	17.00	14.00	15.50	12.00	12.00	10.50	12.00	10.38	15.00	11.50	13.00	11.00	15.00	12.00	14.75	13.00	15.63	13.00	21.00	14.88	24.00	15.13	107,657
Humboldt *b*	25	2.00	.80	2.50	1.50	2.00	1.50	1.75	1.50	4.50	1.88	6.25	4.13	6.13	4.88	6.25	4.63	5.00	4.50	5.88	4.00	5.50	3.75	4.00	3.00	81,699
Isle Royal *b*	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27.00	22.50	25.00	23.00	33.00	24.50	50.00	27.00	67,510
Old Dominion *c*	25	25.25	23.50	31.00	24.50	32.13	23.88	27.25	24.25	28.50	25.88	28.88	22.00	25.00	22.25	29.75	25.13	29.13	27.00	30.00	27.00	38.00	28.25	40.00	31.25	544,118
Osceola *b*	25	43.00	39.00	44.00	39.50	44.88	35.00	41.00	38.50	49.50	41.50	55.25	46.38	48.00	45.25	58.50	47.38	57.25	52.75	65.00	56.00	77.00	64.45	87.00	66.75	294,754
Parrot *a*	10	.....	.....	24.50	21.75	25.75	21.00	24.00	22.00	23.00	18.50	24.60	22.00	23.38	22.50	23.50	22.50	24.00	22.50	24.25	23.50	30.00	24.00	40.00	28.00	38,029
Quincy *b*	25	118.00	108.50	117.00	108.50	114.00	105.00	110.00	106.00	116.50	107.00	118.50	113.00	116.00	110.50	120.00	110.00	119.50	115.50	127.00	118.00	144.50	124.00	149.00	126.00	26,597
Tamarack *b*	25	145.00	131.00	160.00	145.00	159.50	139.00	154.00	142.00	167.00	154.00	167.00	154.00	157.00	154.00	175.00	153.00	179.00	171.00	182.00	171.00	199.00	173.00	190.00	168.00	31,112
Tecumseh *b*	25	3.50	1.00	3.38	2.50	3.50	2.00	5.00	1.50	3.00	1.75	3.38	2.00	2.50	2.00	4.75	2.00	3.50	2.50	3.50	2.88	6.13	3.00	6.00	4.50	26,283
Washington *b*		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.80	.75	2.38	1.75	1.50	1.00	1.75	1.00	2.00	1.50	1.50	1.00	64,978
Winona *b*	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15.50	14.25	9,489
Wolverine *b*	25	19.50	18.00	23.00	19.50	23.00	17.50	20.50	18.63	22.50	20.00	28.00	21.00	24.50	22.00	27.88	24.25	28.00	22.25	28.50	26.00	34.25	27.50	35.75	29.50	120,355
Gold:																										
Boston & C. C. *d*	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.20	.15	.30	.15	.....	.....	.25	.....	.30	.25	.40	.25	.45	.35	14,355
Gold Coin *d*	1	2.50	1.80	2.00	1.00	1.13	1.00	.....	.....	1.00	.88	1.00	.90	1.00	.90	.93	.75	.75	.30	.90	.25	.90	.50	1.00	.40	26,877
Mercede	15	5.75	4.50	5.75	4.75	6.00	4.00	4.75	4.63	5.00	4.50	.....	.....	.....	.....	8.00	6.00	6.50	4.25	6.00	5.00	5.50	5.25	7.50	5.00	18,105
N.A. Gold Dreg. *a*	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.25	14.38	21,775
Pioneer *e*	10	6.88	5.50	.....	.....	5.75	5.00	5.50	5.00	6.00	5.00	6.25	5.38	6.00	5.00	5.75	5.13	5.50	4.88	5.25	4.75	5.25	4.88	6.00	4.88	64,071
Santa Ysabel *e*	5	7.50	5.25	8.00	5.50	7.13	5.50	6.00	5.00	5.88	4.75	5.25	4.00	.....	.....	5.75	4.88	5.50	4.50	7.75	4.25	7.50	6.50	7.00	6.00	18,485
Victor *d*	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.25	6.50	.....	.....	7.00	5.75	8.00	6.63	.....	.....	7.25	5.75	5.50	2.88	45,907
Miscellaneous:																										
Ætna *c*	5	.....	.....	3.88	3.50	.....	.....	.....	.....	4.00	2.25	4.00	.....	4.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.00	3.50	1,725
Bonanza	10	.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.45	.....	.....	.....	.....	.....	1.05	.73	1.15	.75	1.80	1.20	49,375
Breece *d*	25	.35	.30	.35	.....	.....	.....	.....	.....	.....	.....	.45	.....	.50	.....	.95	.65	.73	.45	.....	.....	.....	.....	.....	.....	8,350
Dominion Coal *f*	100	23.75	20.50	22.75	13.50	20.75	15.00	19.50	17.50	24.50	17.50	24.50	22.00	23.50	21.00	23.88	22.50	26.50	21.00	30.00	25.00	36.00	29.00	35.00	30.13	283,712
Dominion Coal *g*	100	107.50	106.00	108.00	107.00	108.00	99.00	101.50	91.83	109.25	100.00	118.00	109.50	109.00	108.00	112.50	111.00	113.00	111.50	115.00	111.50	117.00	114.00	118.00	116.50	4,351
Dunkin *d*	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.27	.10	.23	.20	.25	.....	.30	.20	6,000
Illinois Steel *j*	100	55.75	48.00	55.50	46.00	50.00	44.00	.....	.....	.....	.....	.....	.....	60.13	57.00	73.88	59.00	74.50	64.50	90.00	65.00	.....	.....	.....	.....	44,244
Lake Sup. Iron *b*	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Napa Con. Q. *e*	7	8.50	7.00	8.25	7.00	8.00	6.00	6.75	6.00	7.00	6.00	.....	.....	7.00	.....	7.00	.....	.....	.....	.....	.....	.....	.....	7.75	5.25	1,400
New Idria *e*	5	.....	.....	.....	.....	.....	.....	.....	.....	6.63	6.00	.....	.....	7.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.63	6.50	890
Total		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,564,303

(*a*) Montana. (*b*) Michigan. (*c*) Arizona. (*d*) Colorado. (*e*) California. (*f*) Nova Scotia. (*g*) Preferred. (*j*) Illinois.

The Cleveland Iron Mining Stock Market During 1898.

By Our Special Correspondent.

With possibly one or two exceptions the iron stocks offered for sale on the Cleveland market closed the year 1898 stronger than twelve months before. During the year there was a healthy demand for mining stocks and the market was considerably strengthened during the Summer by the payment of extra dividends by several companies. The activity in all lines of the iron industry during the year and the prospects for increased activity during 1899 makes the mining stock valuable and difficult to get without the payment of a handsome premium. Minnesota began the year at $58, and the next month advanced to $65. In March, however, the holders of the stock were again offering it at $58, without takers. In July the stock had advanced to $75, and the following month jumped to $100, closing the season at that figure. Republic has been steady, although there has been little movement of the stock. The price has ranged from $9.50 to $10.50, and closed at the last named figure. Lake Superior was held at $25 early in the season, strengthened in June, and in September prospective purchasers were offering $30 and were unable to secure stock at that figure. Owners of Chandler held their stock at $41 at the close of the season, an increase of $1 over the price quoted the first of the year. Cleveland-Cliffs was quoted at $38 at the close of the season of 1897, gradually advanced until October, when it was selling for $47, and closed the year at $45. Pittsburg & Lake Angeline advanced from $85 to $100 in April, and held firm

FLUCTUATIONS OF MINING STOCKS AT COLORADO SPRINGS DURING 1898.

Name of Company.	Par Value.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alamo	$1.00	.03	.....	.03	.02	.03	.02	.02	.....	.02	.....	.03	.02	.03	.....	.04	.03	.05	.04	.04	.03	.05	.04	.05	.....	421,900
Anaconda Gold	5.00	.41	.38	.43	.40	.38	.30	.39	.29	.53	.40	.53	.45	.43	.39	.38	.34	.70	.40	.63	.49	.64	.40	.85	.40	187,176
Argentum-Juniata	2.00	.20	.18	.21	.19	.21	.18	.26	.18	.27	.23	.27	.25	.25	.22	.22	.20	.25	.19	.24	.22	.40	.22	.46	.35	502,239
Bat le Mountain	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.39	.33	.39	.30	.45	.28	.43	.39	100,140
Columbine	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.19	.15	.16	.09	.15	.13	.16	.14	185,600
Creede & Cripple Creek	1.00	.04	.03	.04	.03	.05	.03	.....	.....	.....	.....	.04	.03	.04	.....	.05	.03	.08	.05	.06	.04	.06	.01	.05	.....	82,200
Cripple Creek Cons	1.00	.10	.09	.11	.10	.11	.08	.09	.08	.09	.08	.09	.09	.09	.08	.09	.06	.11	.08	.09	.08	.09	.06	.09	.08	713,317
Currency	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.04	.03	.05	.02	.04	.02	.05	.03	.04	.03	92,800
Des Moines	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.04	.01	.02	.01	.02	.....	.02	.....	.02	.....	141,667
Elkton Cons	1.00	.90	.....	.88	.75	.84	.69	.76	.51	.95	.70	.94	.88	.95	.85	1.17	.92	1.27	1.16	1.19	1.00	1.06	.93	.96	.70	2,505,371
El Paso	1.00	.20	.16	.17	.08	.09	.05	.07	.06	.07	.06	.09	.07	.09	.08	.12	.08	.17	.12	.11	.....	.14	.12	.13	.10	827,632
Fanny Rawlings	1.00	.17	.15	.21	.15	.24	.17	.20	.16	.17	.15	.20	.17	.20	.18	.40	.20	.59	.38	.52	.44	.48	.39	.47	.35	642,295
Favorite	1.00	.04	.03	.04	.02	.03	.02	.03	...	.03	.....	.03	.....	.03	.....	.04	.03	.05	.04	.03	.02	.03	.02	.04	.03	199,333
Findley	1.00	.....	.....	.02	.01	.....	.....	.02	.01	.04	.02	.03	.....	.06	.03	.10	.05	.10	.07	.10	.08	.19	.12	.17	.15	2,889,040
Franklin	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.05	.....	.....	.....	.03	.02	.....	.....	.....	.....	.....	.....	.....	.....	273,000
Gold Crater	1.00	.....	.....	1.00	.....	1.00	.....	.....	.....	.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Golden Fleece	1.00	.62	.52	.52	.44	.45	.35	.41	.24	.....	.....	.....	.....	.....	.....	.24	.21	.40	.25	.26	.25	.30	.25	.30	.29	13,125
Gold & Globe	1.00	.04	.....	.03	.02	.....	.....	.05	.....	.....	.....	.03	.02	.03	.....	.02	.....	.05	.02	.05	.04	.07	.05	.06	.05	208,650
Independence	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.70	.63	.70	.50	.61	.53	.62	.52	414,500
Ingham Cons	.50	.14	.09	.16	.07	.09	.05	.07	.06	.07	.06	.07	.05	.06	.....	.08	.07	.10	.07	.....	.....	.09	.07	.08	.07	584,930
Isabella	1.00	.36	.31	.32	.26	.26	.20	.22	.20	.24	.21	.28	.24	.26	.20	.29	.22	.28	.24	.27	.24	.29	.25	.32	.26	1,839,729
Jack Pot	1.00	.05	.04	.05	.04	.04	.03	.....	.....	.04	.03	.07	.03	.07	.06	.13	.08	.15	.09	.17	.11	.26	.21	.37	.24	2,436,139
Lexington	1.00	.07	.....	.07	.....	.....	.....	.....	.....	.07	.....	.....	.....	.....	.....	.....	.....	.08	.07	.08	.07	.08	.07	.07	.....	41,300
Lillie	5.00	.70	.65	.76	.67	.85	.74	.82	.75	.92	.84	.90	.85	.90	.87	1.25	.90	1.22	1.00	1.10	1.07	5.50	1.30	.....	.....	214,527
Magnet Rock	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.02	.....	.02	.01	.02	.01	.02	.01	422,000
Maton	1.00	.17	.16	.16	.14	.15	.12	.14	.13	.15	.14	.24	.21	.23	.20	.27	.21	.41	.30	.34	.29	.36	.28	.34	.27	688,400
Mobile	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01	.....	.....	.....	.03	.01	.03	.02	.04	.03	.04	.03	1,667,000
Mollie Gibson	5.00	.29	.19	.22	.20	.22	.20	.21	.20	.25	.21	.....	.....	.21	.20	.22	.19	.23	.20	.22	.20	.28	.22	.29	.23	154,569
Moon-Anchor	1.00	.99	.87	1.00	.95	.99	.89	.97	.62	.76	.67	.94	.75	.98	.87	1.19	.92	1.23	1.15	1.19	1.11	1.25	1.11	1.28	1.17	710,779
Mt. Rosa	1.00	.17	.11	.14	.....	15	.10	.13	.10	.13	.12	.12	.....	.12	.....	.16	.12	.20	.18	.20	.17	.25	.18	.20	.18	445,090
New Haven	1.00	.....	.....	.01	.....	.....	.....	.....	.....	.....	.....	.01	.....	.01	.....	.03	.01	.03	.02	.02	.....	.02	.....	.02	.....	775,025
Oriole	1.00	.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.02	.01	.02	.01	.02	.01	.02	.01	256,360
Pharmacist	1.00	.08	.06	.07	.06	.06	.05	.07	.05	.06	.05	.06	.05	.06	.04	.04	.02	.10	.03	.07	.03	.05	.04	.04	.....	2,963,850
Portland	1.00	.81	.74	.82	.75	.79	.74	.90	.74	1.00	.88	1.17	1.06	1.17	1.03	1.44	1.13	1.51	1.41	1.46	1.38	1.48	1.41	1.49	1.42	927,375
Prince Albert	1.00	.....	.....	.....	.....	.....	.....	.03	.02	.....	.....	.....	.....	.02	.....	.03	.01	.03	.02	.02	.....	.03	.02	.02	.....	383,600
Specimen	1.00	.04	.03	.04	.03	.03	.02	.06	.02	.04	.03	.04	.03	.04	.....	.04	.....	.06	.04	.05	.03	.04	.....	.06	.04	458,000
Theresa	1.00	.08	.07	.13	.07	.07	.05	.07	.06	.07	.06	.07	.06	.07	.06	.07	.06	.10	.07	.08	.07	.09	.07	.08	.07	496,400
Trachyte	1.00	.02	.01	.02	.01	.01	.....	.....	.....	.01	.....	.02	.01	.02	.01	.03	.02	.03	.01	.03	.....	.05	.03	.05	.04	11,938,454
Union	1.00	.15	.10	.14	.12	.13	.09	.11	.09	.12	.10	.17	.11	.17	.13	.19	.13	.27	.16	.21	.19	.29	.19	.20	.18	4,526,470
Work	1.00	.04	.01	.04	.03	.04	.02	.03	...	.03	.02	.04	.03	.05	.04	.10	.04	.11	.08	.09	.08	.15	.09	.16	.10	4,417,805
Total shares sold		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	46,148,477

at the latter figure until August, when it was advanced to $125 by the holders. This price was maintained until the close of the season.

Salt Lake Stock Market in 1898.

By Our Special Correspondent.

The year established a new record for sales of Utah mining shares. In 1897 the Exchange closed in mid-summer for lack of business, while this year, in spite of the war depression, there was a fair amount of trading throughout a long hot summer. The business done in the 12 months was replete with sensational upsets and startling advances, and speculators have little cause to complain. Prices generally have moved upward, and 1898 ends with a strong and buoyant market. The total shares sold and their selling price for each month are shown below:

Month.	No. of Shares Sold.	Total Selling Value.
January	206,100	$53,048
February	108,895	54,598
March	151,559	49,802
April	187,185	80,791
May	201,385	76,041
June	259,430	71,734
July	98,565	31,340
August	49,575	32,319
September	106,200	35,338
October	347,367	89,087
November	839,069	235,098
December	1,384,131	373,983
Total	3,939,461	$1,183,179

These totals do not represent all the Salt Lake trading, for frequently being launched at 60, and they have ruled between 60 and 70 since. The mill is doing excellent work. Dexter is another lively stock. It began last year around $1.25, dropped below $1 and soared to $3.40. After paying operating charges and $30,000 for additional water power the indebtedness is cut down to about $60,000. Alice was inactive, but during the last few weeks was in better demand. Overland, in January, could be had around 50c. and steadily climbed, reaching $2 in the fall. Overland shares to-day, practically, are owned in Boston and New England and no longer are quoted here.

Ontario began under $3, gained over 100 per cent. by November 15th, and maintained the advance through December. Daly and Daly West did slight business. Daly West mines were idle throughout 1898. The company probably soon will be reincorporated, taking in the Haggin unincorporated half, and operations resumed. Utah and Galena swung back and forth. At the end each showed greater strength. Galena has bobbed about in a way to satisfy the most ardent plunger. Valeo is a recent top-roller. In mid-summer it sold around 20; in November it spurted above $1.50, with brisk business. Omaha increased 200 per cent. Sunshine made sporadic contortions, one twist carrying it above the $1 mark. Little Pittsburg is cutting up high-jinks for Eastern purchasers, jumping up 400 per cent. in a fortnight, largely on merry faith.

Of the Tintics, Star Consolidated might have been had last summer around 50. The other day bids of $1.45 went begging after it was known that David Keith, of the Silver King, had accepted the management. Lower Mammoth has made good profits for those who deal in it. Ajax recently went from 60 to $1.40 almost between two days. Four Aces has changed to a 50c. shipping proposition from a pure 2c. speculation,

FLUCTUATIONS OF MINING STOCKS AT DENVER DURING 1898.

Name of Company.	Par Value.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Sales.
		B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	
Anaconda	5.00	.38	.46	.38	.45	.30	.42	.25	.39	.35	.55	.39	.55	.35	.48	.33	.42	.38	.82	.48	.66	.50	.65	.52	.61	$552,400
Anchoria-Leland	1.00	.93	.104	.85	1.10	.68	.98	.42	.81	.58	1.00	.....	.....	.70	.80	.60	.90	.70	.86	.72	.82	.70	.83	.90	.....	39,500
Arcadia Con	1.00	.02	.03	.01	.03	.006	.02	.005	.02	.....	.....	.011	.02	.01	.02	.01	.02	.02	.03	.02	.03	.02	.04	.03	.....	69,050
Argentum-Juniata	1.00	.18	.21	.19	.21	.18	.21	.15	.20	.22	.28	.24	.28	.20	.25	.19	.23	.18	.26	.22	.25	.21	.39	.34	.45	84,900
Bankers	1.00	.04	.07	.06	.04½	.04	.08	.04	.07	.04	.07	.05	.08	.04	.08	.04	.07	.06	.08	.06	.07	.05	.07	.06	.....	607,000
Banner	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.06	.....	.06	.08	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,000
Ben Hur	1.00	.....	.....	.02	.04	.01	.04	.01	.03	.02	.03	.....	.....	.02	.03	.01	.04	.03	.07	.03	.04	.04	.....	.03	.04	130,100
Big Six	1.00	.08	.21	.09	.20	.01	.15	.03	.16	.03	.15	.03	.15	.05	.15	.04	.12	.....	.....	.05	.06	.04	.06	.04	.07	31,200
Creede & Cripple Creek	1.00	.03	.05	.03	.13	.02	.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,000
Cripple Creek Con	1.00	10	.11	.09	.12	.08	.11	.06	.13	.07	.11	.06	.10	.08	.10	.07	.10	.07	.12	.08	.09	.06	.09	.08	.09	308,400
Della S	1.00	.04	.20	.05	.12	.03	.20	.01	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.04	.06	.....	.....	1,000
Elkton Cons	1.00	.81	.89	.75	.88	.68	.85	.53	.74	.70	.95	.88	1.00	.85	.96	.91	1.20	1.14	1.28	1.00	1.19	.92	1.06	.70	.96	274,691
El Paso	1.00	.14	.20	.08	.18	.05	.10	.05	.08	.05	.08	.06	.10	.07	.09	.07	.12	.10	.19	.10	.14	.11	.14	.10	.13	292,480
Enterprise	1.00	.03	.06	.03	.06	.02	.05	.01	.05	.03	.....	.03	.05	.03	.05	.04	.07	.04	.07	.04	.06	.04	.05	.03	.06	113,100
Fanny Rawlings	1.00	.14	.18	.14	.25	.14	.25	.13	.24	.....	.....	.17	.22	.16	.23	.19	.50	.30	.65	.44	.55	.40	.49	.37	.50	122,300
Findley	1.00	.01	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.03	.06	.05	.11	.09	.10	.08	.10	.12	.19	.14	.18	112,000
Garfield Cons	1.00	.05	.07	.06	.08	.04	.07	.05	.07	.....	.....	.06	.15	.10	.13	.....	.....	.12	.14	.10	.13	.12	.14	.12	.16	134,325
Gilpin & C. C	1.00	.....	.....	.16	.17	.16	.22	.23	.27	.26	.30	.29	.32	.12	.40	.....	.....	.39	.45	.40	.45	.....	.....	.43	.46	196,550
Gold Coin	1.00	.75	1.00	.80	1.02	.60	1.03	.80	1.03	.85	.95	.88	1.08	.80	1.00	.....	.....	1.39	1.51	1.23	1.50	1.35	1.53	1.46	1.64	42,450
Gold Crater	1.00	.50	1.40	.50	1.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold & Globe	1.00	.15	.05	.....	.....	.01	.04	.01	.04	.....	.....	.....	.....	.02	.....	.02	.03	.04	.05	.....	.....	.04	.13	.05	.14	7,700
Gold Eagle	1.00	.15	.30	.10	.50	.15	.38	.21	.40	.30	.40	.25	.50	.18	.40	.18	.40	.....	.....	.....	.....	.....	.....	.....	.....	16,100
Gold Fleece	1.00	.50	.60	.45	.54	.28	.51	.21	.50	.22	.39	.18	.42	.16	.30	.19	.30	.30	.76	.....	.....	.....	.....	.....	.....	116,974
Independence	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.62	.78	.60	.76	.49	.72	.52	.61	.58	.62	151,400
Iowa	1.00	.20	.48	.15	.50	.10	.36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ironclad	1.00	.03	.04	.02	.04	.01	.03	.01	.02	.01	.03	.02	.04	.02	.03	.02	.06	.02	.04	.02	.03	.03	.04	.02	.04	201,250
Isabella	1.00	.31	.35	.26	.36	.19	.26	.19	.23	.20	.24	.23	.27	.20	.26	.22	.29	.24	.30	.23	.27	.25	.30	.26	.32	631,100
Jack Pot	1.00	.04	.06	.04	.06	.02	.04	.02	.04	.03	.05	.03	.07	.06	.08	.07	.14	.10	.16	.12	.20	.20	.25	.23	.36	401,505
Jefferson	1.00	.03	.07	.04	.06	.03	.07	.02	.06	.03	.05	.04	.10	.06	.13	.....	.....	.04	.08	.03	.06	.05	.06	.04	.06	29,200
Keystone	1.00	.04	.06	.04	.09	.02	.05	.03	.05	.04	.08	.04	.05	.04	.05	.04	.06	.05	.07	.04	.06	.05	.06	.05	.06	107,100
Lillie	5.00	.62	.72	.50	.80	.50	1.00	.64	.88	.60	.96	.75	1.00	.85	.95	.88	1.25	1.02	1.25	1.00	1.16	.....	.....	.....	.....	123,200
Matoa	1.00	.15	.17	.13	.16	.11	.15	.13	.16	.13	.16	.15	.23	.21	.33	.19	.23	.28	.43	.24	.32	.28	.36	.28	.33	218,100
Mineral Rock	1.00	.02	.07	.02	.10	.05	.09	.04	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,650
Mollie Gibson	5.00	.18	.31	.17	.23	.18	.23	.16	.23	.20	.28	.22	.25	.11	.22	.18	.25	.19	.25	.2.	.24	.20	.25	.17	.35	54,709
Moon-Anchor	1.00	.86	.98	.94	1.03	.93	1.00	.64	.97	.50	.78	.75	.96	.87	.98	.91	1.20	1.12	1.20	1.10	1.20	1.13	1.25	1.15	1.30	121,950
Mt. Rosa	1.00	.09	.16	.12	.17	.10	.14	.09	.14	.11	.15	.12	.15	.11	.15	.10	.18	.16	.20	.16	.20	.17	.25	.17	.23	146,000
New Haven	1.00	.01	.02	.008	.02	.006	.02	.....	.....	.....	.....	.01	.....	.01	.02	.02	.....	.02	.03	.02	.....	.02	.03	.02	.03	100,000
New Zealand	1.00	.04	.07	.03	.10	.03	.07	.05	.07	.06	.09	.....	.....	.04	.08	.....	.....	.08	.18	.10	.15	.10	.14	.11	.16	75,443
Nugget	1.00	.02	.10	.03	.08	.01	.12	.02	.07	.....	.....	.....	.....	.02	.08	.....	.....	.....	.....	.05	.08	.01	.05	.....	.....	30,000
Ophir	1.00	.04	.15	.03	.13	.05	.15	.06	.12	.04	.10	.09	.12	.08	.13	.....	.....	.08	.11	.06	.14	.05	.10	.10	.....	89,300
Pharmacist	1.00	.06	.08	.06	.07	.04	.07	.04	.07	.04	.06	.05	.06	.04	.06	.03	.05	.03	.10	.03	.06	.03	.05	.03	.04	194,600
Portland	1.00	.76	.84	.72	.84	.73	.79	.73	.88	.60	1.01	.99	1.16	1.03	1.18	1.12	1.45	1.40	1.51	1.39	1.50	1.40	1.48	1.40	1.48	87,730
Prince Albert	1.00	.01	.03	.01	.03	.005	.04	.006	.03	.01	.05	.01	.03	.01	.03	.01	.03	.02	.03	.01	.03	.02	.03	.01	.02	74,700
Sacramento	1.00	.02	.03	.02	.04	.02	.03	.01	.03	.02	.03	.02	.04	.02	.04	.02	.05	.04	.06	.03	.04	.03	.05	.04	.05	181,600
Republic	1.00	.02	.06	.02	.04	.01	.04	.02	.03	.....	.....	.02	.04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,000
Smuggler	1.00	.20	.50	.20	.50	.09	.60	.20	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.20	.35	.25	.28	.....	.....	2,700
Specimen	1.00	.....	.....	.....	.....	.01	.04	.02	.04	.03	.04	.03	.05	.03	.04	.03	.06	.03	.07	.03	.05	.04	.05	.03	.05	96,200
Trachyte	1.00	.02	.03	.01	.03	.005	.02	.....	.....	.....	.....	.01	.02	.008	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,000
Union Gold	1.00	.10	.15	.12	.15	.09	.14	.09	.12	.10	.13	.10	.19	.12	.17	.12	.19	.16	.25	.19	.23	.19	.22	.17	.21	326,330
Union Leasing	1.00	.01	.06	.01	.03	.01	.10	.02	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000
Virginia Mountain	1.00	.02	.03	.02	.04	.02	.03	.01	.03	.01	.05	.04	.05	.03	.04	.04	.06	.04	.05	.03	.04	.03	.04	.03	.04	136,500
Work	1.00	.04	.05	.03	.06	.01	.04	.02	.04	.02	.03	.02	.05	.04	.05	.05	.12	.09	.11	.08	.10	.10	.14	.11	.16	209,250
Total Sales																										6,988,607

the off-call sales aggregate more than those on the Exchange. It is probable twice the figures given will indicate the year's actual trading. A year ago seats on the local board were bargain-counter drugs at $20 to $30 each, with special inducements for frayed job lots. One day last month four seats at auction brought $235 to $320 each, and later on the same day $475 was refused for one.

Northern Light, the only active trader which suffered a complete collapse, selling under the last assessment, has more than recovered the quotations of January, 1897. Grand Central was the brilliant star of 1898. It began January under $1 and with few recessions climbed to $9.60, then sagged off a little with the holiday profit-taking. Dividends began in June—12½c. per share, or $31,250—and continued monthly. Silver King has doubled in price, and is held about as high and firmly per share, with its 150,000 shares, as Centennial Eureka, with 30,000 shares. The latter resumed dididends in December, not having paid before since March, 1897. Mercur fluctuated from $8.50 to $6.90 and ends the year about midway between these extremes. Swansea steadily climbed from below $2 to $3.90 and ruled firm. The other dividend-payers have neither advanced nor declined in any marked degree. The total dividends paid by the companies making known their distributions are $1,605,750. Of the new dividend-payers Chloride Point gradually moved up till it is very firm at over 100 per cent. above a year ago. Daisy made its bow on the Exchange the latter part of September, the shares and Joe Bowers is in the same boat.

Some shares of worth, not noted, are held locally. It is impossible in this space to mention all. Never have the mines in Utah's reliable producing districts shown better in mid-winter than to-day, and the shares reflect the physical condition of the mines. There seems a bright outlook for the new year for the Salt Lake stock market, with many opportunities for profit-making.

The San Francisco Mining Stock Market in 1898.

By Our Special Correspondent.

The Mining Share Market on Pine street has been as near absolute dissolution during the year now ended as could well be imagined. For the first six months of this period it was simply kept alive by the operations of a few dealers of limited means, who managed to eke out a miserable livelihood trading on the turn of a cent or two one way or the other, the small fluctuations being manipulated by a system which played the Pine Street Exchange against the smaller institution on Pauper Alley at the expense of the brokers in the so-called "Big Board." Between this fraternity of "chippers" and a few scalping brokers the few side dealers stood little chance in a speculative game which had dwindled down to a most beggarly margin, so that in time they were practically weeded out, leaving the companies in a position

where it was next to impossible to collect assessments. With this source of revenue cut off the managers of the mining companies soon found themselves between the horns of a dilemma, a serious situation, which left them as an alternative only a united effort to resurrect the market by reviving public interest in the Comstock mines.

lected for the onerous undertaking of arranging the plan of drainage were energetic and capable, and the way in which they finally put their plans into working shape has earned confidence. A contract was effected with the Risdon Iron Works, owners of a hydraulic elevator, who for $30,000 have guaranteed to lower the water 500 ft. from its present level—1,750 below the surface—the power being supplied them at a nominal cost by the local water company at Virginia City.

The new plant will be installed at the C & C Shaft, with the object in view of first attacking an unprospected zone in the old Consolidated California & Virginia Mine, where it is confidently believed ore will be found in the course of explorations. If the drainage of the lode in this direction proves a success, one or more plants of the same kind will undoubtedly be put in at different points along the lode, the cost being

FLUCTUATIONS OF UTAH MINING SHARES IN 1898.

	Par Value.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
		4	15	5	19	5	19	2	16	7	21	4	18	2	16	6	20	3	17	1	15	5	19	3	17
Ajax	$10	$ .51	$ .40	$ .37	$ .27	$ .35	$ .33	$ .34	$ .36	$ .35	$ .33	$ .30	$ .30	$ .30	$ .31	$ .32	$ .34	$ .37	$ .33	$ .44	$ .45	$ .65	$ .64	$ .60	$1.23
Alice	25	.....	.50	.83	.....	.85	.....	.....	.80	.....	.....	.85	.....	.....	.....	.....	.....	.60	.60	.65	.....	.75	.....	.75	.75
Anchor	10	.70	.70	.60	.60	.60	.50	.50	.50	.50	.52	.50	.25	.25	.15	.20	.20	.60	.60	.70	.65	.65	.65	.91	.84
Bullion-Beck	10	4.90	5.50	5.00	5.00	5.60	6.00	5.90	5.90	5.60	5.65	6.20	5.50	5.65	5.75	6.00	6.05	6.05	5.85	5.50	5.00	5.15	5.25	4.55	5.00
Buckeye	1	.30	.01	.01	.01	.01	.01	.01	.01	.02	.01	.00	.....	.01	.02	.01	.02	.01	.01	.00	.01	.02	.04	.05	.06
Centennial Eureka	50	21.25	21.00	19.00	21.00	21.00	22.50	23.00	24.50	25.50	32.00	31.00	31.00	32.00	30.00	26.00	26.00	29.00	26.00	26.50	28.00	31.50	38.00	35.50	36.00
Chloride Point	1	.56	.55	.56	.63	.66	.65	.65	.91	.90	.90	.91	.91	.91	.96	.97	.98	1.00	.97	.98	1.00	1.12	1.10	1.15	1.37
Daisy	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.60	.61	.60	.60	.63	.64
Dalton	5	.00	.00	.00	.00	.01	.00	.....	.00	.00	.00	.00	.00	.....	.00	.00	.....	.00	.00	.00	.00	.....	.01	.01	.01
Dalton & Lark	1	.03	.02	.03	.03	.02	.01	.01	.02	.02	.05	.05	.06	.09	.08	.03	.03	.04	.03	.05	.04	.04	.05	.06	.08
Daly	20	.75	.75	.60	.50	.60	.60	.60	.70	.65	.68	.60	.62	.67	.70	.72	.67	.72	.70	.80	.80	.92	.90	1.02	1.00
Daly West	20	3.00	3.75	3.00	3.00	3.50	4.00	4.00	4.25	3.75	3.50	3.75	3.00	3.50	3 25	3.50	3.75	4.10	4.50	4.50	4.50	4.00	4.35	4.10	4.15
Dexter	5	1.25	1.35	1.75	1.50	.95	.97	.75	1.20	1.25	1.06	1.15	1.06	1.35	1.22	1.01	1.30	1.29	1.38	1.62	2.49	2.77	3.00	3.60	3.18
Eagle	1	.01	.01	.01	.02	.03	.02	.03	.06	.05	.04	.04	.04	.05	.04	.03	.02	.03	.05	.07	.07	.11	.10	.08	.06
Eagle & Blue Bell	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.15	1.75	1.75
Emerald	1	.02	.02	.02	.03	.02	.03	.06	.02	.05	.05	.03	.02	.....	.04	.03	.06	.03	.05	.06	.04	.12	.15	.17	.16
Four Aces	1	.04	.03	.02	.02	.02	.05	.08	.09	.05	.05	.09	.06	.04	.04	.04	.04	.04	.05	.05	.08	.28	.27	.31	.45
Galena	10	.57	.53	.54	.54	.50	.60	.64	.64	.62	.61	.57	.52	.51	.51	.41	.49	.37	.20	.16	.29	.39	.59	.61	.60
Geyser-Marion	5	.92	.94	.92	.89	.89	1.00	1.00	1.02	.90	.89	.86	.77	.75	.77	.74	.65	.63	.69	.64	.66	.63	.63	.82	.89
Golden Eagle	1	.....	.07	.....	.....	.04	.04	.02	.....	.....	.03	.....	.....	.....	.01	.....	.02	.02	.04	.....	.03	.04	.07	.06	.09
Grand Central	1	.70	1.05	1.00	2.00	1.50	1.40	1.65	2.00	4.25	4.60	6.75	7.00	6.95	7.00	6.80	6.35	6.80	6.75	6.80	6.70	7.15	7.25	7.92	8.90
Homestake	1	.00	.01	.00	.00	.00	.00	.....	.02	.01	.01	.01	.02	.....	.00	.00	.....	.....	.00	.....	.....	.00	.03	.03	.05
Horn Silver	25	1.25	1.25	1.15	1.25	1.25	1.25	1.30	1.30	1.25	1.25	1.25	1.27	1.15	1.37	1.35	1.35	1.22	1.20	1.20	1.15	1.15	1.15	1.17	1.15
Joe Bowers	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.15	.....	.04	.04	.06	.23	.24	.21	.29
Little Pittsburg	5	.02	.01	.01	.01	.01	.01	.01	0.1	.02	.02	.02	.02	.....	.02	.01	.02	.02	.02	.02	.03	.03	.04	.10	.15
Lower Mammoth	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.46	.37	.30	.30	.35	.70	.70	.63	.65
Mammoth	5	2.17	2.17	1.75	2.25	2.12	2.12	1.90	1.96	1.95	1.97	1.75	1.90	1.82	1.85	1.85	1.98	1.90	1.75	1.66	2.10	2.15	1.95	2.00	1.97
Mercur	25	8.45	8.45	8.37	8.35	8.45	8.40	8.35	8.10	7.95	8.02	7.95	7.35	6.90	7.10	7.37	7.30	7.27	7.10	7.12	7.00	6.95	7.05	7.50	7.65
Northern Light	5	.39	.23	.12	.12	.22	.21	.26	.29	.15	.16	.07	.03	.01	.11	.07	.09	.09	.09	.08	.07	.06	.31	.45	.57
Omaha	2	.26	.25	.22	.20	.22	.20	.17	.25	.25	.28	.25	.25	.25	.30	.29	.43	.43	.52	.50	.08	.56	.57	.55	.54
Ontario	100	2.85	3.20	2.90	3.12	3.15	3.10	3.75	3.25	3.40	3.75	3.85	3.85	3.25	3.60	3.50	3.90	4.25	4.50	4.50	5.25	5.35	6.00	6.60	6.65
Sacramento	5	.22	.27	.28	.29	.31	.44	.46	.45	.73	.72	.70	.65	.60	.60	.56	.52	.55	.55	.56	.57	.57	.62	.56	.53
Silver King	20	15.50	16.00	16.00	16.50	16.87	16.75	16.75	16 75	16.75	17.75	19.25	19 75	19.50	19.50	19.75	19.25	24.00	21.00	21.00	27.50	27.50	28.50	30.00	31.00
South Swansea	1	1.22	1.20	1.25	1.30	1.22	1.15	1.17	1.22	1.17	1.22	1.25	1.20	1.12	1.15	1.18	1.20	1.29	1.21	1.22	1.26	1.25	1.30	1.22	1.27
Star Consolidated	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.99	1.00	1.41
Sunbeam	1	.05	.05	.01	.02	.03	.02	.03	.11	.08	.09	.14	.16	.08	.06	.04	.05	.05	.05	.05	.05	.07	.09	.09	.15
Sunshine	10	.28	.16	.20	.20	.20	.20	.25	.27	.30	.27	.25	.21	.21	.28	.25	.25	.27	.27	.30	.50	.35	.42	.56	.45
Swansea	5	1.95	2.02	2.07	2 27	2.12	2.07	2.00	1.95	2.05	2.17	2.22	2.25	2.42	2.30	2.52	2.25	2.66	2.75	2.72	2.72	3.00	3.50	3 75	3.65
Utah	10	.61	.61	.54	.54	.54	.54	.55	.55	.50	.54	.50	.47	.47	.51	.67	.60	.68	.50	.56	.56	.70	.70	.85	.95
Tetro	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.03	.06	.06
Valeo	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.15	.52	.33	.47	.51	.53	47	1.10	1.45	1.30	1.47

NOTE. This table gives the closing bid quotation on the first and third Saturday of each month, except where Saturday was a holiday, when the following Monday market is given As near as may be, this affords the best index of the Salt Lake market and generally is but a little under what the shares can be bought for, particularly for the active traders. So me of the present favorites were not heard of several months ago. The table supplies a record of when each new stock began to attract attention.

The solution of the problem presented many difficulties. Everything connected with the business had been permitted to run to seed. The leading manipulators had long ago deserted the street. The heaviest class of operators had retired one by one in sheer disgust, while, with one or two exceptions, the brokers themselves were reduced to financial straits which rendered them incapable of resurrecting the market by independent action upon their own part. It was useless trying to raise any more money from the public for explorations in the upper levels.

FLUCTUATIONS OF MINING STOCKS AT SAN FRANCISCO DURING 1898.

Name and Location of Company.	Par Value.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.
Alpha Cons., Nev	1.00	.08	.05	.11	.02	.15	.03	.09	.01	.03	.02	.02	.01	.05	.02	.05	.02	.04	.02	.03	.01	.06	.02	.06	.0.
Alta, Nev	2.00	.15	.10	.19	.04	.17	.11	.26	.16	.18	.09	.10	.02	.11	.02	.15	.07	.11	.05	.07	.02	.14	.04	.13	.0
Andes, Nev	3.00	.16	.10	.15	.10	.13	.08	.17	.06	.09	.07	.08	.02	.07	.03	.07	.02	.15	.06	.10	.07	.12	.06	.08	.03
Belcher, Nev	3.00	.48	.33	.34	.23	.26	.19	.25	.08	.16	.06	.10	.02	.19	.03	.19	.11	.22	.07	.15	.05	.26	.11	.34	.16
Best & Belcher, Nev	3.00	.58	.43	.46	.36	.37	.30	.50	.26	.33	.25	.27	.09	.19	.08	.19	.11	.37	.13	.28	.13	.36	.24	.45	.32
Bullion, Nev	1.00	.10	.03	.10	.06	.12	.07	.08	.01	.07	.05	.05	.01	.07	.02	.04	.01	.07	.02	.11	.01	.07	.05	.05	.02
Caledonia, Nev	3.00	.24	.15	.40	.16	.31	.24	.27	.15	.25	.12	.26	.11	.22	.09	.24	.15	.30	.18	.28	.18	.34	.22	.23	.17
Challenge Cons., Nev	3.00	.38	.15	.38	.24	.30	.25	.32	.10	.24	.07	.23	.12	.21	.07	.15	.12	.26	.14	.17	.10	.23	.15	.19	.14
Chollar, Nev	3.00	.40	.20	.40	.20	.54	.34	.65	.16	.24	.14	.15	.05	.21	.04	.23	.13	.20	.13	.17	.07	.25	.11	.30	.12
Confidence, Nev	3.00	.97	.72	.78	.65	.73	.52	.78	.43	.45	.33	.45	.21	.48	.18	.49	.35	.53	.19	.49	.25	.73	.49	.80	.55
Con. California & Virginia, Nev	2.50	1.35	.81	1.00	.83	.86	.76	1.00	.57	.66	.45	.48	.14	.42	.07	.44	.30	.92	.36	.90	.61	1.50	.96	1.40	.98
Cons. Imperial, Nev	1.00	.01	.....	.02	.01	.01	.....	.01	.....	.01	.....	.01	.....	.....	.....	.....	.....	.01	.....	.01	.....	.01	.....	.01	.....
Cons. New York, Nev	1.00	.02	.01	.03	.01	.02	.01	.02	.....	.01	.....	.02	.....	.....	.....	.03	.01	.02	.....	.02	.01	.04	.....	.02	.....
Crown Point, Nev	3.00	.33	.21	.33	.11	.25	.11	.27	.09	.12	.06	.15	.02	.11	.02	.15	.06	.20	.10	.16	.06	.22	.09	.19	.14
Exchequer, Nev	1.00	.....	.....	.06	.01	.06	.03	.04	.01	.01	.....	.02	.01	.....	.....	.03	.02	.02	.01	.02	.01	.02	.01	.01	.....
Gould & Curry, Nev	3.00	.44	.30	.32	.18	.25	.16	.33	.11	.27	.18	.19	.04	.09	.03	.18	.06	.27	.14	.21	.13	.25	.15	.29	.16
Hale & Norcross, Nev	3.00	1.65	1.20	1.65	1.40	1.50	1.25	1.35	.47	1.00	.45	.95	.41	.60	.35	.80	.60	1.15	.45	1.10	.75	1.40	.90	1.88	1.50
Julia Cons, Nev	1.00	.01	.....	.02	.01	.02	.01	.03	.01	.01	.....	.....	.....	.....	.....	.....	.....	.07	.01	.01	.....	.01	.....	.01	.....
Justice, Nev	2.00	.41	.28	.46	.30	.30	.23	.24	.09	.09	.06	.08	.01	.08	.03	.15	.05	.18	.10	.10	.03	.22	.05	.20	.14
Kentuck Cons , Nev	1.00	.06	.03	.04	.01	.03	.02	.04	.01	.11	.07	.06	.03	.04	.01	.05	.04	.09	.02	.03	.01	.07	.02	.11	.05
Lady Washington, Nev	1.00	.01	.....	.03	.....	.03	.02	.09	.....	.01	.....	.....	.....	.14	.10	.01	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, Nev	3.00	.32	.20	.36	.21	.44	.28	.43	.15	.21	.07	.20	.08	.16	.06	.17	.10	.09	.02	.22	.09	.30	.20	.35	.26
Occidental Cons., Nev	3.00	1.60	1.30	1.55	1.35	2.75	1.55	2.95	2.65	1.10	.35	.68	.55	.57	.50	.59	.49	.90	.47	.84	.20	.72	.40	1.15	.52
Ophir, Nev	3.00	.65	.36	.57	.47	.85	.42	.83	.52	.43	.32	.37	.14	.27	.09	.33	.15	.76	.17	.63	.40	.77	.64	.71	.46
Overman, Nev	2.00	.14	.06	.12	.05	.12	.08	.11	.04	.08	.02	.08	.02	.08	.03	.07	.02	.06	.03	.06	.01	.08	.02	.08	.02
Potosi, Nev	3.00	.43	.27	.27	.18	.46	.13	.41	.29	.24	.17	.19	.03	.21	.03	.20	.14	.23	.14	.17	.08	.21	.12	.27	.10
Savage, Nev	2.50	.25	.13	.28	.13	.27	.22	.26	.11	.18	.08	.10	.04	.14	.07	.13	.09	.22	.10	.12	.05	.25	.07	.18	.10
Scorpion, Nev	1.00	.20	.04	.06	.05	.06	.05	.05	.02	.01	.....	.01	.....	.03	.01	.03	.01	.04	.02	.04	.03	.04	.02	.03	.02
Sierra Nevada, Nev	3.00	1.05	.53	1.05	.70	1.90	.94	2.05	.73	.67	.40	.68	.28	.55	.36	.62	.46	1.15	.56	.81	.61	1.20	.74	1.30	.60
Silver Hill, Nev	1.00	.05	.03	.04	.03	.04	.01	.02	.....	.06	.05	.03	.02	.06	.03	.12	.05	.05	.....	.....	.....	.05	.....	.....	.....
Standard Cons , Cal	1.00	1.70	1.30	1.75	1.50	1.75	1.55	1.65	1.45	1.60	1.50	1.65	1.50	1.65	1.40	1.65	1.40	1.80	1.50	1.75	1.60	1.95	1.70	2.50	1.75
Union Cons., Nev	2.50	.47	.21	.45	.34	.45	.32	.48	.22	.19	.07	.19	.05	.29	.12	.28	.15	.33	.14	.26	.17	.33	.23	.28	.10
Utah Cons., Nev	1.00	.12	.07	.12	.09	.13	.08	.13	.03	.07	.04	.06	.01	.07	.01	.06	.05	.26	.06	.07	.04	.26	.06	.17	.07
Yellow Jacket, Nev	3.00	.42	.28	.45	.22	.31	.20	.28	.11	.27	.05	.25	.09	.34	.08	.33	.14	.26	.14	.20	.10	.25	.16	.23	.15

Failure had attended all efforts in this direction, and it was deemed worse than useless to continue the attempt. Only one course remained, to reopen the lower levels beneath the present water levels and resume the search for ore at depth.

The idea was a happy one, and fortune favored the proposition from the start. The execution of the plan was turned over to a number of officials selected from the directors of the leading companies, who organized in turn as the Comstock Pumping Association. The men se-

comparatively insignificant if the results predicted are attained. The cost of working the pumps at depth has heretofore deterred the mining managers from any attempt to solve the water problem, which is the most serious ever encountered in the exploration of the Comstock mines. An experiment with the old system of steam pumps at Crown Point cost something like $450,000 and resulted in a rank failure. Since then no company has had the temerity to tackle the operation, even by way of suggestion, on similar lines. It is hoped now that the new

plan will solve the difficulty, the plant being simplicity in itself, with the expense reduced to a scale which any of the larger companies could afford to contribute should an ore body materialize to furnish the necessary incentive.

The good effect of the drainage proposition has already made itself felt upon the market, and although prices are still comparatively low, some of the stocks have scored a material advance since the contract was signed for the new pumps. On the day the last assessment was delinquent in office on Con.-Cal.-Virginia a few months ago, the stock was offered on the board for 25c., the exact amount of the levy, with no takers, showing the extraordinary condition of affairs on the Street. Since then it has sold up to $1.50, with a steady daily trade in the stock. Recent assessments have all been paid up, and every company subscribing to the pumping fund has met the demand for its quota promptly, the full amount of the subscription, aggregating $517,000, having been paid into the treasury of the Pumping Association.

The only notable events of the year in connection with the market outside of the movement to drain the lower levels of the Comstock mines have been the reduction of capital stock by the companies and the settlement of the Hale & Norcross litigation. The former was a measure enforced by the war tax, which bore heavily upon the Comstock companies, which in all cases were incorporated with a capital of $10,000,000. This necessitated a stamp of $1 upon every 100 share piece, and practically stopped trading in all stocks, many of which were quoted at less than 5c. per share. The reduction made was to $3 to $1 per share par value.

The Norcross litigation ended with the payment of $1.50 per share to the shareholders, the balance of the $320,000 judgment recovered being distributed between the lawyers and claimants for expenses and other services, the mine being turned over to the Fox board of directors, who have held possession of the company's office and books for the past two years. Work will now be resumed in the mine which has laid idle for a long time.

The prospects for more lively trading in Comstock shares during the coming year are brighter than they have been in a decade. Of course, all depends upon the success of the new pumping plant. The utmost confidence is placed in it, and the hope is generally expressed that it will do all that is claimed for it. If it does, lively times can be looked for in the market again, with the chances favoring another ore development in some of the old-time mines to inaugurate another area of speculation.

The total sales for the 11 months ending December 1st were $4,903,868; from December 1st to 10th, $150,260. The smallest month was July, when the sales amounted only to $150,250. The heaviest month was November, when they reached a total of $716,006.

DIVIDENDS. ($1 = $1,000; total, full amount.)

Name and Location of Company.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	Total Paid.
Adams, S., L., Colo.	75	8	.....	.....	6	.....	.....	.....	$693,500
Ætna Con., Q., Cal.	.....	.....	.....	20	20	40	40	40	160,000
Alaska-Mexican, G., Alaska	.....	.....	.....	26	80	70	80	72	321,381
Alaska-Treadwell, G., Alaska (a)	450	300	375	375	400	350	300	300	3,625,000
Alice, S., G., Mont.	75	.....	.....	.....	.....	.....	80	20	1,075,000
Alliance, S., L., Utah	.....	.....	.....	.....	.....	.....	5	.....	5,000
Am. Dev. & Mg., G., S., C., Mont.	.....	.....	.....	52	24	.....	.....	.....	76,422
American Gold, G., S., L., Colo.	.....	.....	.....	.....	.....	.....	36	54	362,000
American & Nettie, G., Colo.	45	30	.....	.....	.....	.....	.....	.....	225,000
Anaconda, G., Colo.	.....	13	.....	.....	.....	.....	.....	.....	12,500
Anaconda Copper, Mont.	.....	.....	.....	.....	.....	2250	3000	3000	8,250,000
Anchoria-Leland, G., Colo.	.....	.....	.....	.....	.....	30	72	72	174,000
Apollo, Con., G., Cal.	.....	.....	.....	.....	.....	.....	100	.....	100,000
Argentum-Juniata, S., Colo.	.....	.....	.....	.....	156	.....	.....	.....	156,000
Argonaut, G., Cal.	.....	.....	.....	.....	.....	.....	.....	180	180,000
Aspen, S., L., Colo.	100	100	100	40	.....	.....	.....	.....	900,000
Associated, G., Colo.	.....	.....	.....	.....	.....	.....	.....	50	50,000
Atlantic, C., Mich.	40	.....	.....	.....	.....	.....	40	40	780,000
Aurora, I., Mich.	200	100	200	.....	.....	50	.....	50	750,000
Bald Butte, G., Mont.	30	20	100	200	128	32	8	98	642,148
Bangkok-Cora Belle, S., Colo.	.....	.....	.....	.....	54	6	.....	.....	105,000
Belden, F., E., M., N. H.	.....	45	60	60	48	4	.....	.....	217,000
Big Seven, Cal.	.....	.....	.....	.....	.....	.....	3	3	3,000
Big Six, G. S., Colo.	.....	.....	.....	.....	.....	3	5	7	15,000
Bimetallic, S., G., Mont.	840	200	100	.....	.....	.....	.....	.....	1,630,000
Boreel, S., Colo.	.....	.....	60	23	.....	.....	.....	.....	105,000
Boston & Montana, C., S., Mont.	500	.....	.....	275	1050	1500	1800	1950	9,125,000
Breece, L., Colo.	.....	.....	.....	.....	.....	.....	.....	10	30,000
Brotherton, L., Mich.	.....	40	80	.....	.....	.....	.....	.....	120,000
Bullion-Beck & Champion, Utah.	.....	.....	.....	425	325	220	170	90	2,328 400
Bunker Hill & Sull., S., L., Ida.	.....	.....	.....	.....	.....	.....	102	228	600,000
Caledonia, G., So. Dak.	.....	.....	.....	.....	.....	.....	.....	.....	192,000
Calumet & Hecla, C., Mich.	2000	2000	2000	1500	2000	2500	5000	5000	56,850,000
Centennial-Eureka, S., G., L., Utah	330	90	188	195	510	330	98	15	2,025,000
Central, C., Mich.	20	.....	.....	.....	.....	.....	.....	.....	1,970,000
Central Lead, L., Mo.	.....	.....	.....	.....	.....	.....	28	54	82,000
Champion, G., Cal.	43	41	41	41	27	.....	51	26	296,200
Charleston, P., S. C.	.....	.....	140	.....	.....	.....	10	30	180,000
Church, G., Cal.	.....	.....	.....	.....	5	.....	.....	.....	5,000
Cleopatra, G., S., So. Dak.	.....	.....	450	.....	.....	.....	.....	.....	450,000
C. O. D., G., Colo.	.....	.....	.....	.....	20	5	.....	.....	25,000
Colorado Central, S., Colo.	14	55	28	.....	.....	.....	.....	.....	502,661
Colorado Smelting, Colo.	.....	.....	.....	.....	.....	.....	.....	250	1,845,000
Commodore, Colo.	.....	.....	.....	.....	.....	.....	26	20	140,000
Con. Tiger & Poorman, Ida. (b)	.....	.....	.....	.....	.....	.....	.....	20	20,000
Copper Queen, C., S., Ariz.	.....	140	300	300	150	.....	.....	.....	1,910,000
Coptic, S., Nev. (d)	.....	.....	.....	.....	1	.....	.....	.....	72,000
Cortez, S., Nev.	250	95	45	.....	.....	.....	.....	.....	735,000
Crowned King, G., S., L., Ariz.	.....	.....	.....	.....	.....	.....	.....	96	208,000
Dal on & Lark, G., S., L., Utah.	.....	.....	.....	.....	.....	88	.....	.....	87,500
Daly, S., L., Utah.	450	450	188	.....	.....	37	38	.....	2,925,000
Doe Run, L., Mo.	.....	.....	.....	.....	.....	.....	30	30	60,000
Deadwood-Terra, G., So. Dak. (e)	50	100	.....	.....	.....	100	80	30	1,350,000
De Lamar, S., G., Idaho.	150	200	450	500	450	500	.....	48	2,298,000
Della S., Colo.	.....	.....	.....	50	.....	.....	10	.....	60,000
Derbec, G., Cal.	20	.....	.....	.....	.....	.....	.....	.....	280,000
Dutch, Cal.	.....	.....	.....	.....	.....	.....	8	17	39,000
Elkhorn, S., L., Mont.	300	303	225	142	50	.....	.....	.....	1,265,000
Elkton Cons., G., Colo.	.....	.....	.....	60	.....	90	260	220	656,960
El Paso, Colo.	.....	.....	.....	.....	.....	.....	5	7	12,393
Empire tate, Idaho.	.....	.....	.....	.....	.....	.....	.....	62	61,962
Enterprise, S., G., Colo. (k)	25	450	125	.....	.....	.....	.....	50	900,000
Florence, S., Mont.	.....	.....	.....	.....	35	54	54	25	162,530
Forepaugh, Colo.	.....	.....	.....	.....	16	.....	.....	.....	16,000
Franklin, C., Mich.	80	160	120	80	.....	.....	.....	.....	1,240,000

DIVIDENDS—*Continued.*

Name and Location of Company.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	Total Paid.
Galena, S., L., G., Utah.	.....	.....	.....	.....	6	49	5	.....	71,000
Garfield Grouse, G., Colo.	.....	.....	.....	.....	.....	24	12	.....	36,000
Geyser-Marion, G., Utah.	.....	.....	.....	.....	.....	.....	63	33	96,000
Gold Coin, G., Colo.	.....	.....	.....	.....	15	85	45	.....	150,000
Gold Coin of Victor, Colo.	.....	.....	.....	.....	.....	.....	20	120	140,000
Golden Cycle, Colo.	.....	.....	.....	.....	.....	.....	60	60	158,300
Golden Eagle, G., Colo.	.....	.....	.....	.....	.....	10	.....	.....	10,000
Golden Fleece, G., Colo.	.....	.....	.....	.....	192	162	6	.....	569,179
Golden Reward, G., So. Dak.	.....	60	60	.....	.....	.....	.....	30	155,000
Gold & Globe, G., Colo.	.....	.....	.....	.....	.....	11	25	.....	36,000
Grand Central, G., Utah.	.....	.....	.....	.....	.....	.....	.....	219	218,750
Granite Mountain, S., G., Mont.	1400	520	.....	.....	.....	.....	.....	.....	12,120,000
Gwin, Cal.	.....	.....	.....	.....	.....	.....	12	.....	12,000
Harquahala, G., Ari.	.....	.....	.....	72	.....	.....	.....	.....	126,000
Hecla Con., S., L., Mont.	180	90	60	120	90	45	30	.....	2,175,000
Helena & Frisco, L., S., Idaho.	190	20	.....	15	10	50	.....	.....	475,00
Highland, G., So. Dak.	.....	.....	.....	.....	50	240	240	240	3,784,718
Holy Terror, G., So. Dak.	.....	.....	.....	.....	.....	.....	36	81	117,000
Homestake, G., S. Dak.	150	150	150	256	344	375	375	636	7,181,250
Hope of St. Louis, S., Mont.	.....	100	175	75	10	60	100	20	762,252
Horn Silver, S., L., Utah.	200	200	230	150	50	50	.....	80	5,230,000
Idaho, G., Cal.	93	42	105	.....	.....	.....	.....	.....	5,489,000
Iowa, G., S., L., Colo.	.....	.....	.....	.....	.....	50	25	10	95,000
Iron Mountain, S., Mont.	25	.....	30	50	105	82	5	20	507,500
Isabella, G., Colo.	.....	.....	.....	.....	23	180	68	.....	270,500
Jackson, G., S., Nev.	5	.....	.....	.....	2	.....	.....	.....	80,000
Jay Hawk, S., G., Mont. (h)	.....	33	.....	.....	.....	.....	.....	.....	33,375
Kennedy, G., Cal.	360	500	480	540	184	.....	.....	.....	1,796,000
Keystone, G., Cal	.....	.....	.....	.....	.....	10	.....	.....	10,000
Lake Superior, I., Mich.	.....	400	.....	.....	84	.....	.....	252	2,048,000
Last Chance, S., Colo.	.....	650	.....	.....	.....	.....	.....	.....	650,000
Leadville, S., L., Colo.	.....	12	12	.....	.....	.....	.....	.....	316,000
Lexington, G., Colo.	.....	36	.....	.....	.....	.....	.....	.....	36,000
Lillie, G., Colo. (g)	.....	.....	.....	.....	.....	.....	.....	50	50,000
Maid of Erin, S., L., C., Colo. (j)	.....	.....	.....	.....	.....	.....	.....	6	740,000
Mammoth, G., S., C., Utah.	320	.....	.....	.....	.....	60	.....	200	1,350,000
Matoa, G., Colo.	.....	.....	.....	.....	.....	.....	.....	25	25,000
Maxfield, S., L., Utah.	36	18	.....	.....	.....	.....	.....	.....	117,000
May-Mazeppa, S., L., Colo.	110	.....	.....	.....	.....	.....	.....	.....	180,000
Mead, G., Cal.	.....	.....	.....	.....	.....	.....	.....	80	80,000
Mercur, G., Utah.	.....	.....	60	175	200	200	250	355	1,241,000
Merrimac, G., Cal.	.....	.....	.....	.....	.....	.....	9	.....	9,400
Minnesota, I., Minn.	840	840	495	.....	.....	495	.....	1495	4,735,000
Modoc, G., Colo.	.....	.....	.....	.....	.....	.....	10	90	100,000
Mollie Gibson, S., Colo. (g)	1000	1700	1280	100	50	.....	.....	.....	4,080,000
Montana, Ltd., G., S., Mont.	83	.....	.....	.....	205	.....	.....	36	2,925,640
Montana Ore Purchasing, Mont.	.....	.....	.....	.....	160	320	160	160	800,000
Moon-Anchor, G., Colo.	.....	.....	.....	.....	.....	24	54	150	261,000
Moose, G., Colo.	.....	.....	.....	108	72	6	.....	.....	186,000
Morning Star, S., L., Colo.	50	.....	.....	.....	.....	.....	.....	.....	1,025,000
Morning Star Drift, G., Cal.	23	83	72	106	154	132	142	82	878,600
Moulton, S., Mont.	.....	30	.....	20	30	.....	.....	.....	460,000
Mount Rosa, G., Colo.	.....	.....	.....	5	5	20	10	20	6 ,000
Mountain Copper, Cal.	.....	.....	.....	.....	.....	.....	31	62	93,750
Napa Cons., Q., Cal.	40	70	70	50	80	70	80	80	970,000
New Elkhorn, G., Colo.	.....	.....	.....	.....	.....	72	.....	.....	72,000
New Guston, S., Colo.	440	124	.....	.....	.....	.....	.....	.....	1,198,120
New Idria, Q., Cal.	.....	.....	.....	.....	.....	.....	10	70	100,000
N.Y. & Hond. Rosario, S., G., C.A.	.....	.....	.....	.....	.....	.....	165	165	975,000
North Banner Con., G., Cal.	20	.....	.....	.....	.....	.....	.....	.....	20,000
North Star, G., Cal.	50	50	100	.....	.....	.....	.....	50	500,000
Nugget, G., Colo.	.....	.....	.....	5	5	.....	.....	20	30,000
Omaha, G., Cal.	.....	7	43	43	.....	.....	.....	.....	106,100
Ontario, S., Utah.	900	750	.....	.....	.....	180	203	.....	31,557,500
Osceola, C., Mich.	150	150	100	.....	100	125	150	300	2,522,500
Pamlico, G., Nev.	.....	12	.....	.....	.....	.....	.....	.....	189,080
Pandora, G., Mont.	3	3	.....	.....	.....	.....	.....	.....	6,000
Parrot, C. S., Mont.	360	216	138	67	.....	.....	.....	483	2,267,898
Pennsylvania Con., G., Cal. (i)	.....	.....	.....	.....	.....	.....	18	28	51,350
Petro, S., Utah.	18	.....	.....	.....	.....	.....	.....	.....	17,500
Pharmacist, G., Colo.	.....	36	44	.....	.....	.....	.....	.....	80,000
Pioneer, G., Cal.	.....	.....	.....	.....	.....	.....	.....	50	50,000
Pleasant Valley, C., Utah.	.....	.....	20	.....	.....	.....	.....	.....	593,656
Plumas Eureka, G., Cal.	70	25	53	.....	.....	.....	.....	.....	2,696,204
Portland, G., Colo.	.....	.....	.....	67	556	240	330	570	2,227,080
Princess, G., Colo.	.....	.....	.....	.....	.....	.....	45	.....	45,000
Quicksilver, Q., Cal. (l)	118	.....	.....	.....	.....	.....	.....	.....	2,475,082
Quincy, C., Mich.	400	350	300	400	600	1000	800	650	10,120,000
Raven, G., Colo.	.....	.....	.....	.....	.....	.....	.....	15	15,000
Red Cloud, S. L., Idaho.	20	80	70	10	.....	.....	.....	.....	180,000
Republic, G., Wash.	.....	.....	.....	.....	.....	.....	.....	120	120,000
Rescue, G., N. M.	.....	12	.....	.....	.....	.....	.....	.....	12,000
Rialto, G., Colo.	32	18	.....	.....	.....	.....	.....	.....	50,250
Richmond Con., S., L., Nev.	34	.....	14	.....	.....	.....	.....	.....	4,386,780
Rico-Aspen, Colo.	.....	.....	50	300	.....	.....	.....	.....	350,000
Running Lode, G., Colo.	15	6	1	.....	.....	.....	.....	.....	27,000
Sacramento, G., S., L., Utah.	.....	.....	.....	.....	.....	5	15	40	57,000
Saint Joseph, L., Mo.	150	150	150	150	150	.....	144	113	2,784,500
Santa Rosalia, G., Cal.	.....	.....	.....	.....	.....	.....	20	.....	20,000
Sheridan, S., G., Colo.	75	.....	.....	.....	.....	.....	.....	.....	300,000
Sierra Buttes, G., Cal.	25	36	31	.....	.....	.....	.....	.....	1,584,933
Silver King, G., S., L., Utah (p).	.....	.....	.....	.....	263	375	450	450	1,800,000
Small Hopes, S., Colo.	.....	38	25	.....	.....	25	.....	25	3,300,000
Smuggler, S., L., Z., Colo.	.....	.....	.....	.....	.....	.....	.....	120	1,095,000
Smuggler Union, G., S., Colo. (m)	.....	.....	.....	.....	.....	150	.....	.....	150,000
South Eureka, G., Cal.	.....	.....	.....	.....	.....	.....	.....	12	12,000
South Swansea, S., L., Utah.	.....	.....	.....	.....	.....	.....	68	38	112,460
Standard Con., G., Cal. (n)	10	40	20	40	20	.....	40	27	5,674,940
Strong, G., Colo.	.....	.....	.....	.....	.....	.....	145	300	445,000
Swansea, G., S., L., Colo.	.....	.....	.....	2	.....	.....	.....	.....	39,000
Swansea, Utah.	.....	.....	.....	.....	1	20	50	65	136,500
Tamarack, C., Mich.	600	600	600	400	400	300	360	440	5,570,000
Temonj, G., Colo.	.....	.....	.....	.....	10	.....	.....	.....	10,000
Tomboy, G., Colo.	.....	.....	.....	.....	300	300	.....	50	660,000
Trinity River, G., Colo.	.....	.....	15	.....	.....	.....	.....	.....	15,000
Union, G., Colo.	.....	.....	.....	27	13	23	.....	.....	73,000
United Verde, C., S., Ariz.	.....	20	435	.....	.....	.....	.....	.....	562,500
Utah, Utah.	.....	15	5	.....	17	22	4	.....	177,000
Victor, G., Colo.	.....	.....	120	105	240	240	90	350	1,155,000
Victor, L. & M., Colo.	.....	.....	.....	.....	24	12	.....	.....	42,000
Vindicator, G., Colo.	.....	.....	.....	.....	.....	.....	.....	138	137,875
Wolverine, C., Mich. (q)	.....	.....	.....	.....	.....	.....	.....	60	60,000
W. Y. O. D., G., Cal. (r)	.....	.....	.....	24	24	.....	.....	.....	48,000
Yankee Girl, S., Colo. (o)	260	.....	.....	.....	.....	.....	.....	.....	520,000
Yellow Aster, G., Cal.	.....	.....	.....	.....	.....	.....	40	129	168,785
Yosemite, S., Utah.	.....	.....	.....	.....	.....	.....	5	.....	5,000

(*G*) Gold; (*S*) Silver; (*L*) Lead; (*I*) Iron; (*C*) Copper; (*Q*) Quicksilver; (*Z*) Zinc; (*M*) Mica.
(*a*) Formerly the Alaska Mining and Milling Company, reorganized in 1891 as the Alaska-Treadwell Gold Mining Company; the dividends credited for 1891 and 1892 are the payments of the latter company. The Alaska Mining and Milling Company paid $700,000 previously.
(*b*) Consolidation of Cœur d'Alene and Tiger formed in 1895. The Cœur d'Alene Silver Lead Mining Company paid $375,000 in dividends; and the Tiger about $250,000.
(*d*) Formerly the Young America South Mining Company, reorganized as the Coptis in 1891.
(*e*) Previous to consolidation the Deadwood paid $275,000 and the Terra $75,000.
(*g*) Mollie Gibson levied assessments to 1892 amounting to $20,000.
(*h*) Jay Hawk & Lone Pine Consolidated Mining Company, Limited

(*i*) Pennsylvania Cons. levied assessments to 1892 amounting to $50,051.
(*j*) Maid of Erin Silver Mines, Limited, formerly Henriette & Maid Consolidated Mining Company. The dividends for 1887, 1888, 1889, and 1890 were paid by the old company, and those for 1891 and 1892 by the new company.
(*k*) Enterprise Mining Company, of Rico, Colo.; there is also an Enterprise Mining Company in Aspen and one in Leadville.
(*l*) Including dividends paid on preferred stock and common stock.
(*m*) Previous to consolidation in 1896 the Smuggler Mining Company had paid $1,140,000 in dividends.
(*n*) Bodie, Bulwer, and Mono transferred to Standard Con., January, 1897. Previous to consolidation Bodie paid $1,677,572, Bulwer paid $100,000, and Mono $12,500, while Standard Con. levied assessments to 1890, amounting to $99,887.
(*o*) Yankee Girl Silver Mines, Limited, formerly Yankee Girl Mining Company. The above statement includes the payments by both the old and new companies.
(*p*) Silver King levied assessments to 1897 amounting to $3 000
(*q*) Wolverine levied assessments to 1895 amounting to $180,000.
(*r*) W. Y. O. D. levied assessments to January, 1890, amounting to $22,500.
(*s*) Lillie transferred to an English company in October, 1898; old company paid $134,110 in dividends to September 1, 1898.

ASSESSMENTS.

Name and Location of Company	1892.	1893.	1894.	1895.	1896.	1897.	1898.	Total Levied.
Abbie, Cal.							$3,500	$3,500
Ada Cons., Utah		$330		$3,000			313	3,333
Alamo, Utah						$625		937
Alhambra, Nev							100,000	100,000
Alliance, Utah				50,000				200,000
Allouez, Mich			$16,000				80,000	1,520,937
Alpha, Nev	$36,750	10,000	6,000	15,750	$15,750	15,750	8,400	316,050
Alta, Nev	27,000	25,200	50,400	20,160	32,400	25,200	16,200	3,664,910
American Quartz, Cal						1,000		1,000
Anchor, Utah		90,000						560,000
Andes, Nev	25,000		25,000	15,000	15,000	20,000	10,000	1,195,000
Arrastraville, Cal							10,000	10,000
Arnold, Mich							180,000	180,000
Baliol, Cal						25,000	30,000	55,000
Banner, Idaho						10,000		10,000
Beaver Creek, Mont						4,000		4,000
Belcher, Nev	78,000		50,200	50,200	50,200	57,200	20,800	3,514,800
Bellefontaine, Cal							10,000	10,000
Belle Isle, Nev	30,000	20,000			10,000			240,271
Best & Belcher, Nev	50,000	75,600	50,400	50,400	25,200	75,600	30,240	2,589,643
Bogan Silver, Utah						8,125		26,875
Boston & Cripple Creek, (g.), Col							20	20,000
Boulder, g. Cal							10,000	10,000
Brunswick Cons., Cal	20,000	20,000	10,000	20,000	15,000	200,000		160,000
Buchanan, Cal							25,000	25,000
Buckeye, Utah					3,750	5,000	6,250	15,000
Bullion, Nev	100,600	25,000	30,000	40,000	20,000	20,000	15,000	3,120,000
Burlington, Cal					3,000			3,000
Butte & Boston, Mont				1,500	1,500			3,000
Butte-Queen, Cal	4,000							16,000
Butte & Phila., Mont						1,000		1,000
Caledonia Silver, Nev			50,000		5,000			3,240,000
California, Cal	6,000			4,500		1,000		17,500
Cedar Creek, Cal							2,000	2,000
Centennial, Mich						120,000	300,000	460,000
Central Eureka, Cal						20,000	22,000	78,000
Central G. & S., Cal						2,250		7,500
Central North Star, Cal		10,000						10,000
Challenge Cons., Nev	45,200	15,000	50,000	5,000	7,500	5,000	10,000	427,500
Channel Bend Cal							2,000	2,000
Chollar, Nev	112,000	61,600	56,000	56,000	28,000	44,800	50,400	2,048,600
Church, (g.) Cal							3,000	3,000
Cinnabar King, Cal							1,000	1,000
Cleveland, (g.) Utah							2,500	2,500
Columbia, Utah							750	750
Commonwealth, Nev	30,000							190,000
Comstock, Utah					25,000			25,000
Confidence, Nev	49,920		6,240	14,976	7,488	14,976	13,728	540,126
Cons. St. Gothard, Cal							35,000	35,000
Cons. Cal. & Va., Nev. (*a*)	108,000	6,220	108,000	54,000	118,800	216,000	108,000	678,000
Cons. Imperial, Nev	26,500			5,000	500	10,000	10,000	2,246,000
Cons. New York, Nev	20,000	25,000	5,000	10,000	5,000	60,000	30,000	160,500
Crown Point, Nev	100,000	80,000	65,000	25,000	70,000		25,000	2,970,000
Dalton, Utah		3,750	5,000	5,000	5,000	2,500	7,500	53,750
Derbec Blue Gravel, Cal	10,000	5,000						15,000
Dexter, Nev. (*b*)							30,000	38,000
Eagle, Cal						5,000		5,000
Eagle, Ore						3,000	3,000	6,000
East Best & Belch, Nev	20,000		20,000					85,000
East Golden Gate, Utah						3,000		3,000
East Sierra, Nev			5,000					25,000
Emerald, (g.) Utah							3,000	3,000
Eureka Cons., Nev. (*c*)				12,500			10,000	585,000
Eureka Cons., Utah					5,000			5,000
Eureka Con. Drift, Cal						75,000	5,000	172,500
Excelsior, Cal							667	667
Exchequer, Nev	45,000	15,000	10,000	5,000	5,000	5,000		730,000
Fall River, Cal							5,000	5,000
Far West G. & S. S. Dak						750		42,125
Forlorn Hope, Cal							20,000	25,000
Four Aces, Utah						2,500	2,500	5,000
Galata, Cal							10,000	10,000
Galena, (g.) Utah							10,000	10,000
Geyser, (s.) l. Colo							50,000	1,075,000
Gold Belt, Utah		1,345				1,667		3,012
Gold Flat, Cal	11,000	20,000						13,000
Gold Ridge, Ore							4,000	4,000
Golden Fleece, Cal							260	56,260
Golden King, Cal							3,500	3,500
Good Title, Cal							20,000	20,000
Goodyear, Mont	2,000	4,183						17,183
Gould & Curry, Nev	76,400	80,200	32,400	48,600	48,600	59,400	37,800	4,614,350
Gray Eagle, Cal						10,000		10,000
Great Eastern, Utah							1,500	1,500
Great Western Quick'r, Cal. (*d*)							5,000	5,000
Grizzly, Cal							15,000	15,000
Hale & Norcross, Nev. (*e*)	168,000	56,000	56,000	39,200	61,600	39,200	11,200	5,688,280
Hartery Cons., Cal			2,000	2,000	2,000			33,000
Hidden Treasure, Cal		1,000						1,000
Hilda, Cal							2,000	2,000
Himalaya, Utah	1,800							10,000
Home, Cal							3,000	3,000
Homestake, Utah						4,000	4,000	4,000
Honorine, Utah								50,000
Horsefly, Cal							8,000	8,000
Horseshoe Bar Cons., Cal						24,000	6,000	85,800
Hudson Bay, Cal		10,000						10,000
Independence, Nev	5,000							345,000
Jack Rabbit, Cal	15,000	13,000	5,000					118,000
Jackson, Nev		10,000						247,500
Joe Bowers, Utah							4,000	4,000
Julia Cons., Nev		5,000		5,500	5,500	5,500		1,495,500
Jumbo, Utah							500	500
Junction, Cal							10,500	10,500
Jupiter Gravel, Cal						40,000	40,000	80,000

ASSESSMENTS.—*Continued.*

Name and Location of Company.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	Total. Levied.
Justice, Nev	42,000	30,000	75,000	20,000	15,750		10,500	3,646,750
Karan, Cal							2,500	2,500
Kate Hayes, Cal							10,000	10,000
Kentuck, Utah (g.)							30,000	30,000
Kentuck Cons., Nev	31,500	10,500	26,250	10,500	5,250	10,500	5,250	125,300
Lady Washington, Nev					5,400			157,800
Laird, Cal							10,000	10,000
Larkin, Cal							2,000	2,000
La Suerte, Cal							7,500	7,500
Leo, Mont					10,000			52,500
Leon, Cal							1,500	1,500
Little Pittsburg, Utah				4,000	6,000	4,000	4,000	18,000
Live Oak Con., Cal							20,000	20,000
Live Oak & Minett, Cal							1,500	1,500
Live Yankee, Cal							5,000	5,000
Lone Hill, Cal						1,125		1,125
Lone Star Cons., Cal	5,000							12,500
Lower Mammoth, Utah							15,000	15,000
Lucky Hill, Utah					7,200	6,600	1,800	56,400
Marguerite, Cal						20,000	15,000	70,000
Martin White, Nev	50,000	25,000	25,000					1,350,000
Maxfield, Utah							6,000	6,000
May Day, Cal							5,000	5,000
May Day, Utah							2,000	2,000
Mayflower Gravel, Cal. (*k*)							6,000	6,000
Merrimac, Cal							20,000	20,000
Meteor, Utah							3,734	3,734
Mexican, Nev	75,600	76,500	75,600	75,600	40,320	20,000	40,320	2,258,720
Mineral Hill, Cal						2,500		2,500
Modoc Chief, Idaho	4,375							4,375
Montecito, Cal							10,000	10,000
Montreal, Utah	750			375		375	375	5,625
Morgan, Cal							10,000	10,000
Mount Diablo, Nev. (*g*)					7,500			145,000
Mountaineer, Cal							15,000	15,000
Nancy Hanks, Cal							5,000	5,000
National Con., Cal							15,000	15,000
Nashville, (g.) Cal							2,000	2,000
Navajo, Nev	20,000	20,000						555,521
Nevada Queen, Nev	25,000	25,000		5,000				270,000
North Banner, Cal					10,000			21,794
North Belle Isle, Nev. (*h*)	20,000	38,075			10,000			523,075
North Bloomfield, Cal							25,000	25,000
North Commonwealth, Nev. (*i*)		10,000						120,000
North Eureka, Utah					1,500			1,500
North Gould & Curry, Nev	10,000	10,000	20,000		10,000		20,000	375,000
North Mercur, Utah							10,000	10,000
Northern Light, (g.) Utah							80,000	80,000
Northern Spy, Utah							10,000	10,000
Occidental Cons., Nev	50,000	55,000	30,000	30,000	65,000	30,000	20,000	499,179
Old Home, Cal							5,000	5,000
Omaha-Con., Cal							10,000	10,000
Opohonga, Utah							1,500	1,500
Ophir, Nev	50,000	100,000	100,000	100,000	25,200	25,200	43,200	4,602,568
Original Keystone, Nev	10,000							250,000
Orleans, Cal							15,000	15,000
Osceola Cons., Cal						1,000	1,000	10,924
Overman, Nev. (*j*)	126,720	60,000	34,560	23,040	34,560	17,280	17,280	4,329,630
Peer, Ariz	20,000	10,000	5,000					215,000
Peerless, Nev	5,000	5,000	5,000					410,000
Phœnix, Utah						1,000		1,000
Pine Hill, Cal		3,000	3,000	5,000	5,000	10,000		30,000
Potosi, Nev	56,000	84,000	112,000	56,000	28,000	50,400	50,400	2,157,200
Rainbow, So. Dak	1,250			438	425	100		5,213
Red Cap, Cal							90,000	90,000
Reddick, Cal							5,000	5,000
Rescue Gold, Nev						3,000	2,000	5,000
Reward, Cal						7,040	3,840	63,680
Richmond, Cal							10,000	19,000
Ridge Copper, Mich						50,000		50,000
Rockland, Cal							3,000	3,000
Ropes, Mich		20,000						20,000
Rose Creek, Cal							5,000	5,000
St. Mary's Copper, Mich		2,000		2,000				4,000
Salt Lake & Nevada, Utah							1,000	1,000
Savage, Nev	122,000	112,000	100,805	67,200	67,200	67,200	44,800	7,298,600
Scorpion, Nev	5,000		5,000			5,000		420,000
Seg. Belch. & Mides, Nev	25,000	35,000	20,000	20,000	10,000	10,000	8,000	398,000
Sevier, Utah						22,500		50,000
Sheep Rock, Utah						5,250		5,250
Sierra Nevada, Nev	55,000	45,000	50,000	50,000	50,000	100,000	20,000	6,706,910
Silver Bell, Mont							5,000	5,000
Silver Hill, Nev	16,200	5,400	5,400			5,000	5,400	2,220,200
Silver King, Ariz	25,000		100,000		75,000	50,000	50,000	440,000
Silver State, Utah						1,000		1,000
Siskiyou Cons., Cal	7,000	9,000	14,000	4,000	2,000		3,000	3,000
Snowflake, Utah							2,000	46,000
Soulsby Con., Utah						13,125		17,500
South Fork Con., Utah							5,000	5,000
Spanish Bar, Cal							2,000	2,000
Star, (g. s.) Utah							1,000	1,000
Sterling, Cal							15,000	15,000
Sunbeam Con., Utah						11,250	5,000	23,125
Telegraph, Cal	975							3,575
Tetro, Utah							18,000	18,000
Thorpe, Cal							5,000	5,000
Trinity, Cal							1,000	1,000
Troy, Alaska						2,000	6,250	10,500
Union Cons., Nev	50,000	45,000	35,000	20,000	40,000	20,000	30,000	2,630,000
Utah Cons., Nev		25,000	5,000	5,000	10,000	30,000	20,000	470,000
Vallejo, q. Cal							2,000	2,000
Victory, So. Dak					375			2,625
Wall Street, Mont	900							1,500
Waterloo, Cal		30,000						30,000
Weldon, Ariz	5,000	10,000						65,000
Wood River, Idaho	3,000							3,000
Yellow Jacket, Nev	156,000	90,000	90,000	90,000	90,000		24,000	5,788,000
Yuba River, Cal							2,500	2,500
Zuba, Cal							5,000	5,000

NOTE—All the Comstock companies reduced their capitalization between September and December, 1898.
(*a*) Previous to the consolidation in August, 1884, the California had paid $31,320,000 in dividends and the Consolidated Virginia $42,390,000. Since then, and to February, 1895, the consolidated company paid $3,894,000 in dividends.
(*b*) Dexter paid $100,000 in dividends to 1893.
(*c*) Eureka Con. paid $5,112,500 in dividends to 1892.
(*d*) Great Western paid $988,366 in dividends to 1893.
(*e*) Hale & Norcross paid $5,776,200 in dividends to 1898.
(*g*) Mt. Diablo paid $225,000 in dividends to 1893.
(*h*) North Belle Isle paid $230,000 in dividends to 1888.
(*i*) North Commonwealth paid $25,000 in dividends to 1891.
(*j*) Overman reincorporated in September, 1898.
(*k*) Mayflower paid $166,824 in dividends to December, 1895.

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